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Ideation-to-action framework variables involved in the development of suicidal ideation: A network analysis

Abstract

Background: In the field of suicide, three theories (*the interpersonal theory of suicide*—IPTS, *the integrated motivational–volitional*—IMV—*model*, and *the three-step theory*—3ST) have emerged within the ideation-to-action framework. These theories distinguish between two processes, the development of suicidal ideation and the progression from ideation to suicidal action. In relation to the development of suicidal ideation, each theory proposes different key elements (perceived burdensomeness and thwarted belongingness—IPTS; defeat and entrapment—IMV; and psychological pain and hopelessness—3ST). Through the implementation of network analysis, specifically Gaussian graphical models (GGMs), this study aims to explore the relationship between the variables of the three theories and their relationship (direct and indirect) with suicidal desire after partialing out all the other variables. ***Methods***: In this cross-sectional study, 644 young adults, selected according to age, sex, and educational level, completed an online survey. ***Results***: The network analysis indicated that all the variables, except thwarted belongingness, formed a network model with strong connections. Defeat is the most central variable, and it has the greatest influence in the network. Suicidal desire is only connected directly to perceived burdensomeness, psychological pain, and defeat. ***Conclusions***: The development of suicidal ideation could be understood as a complex set of concurrent and potentially interactive variables.

Keywords: suicidal ideation; network analysis; ideation-to-action framework; interpersonal theory of suicide; integrated motivational–volitional model; three-step theory

Ideation-to-action framework variables involved in the development of suicidal ideation: A network analysis

Each year, approximately 800,000 people die by suicide worldwide (WHO, 2017). Suicide is the second leading cause of death among adolescents and young adults aged 15–29 (WHO, 2017). According to the meta-analysis by Lim et al. (2019), the global lifetime and 12-month prevalence of suicidal ideation in children and adolescents are 18% and 14.2%, respectively. In addition, the lifetime and 12-month prevalence of attempted suicide in this group are 6% and 4.5%. Early suicidal behaviors often emerge in the second decade of life, and adolescents with suicidal ideation (vs. adolescents without suicidal ideation) are 12 times more likely to attempt suicide at the age of 30 (Cha et al., 2018). In the case of Spain, suicide rates in the adolescent and young adult population have remained relatively stable over time (Navarro-Gómez, 2017). In 2018, 18.78% of the total suicide deaths in Spain occurred in the 15–39 age group (INE, 2019). Likewise, 4% of Spanish adolescents have attempted suicide and 6.9% have shown a high level of suicidal ideation; this figure rises to 31% if we consider those who have expressed passive suicidal ideation (Fonseca-Pedrero et al., 2018). Moreover, suicidal ideation in this age group is associated with drug use, the presence of depressive symptoms, peer conflict, and lower emotional well-being and life satisfaction (Bousoño et al., 2017; Fonseca-Pedrero et al., 2018).

Traditionally, efforts to understand the phenomenon of suicide have focused on studying single risk factors (e.g., escape or psychological pain) or specific domains of suicidal risk (e.g., cognitive factors). This approach has provided simplified explanations of suicide, ignoring the complex interaction of the environmental, biological, social, and psychological factors that shape this type of behavior (Klonsky et al., 2018; O'Connor & Nock, 2014). This traditional approach, together with the methodological difficulties (low rate of suicidal behaviors and reduced samples in intervention studies; O'Connor & Portzky, 2018), has probably limited the ability to predict suicides, as demonstrated by 50 years of research without any improvement in predictions (Franklin et al., 2017).

Suicidal ideation can be defined as the thought or desire to be dead or to end one's life (Posner et al., 2007). Suicidal ideation precedes suicidal behaviors and is more common than suicide attempts and suicide deaths (Jobes & Joiner, 2019; Nock et al., 2008). Moreover, it is the third-strongest predictor of future death by suicide (Franklin et al., 2017). Therefore, it seems reasonable that intervening in suicidal ideation through the mutable variables involved in its development (e.g., feelings of hopelessness) could be an effective strategy for the prevention of suicide and other suicidal behaviors. However, despite the

relevance of suicidal ideation as a predictor of suicidal behavior and/or a suicidal risk factor, most people with suicidal ideation are never involved in suicidal behavior (Have et al., 2009; Nock et al., 2008; Stritzke & Page, 2020). Even in the absence of any suicidal behaviors, suicidal ideation is a source of distress and anguish for the person who suffers from it (Jobes & Joiner, 2019). Thus, focusing on the variables involved in suicidal ideation could also represent a useful strategy to alleviate the distress associated with suicidal ideation as a clinical goal per se (Kleiman, 2020).

The development of new theories of suicide formulated within the *ideation-to-action framework* (O'Connor & Portzky, 2018) has facilitated substantial progress in understanding and addressing suicidal thoughts and behaviors. This theoretical framework advocates the idea that suicidal ideation is necessary but not sufficient to threaten one's life. The variables involved in the development of suicidal ideation must differ from those that are essentially involved in the transition from ideation to suicidal behaviors (Klonsky et al., 2018). The theories that have emerged within this theoretical framework (i.e., *the interpersonal theory of suicide*—IPTS, Joiner, 2005; *the integrated motivational–volitional*—IMV—*model*, O'Connor, 2011; and *the three-step theory*—3ST, Klonsky & May, 2015) share a philosophy and key principles. They distinguish between the development of suicidal ideation and progression to suicidal behaviors but differ in the variables that are involved in each of the processes and the way in which they are articulated.

The IPTS (Joiner, 2005) was the first theory within the ideation-to-action framework. Regarding the development of suicidal ideation, the IPTS hypothesizes that suicidal ideation is influenced by two factors: thwarted belongingness (i.e., the experience of feeling disconnected from friends, family, or other valued social circles) and perceived burdensomeness (i.e., the feeling of being a burden to oneself or one's friends, family, and/or society). In the last 10 years of research on the IPTS, empirical evidence has suggested that perceived burdensomeness is more strongly related to suicidal ideation than thwarted belongingness (Chu et al., 2017; Ma et al., 2016). Although both factors influence the desire to die, the transition from passive (i.e., the desire not to be alive) to active (i.e., the desire to take one's own life) suicidal ideation occurs when perceived burdensomeness and thwarted belongingness occur simultaneously and they are perceived as stable and unchanging (i.e., hopelessness with respect to these states; Ma et al., 2016; Van Orden et al., 2010). In short, research has found empirical support for the main theoretical assumptions of the IPTS in clinical and community populations (for a systematic review and meta-analysis of the IPTS, see Chu et al., 2017; Ma et al., 2016).

Following the appearance of the IPTS, one of the most prominent theories about suicide, the IMV model (O'Connor, 2011), emerged; it conceptualizes the phenomenon of suicide in a three-phase model (i.e., pre-motivational, motivational, and volitional phases). The pre-motivational phase is composed of background factors (e.g., environmental factors, triggering events, or personality) that can affect all the other variables in the other phases of the model. The motivational phase describes the variables associated with the development of suicidal ideation. Finally, the volitional phase collects the variables involved in the transition from ideation to suicidal behaviors. Suicidal ideation arises, according to the IMV model, from two variables that occur sequentially: defeat (i.e., the perception of failed struggle and helplessness as a result of a loss or significant alteration of social status, identity, or goals) and entrapment (i.e., when the motivation to escape from the adverse circumstance is blocked and no escape or rescue is perceived).

According to the IMV model, entrapment is not an inevitable consequence of defeat, but rather the transition from defeat to entrapment and from entrapment to suicidal ideation is moderated by a set of variables (i.e., self-threatening and motivational moderators, respectively) that increase or decrease the probability of moving from one state to another within the motivational phase (i.e., defeat–entrapment and entrapment–suicidal ideation). Like the IPTS, studies have obtained empirical evidence for the main assumptions of the IMV model (e.g., Dhingra et al., 2016; Wetherall et al., 2018). The study by Dhingra et al. (2016) tested the structure of the IMV model (and its main suspects) through SEM, using a sample of college students (N = 1809) aged 18–66 years (M_{age} = 24.05; SD_{age} = 8.09). The model obtained a good fit and explained 61% of the variance of suicidal ideation and 27% of the variance of suicide attempts. Similarly, the study by Wetherall et al. (2016) showed that negative social comparison mediated the relationship between socially prescribed perfectionism (a pre-motivational variable) and defeat in a sample of adults (N = 422; M_{age} = 22.87; SD_{age} = 5.2). Furthermore, empirical evidence was found for the relationship between negative social comparison and suicidal ideation through defeat and entrapment, the mediating effect of entrapment between defeat and suicidal ideation (the main assumption of the model), and the effect of resilience as a moderating (buffering) variable in the relationship between entrapment and suicidal ideation.

Finally, the most recent ideation-to-action framework theory is the 3ST (Klonsky & May, 2015). This theory is structured in three steps. The first and second steps describe the development of suicidal ideation. According to the 3ST, pain is the key element involved in the development of suicidal ideation.

This theory does not specify the nature of pain, although it usually refers to psychache or psychological pain (i.e., intense introspective pain linked to negative emotions such as guilt, anguish, fear, panic, loneliness, and/or helplessness as a result of the frustration of a set of psychological needs; Shneidman, 1993) as the most frequent type of pain in the development of suicidal ideation (Klonsky et al., 2016). The 3ST postulates that pain alone is not capable of causing suicidal ideation (if people in pain are hopeful that they will get better, they will not consider ending their life). The same applies if there is hopelessness but no pain. Thus, in the first step of the 3ST, the combination of pain and hopelessness is the main precursor of suicidal ideation, which can be active or passive depending on the connection (i.e., feeling connected to other people, projects, and life interests), present in the second step of the 3ST. The connection is introduced as a protective factor for people experiencing pain and hopelessness. If people are suffering from passive suicidal ideation because of their pain and hopelessness but perceive their connection to family, friends, projects, or other interests to be satisfying, passive suicidal ideation will not progress to active suicidal ideation (Klonsky et al., 2016). Finally, like the IPTS and the IMV, both steps of the 3ST have been successfully replicated (e.g., Dhingra et al., 2019; Yang et al., 2018). The study by Dhingra et al. (2019) supported the core propositions of the 3ST related to the development of suicidal ideation (the first two steps of the model) in a sample of college students (N = 665; M_{age} = 24.2; SD_{age} = 8.11). The interaction between pain and hopelessness was significant and consistent across the different demographic subgroups and explained 56% of the variance in suicidal desire. Similarly, empirical evidence was found for the buffering effect of connectedness (when it exceeds pain) on suicidal desire, similar results to those found by Yang et al. (2018) in a sample of Chinese undergraduates (N = 1097; M_{age} = 19.77; SD_{age} = 1.67).

It is necessary to move beyond the traditional epidemiological studies to attend to the complex relationships of the variables involved in the development of suicidal ideation (De Beurs et al., 2017). Traditionally, the methodological approach has focused on multiple regression models. These methods have been useful when dealing with a relatively high number of inter-related variables for which researchers want to determine their conditional associations with a set of criterion variables (e.g., personality disorders). Nevertheless, nowadays, more up-to-date statistical approaches exist, such as Gaussian graphical models (GGMs; Costantini et al., 2015; Epskamp et al., 2018), that could 1) overcome some of the inherent drawbacks associated with the use of multiple regression in this context and 2) offer additional information regarding the connections between the variables (e.g., the relationships between

predictors, visualization of all the relationships in only one graph, internal structure studies, insights into predictive mediations, etc.).

The application of the GGM to the study of the relationships between psychological variables has enabled major advances to be made within the framework of the *psychological networks* applied to the study of different fields, such as psychological disorders (e.g., Fried et al., 2016), attitudes (e.g., Sayans- Jiménez et al., 2018), personality aspects (e.g., Costantini et al., 2015), and suicide (e.g., De Beurs et al., 2017, 2019). Specifically, this study aims to incorporate the advantages of the GGM to visualize and quantify the association between the key elements of the three theories of suicide associated with the occurrence of suicidal ideation (perceived burdensomeness and thwarted belongingness—IPTS; defeat and entrapment—IMV; and psychological pain and hopelessness—3ST) and their relationship (direct or indirect) with suicidal desire, after partialing out all the other variables. Within the exploratory focus of this study, we expect that this analysis will provide information about which theory has greater influence on the network and which variables could be more relevant and will contrast the associations found and their potential explanation with the literature.

Method

Participants

The sample consisted of 644 residents of Spain recruited from the general population (M_{age} = 25.91, SD_{age} = 5.14; range: 18–35 years old; 51.2% female) who participated in an online survey. The sampling method was to use age quotas (33% were 18–23; 33% were 24–29; and 33% were 29–35 years old), gender (50%), and education (30% were university students), in accordance with the composition of the Spanish young adult population. The rest of the sociodemographic and clinical characteristics can be seen in Table 1.

Instrument

An online questionnaire was administered consisting of sociodemographic variables and the following scales.

The Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012). This is a self-administered questionnaire composed of two scales, one for perceived burdensomeness, containing six items (e.g., “lately I think people close to me would be better off if I disappeared”), and another for

thwarted belongingness, with four items (e.g., "lately I feel close to other people"). The answer choices are given using a seven-point Likert-type scale from one (*not at all true for me*) to seven (*very true for me*). The higher the score on each scale, the higher the respondents' perception that their interpersonal needs are not satisfied. In this study, we used the Spanish version of the INQ (Ordóñez-Carrasco et al., 2018). The scores of this version have shown good internal consistency in a sample of fibromyalgia patients (α = .92 for perceived burdensomeness; α = .80 for thwarted belongingness).

The Defeat Scale (DS; Gilbert & Allan, 1998). This is a self-administered scale consists of 16 items (e.g., "I feel that I have lost my standing in the world"). The answer choices are given on a five-point Likert-type scale from zero (*never*) to four (*always*). The higher the score on the DS, the greater the perception of defeat. The score of the Spanish version of the DS (Ordóñez-Carrasco et al., 2021) has shown good internal consistency (α = .94) in young adults.

The Entrapment Scale (ES; Gilbert & Allan, 1998). This is a self-administered scale composed of 16 items (e.g., "I often have the feeling that I would just like to run away"), with answers provided on a five-point scale from zero (*not at all like me*) to 4 (*extremely like me*). The higher the score on the ES, the greater perception of being trapped. The Spanish version of the ES (Ordóñez-Carrasco et al., 2021) has been shown to have good internal consistency (α = .94) in young adults.

The Psychache Scale (PS; Holden et al., 2001). This is a self-administered scale containing 13 items (e.g., "my psychological pain seems worse than any other physical pain"). The answer choices are made using a five-point Likert-type scale. For items 1 to 9, the response options range from one (*never*) to five (*always*), and for items 10 to 13, the response options range from one (*strongly disagree*) to five (*strongly agree*). The higher the score, the more intense and frequent (the more unbearable) the perception of psychological pain. In a sample of young adults, the estimate of the reliability of the scores of the Spanish version of the PS was .96, obtained through Cronbach's alpha (Ordóñez-Carrasco et al., 2019).

The Beck Hopelessness Scale (BHS; Beck et al., 1974). This is composed of 20 dichotomous response items (0 = *false*, 1 = *true*). An example of an item on this scale is: "My future seems dark to me." The higher the score, the greater the sense of hopelessness. The scores of the Spanish version of the Beck Hopelessness Scale (Aguilar et al., 1995) showed a Cronbach's alpha of .82 in a sample of first-episode psychotic patients.

Suicidal Desire. Item 9 of the Spanish adaptation (Sanz & García-Vera, 2013) of the Beck Depression Inventory II (Beck et al., 1996) was used as an indicator. This item was dichotomized (0 = no suicidal desire; 1 = suicidal desire). This item has frequently been used in the literature and has an outstanding reputation based on its concurrent validity with the Beck Scale for Suicidal Ideation (Beck et al., 1997).

Procedure

The recruiters were psychology students and collaborators of our research team. The collaborators recruited participants from their contacts and social networks. They also briefly explained the conditions of the study and provided the participants with a link to the online questionnaire, respecting the pre-established quotas. An open-source web survey platform, LimeSurvey (http://www.limesurvey.org/), was used to conduct the online questionnaire. Neither the recruiters nor the participants received any economic incentive for their participation. All the participants were informed of the purpose of the research, the voluntary character of their participation, the mechanisms that would guarantee their anonymity, and the data protection law. All the participants gave their consent online. The study was approved by the Bioethics Committee in Human Research of the authors' university.

Results

All the analyses were performed using R version 3.5.3, in R-Studio 1.2.1335, with the following R-packages: *bootnet* version 1.2 (Epskamp et al., 2018), *mgm* version 1.2.5 (Haslbeck & Waldorp, 2016), and *psych* version 1.8.12 (Revelle, 2018).

The descriptive statistics and reliability estimations are presented in Table 2. In general, the means of all the variables are low, which is to be expected since it is not a clinical sample. Besides, the estimation of the reliability of the scores for each scale is good.

The partial correlation network was estimated using the R-package *mgm* and the Extended Bayesian Information Criterium (EBIC, Chen & Chen, 2008) to choose the tuning parameter. To prevent biasing edge estimates toward zero due to shrinkage, the edges were refitted without LASSO regularization (Epskamp & Fried, 2018). The comparisons of the zero-order correlations and the partial correlations (Table 3) are key information to determine which relationships between variables could take place through a third variable (e.g., suicidal desire with hopelessness, thwarted belongingness, or entrapment; psychological pain with hopelessness; thwarted belongingness with perceived

burdensomeness or entrapment). The moderate partial (exclusive) correlations between some pairs of the network could indicate a high degree of co-occurrence of these variables (see the relationships of psychological pain with entrapment—.42—or defeat with entrapment—.36).

Regarding the predictability of each variable, the percentage of explained variance (effect size) of each continuous variable in the network (Haslbeck & Fried, 2017) was computed. For the categorical variable, suicidal desire, we computed the normalized accuracy that indicates, from zero to one, the extent to which this variable can be predicted by the rest of the nodes in the network (Haslbeck & Waldorp, 2020). The predictability of each node in Table 2 (pies surrounding each node in Figure 1) allowed us to determine that thwarted belongingness is the most separated variable ($R^2 = .07$), almost disconnected from the network. The high percentages of explained variance of the rest of the continuous variables (53–81%) indicate that they conform to a highly interconnected dimensional space with a considerable capacity to predict the suicidal desire scores ($R^2 = .32$) of young adults. One way or another, these results indicate that all the variables but thwarted belongingness present a high degree of dependence that makes it inadvisable to treat them independently either when researching suicidal ideation or when treating or preventing it.

The strength centrality index (the sum of the absolute weight of all the edges of each node) was estimated for all the variables. The strength centrality index provides specific information regarding the impact of each node on the rest of the network. Defeat is the most central variable (its standardized strength index was 1.56), and it has the strongest influence in the network. Its variations are expected to be reciprocated by variations in the rest of the variables in the network. The next most central variables are psychological pain (0.52) and entrapment (0.51). The resulting network is displayed in Figure 1.

Despite the results highlighting the importance of all the employed variables but one to the prediction of suicidal desire (thwarted belongingness), suicidal desire is only connected (related) directly to perceived burdensomeness (.35), psychological pain (.25), and defeat (.16). Additionally, defeat is indirectly connected to suicidal desire through its influence on perceived burdensomeness (.23) and psychological pain (.31). On a second level, it can be appreciated that entrapment is indirectly connected to suicidal desire across the three previously mentioned variables (entrapment–defeat, .36; entrapment–perceived burdensomeness, .23; and entrapment–psychological pain, .42). Finally, in the group of highly connected variables, hopelessness is connected to suicidal desire via its influence on defeat (.35). Altogether, these results suggest that perceived burdensomeness, psychological pain, defeat, entrapment,

and hopelessness are imbricated and mutually dependent variables with a strong influence on the final expression of suicidal ideation.

Discussion

This study has explored the relationship between the factors that are essentially involved in the development of suicidal ideation of the three most prominent theories of suicide (i.e., the IPTS, the IMV model, and the 3ST) and their relationship (direct and indirect) with suicidal desire. The network analysis indicated that all the variables, except thwarted belongingness, formed a network model with strong connections, which suggests that the development of suicidal ideation could be understood as a set of variables that could act in a joint and potentially interactive manner. These results emphasize the need to evaluate these variables not only because of their impact on suicidal desire but also because of their strong interrelationship, a fact that has repercussions both for the investigation of suicidal ideation and for the treatment or prevention of suicidal ideation.

Concerning the IPTS variables, De Beurs et al. (2019) applied empirical networks to evaluate the relationship between the core elements of the IPTS and the IMV model and their relationship with suicidal ideation. In this study, perceived burdensomeness and entrapment were the variables with the strongest direct associations with suicidal ideation. Our results coincide in positioning perceived burdensomeness, along with psychological pain and defeat, as the variable with the largest direct relationship with suicidal desire. In line with our findings, the systematic review by Ma et al. (2016) found that the relationship between perceived burdensomeness and suicidal ideation was statistically significant in 82.6% of the studies reviewed with different samples (e.g., general population, clinical, students, etc.). Similarly, in a meta-analysis by Chu et al. (2017), examining IPTS research over the past ten years, perceived burdensomeness was the variable that was most strongly related to suicidal ideation compared with thwarted belongingness. In our study, thwarted belongingness appears disconnected from suicidal ideation and most network variables. This finding is consistent with other studies evaluating the relationship between thwarted belongingness and suicidal ideation. Of the total number of studies reviewed by Ma et al. (2016), 60% of them found no statistically significant association between the two variables. In the cases in which thwarted belongingness was statistically significant, it seemed to contribute slightly to the percentage of explained variance in suicidal ideation (6%). Similarly, the effect size of thwarted belongingness was moderate compared with the effect size of perceived burdensomeness (a large median effect size).

Regarding the IMV variables, defeat is the most central variable in the network, followed by psychological pain and entrapment. Thus, it is expected that, besides its impact on suicidal ideation, variations in the perception of defeat will co-occur with variations in the rest of the variables related to suicidal ideation (Fried et al., 2017). This finding is consistent with the main assumptions of the IMV model, which hypothesizes that the key factors involved in the development of suicidal ideation are defeat and entrapment (O'Connor & Kirtley, 2018). However, according to the IMV model, defeat precedes entrapment and entrapment is the most proximate variable to suicidal ideation. In our study, as in the study by Tucker et al. (2016), entrapment did not have a direct relationship with suicidal desire (although defeat did), which could be explained by the simultaneous measurement of the two variables. As explained by O'Connor and Kirtley (2018), the temporal context seems indispensable for evaluating the transition from defeat to entrapment, so defeat is expected to precede entrapment temporarily, and entrapment is the variable closest to suicidal ideation. Due to the cross-sectional design of this study, this sequence may not have been captured.

Similarly, the potential interdependence of the two variables (Forkmann et al., 2018; Taylor et al., 2009) and the absence of some motivational moderators could have distorted our results. In our case, entrapment had an indirect relationship with suicidal desire through the perceived burdensomeness and psychological pain. In the literature, the relationship between entrapment and perceived burdensomeness is positive, moderately strong, and statistically significant (e.g., Cramer et al., 2019). Similarly, according to the IMV model, the relationship between entrapment and suicidal ideation is contingent on a set of motivational moderators, which include perceived burdensomeness. Forkmann and Teismann (2017) found no empirical evidence for the moderating role of perceived burdensomeness. However, this assumption of the IMV model was supported in two subsequent studies with favorable results (Li et al., 2020; Ordóñez-Carrasco et al., 2020a). Bloch-Elkouby et al. (2020), examining the concomitance of factors involved in the suicide crisis syndrome (i.e., an intense affective state, indicative of an acute risk of imminent suicide) through empirical networks, found a strong connection between entrapment and psychological pain. The authors suggested that psychological pain can capture the characteristic emotional intensity of the deep and urgent feeling of escaping or avoiding a life situation that is perceived as unbearable, or impossible to overcome. Therefore, it is necessary to evaluate whether psychological pain is also a motivational moderator in the IMV.

A strong association was also found between defeat according to the theoretical assumption of the IMV model (O'Connor & Kirtley, 2018) as well as the empirical tests of the model's assumptions (e.g., Dhingra et al., 2016). Furthermore, in our network, defeat was directly related to suicidal desire, in line with other findings, such as those of Siddaway et al. (2015). In addition, as well as entrapment, defeat was related to perceived burdensomeness and psychological pain. Dhingra et al. (2016) had already found a strong correlation between defeat and perceived burdensomeness. Similarly, in the study by De Beurs et al. (2019), defeat was directly associated with suicidal ideation with a weak intensity similar to that of our network, and, as in our results, defeat was closely associated with entrapment and perceived burdensomeness.

As far as the 3ST variables are concerned, hopelessness showed a strong association with defeat, but it was not connected to other variables, as observed with the rest of the nodes in the network (with the exception of thwarted belongingness). The relationship between the two variables is similar to that found by Tarsafi et al. (2015). One possible explanation is that, according to Li et al. (2020), the loss of motivation subscale of the Beck Hopelessness Scale (Beck et al., 1974) shows a strong association with the Scale of Defeat since, consistent with *the diathesis–stress model* and *the cry of pain theory of suicide* (Schotte & Clum, 1987; Williams, 1997), they have the same foundations (i.e., failed social struggle or social comparison) as well as similar content in some items.

Psychological pain showed a strong and direct relationship with suicidal desire in line with the systematic review by Verrocchio et al. (2016), highlighting the important relationship of psychological pain with suicidal risk and, more specifically, with suicidal ideation. Similarly, in a longitudinal design, changes in psychological pain have been significantly associated with changes in suicidal ideation after controlling for depression and hopelessness (Troister et al., 2013).

Suicidal ideation is the result of a complex convergence of factors of different natures influenced by time, so it seems unwise to think that some of the theories available to date can fully explain the repertoire of suicidal ideation and behavior (Gunn & Lester, 2015). However, as in the study by De Beurs et al. (2019), we found that at least one variable from each theory is directly associated with suicidal desire (i.e., perceived burdensomeness, defeat, and psychological pain) and, although all of the variables included in the network are psychological, the predictability of suicidal desire was remarkable. The analysis and understanding of the suicide spectrum, including suicidal ideation, must consider the dynamic interaction between the biological, the sociological, and the psychological factors involved as

well as the particular biographies and circumstances of the individual who manifests it (Fonseca-Pedrero & Pérez-de Albéniz, 2020). However, as stated by O'Connor and Nock (2014), suicide seems to be the cause of death that is most directly influenced by psychological factors. Without losing sight of the fact that the psychological context, with its entity, is subordinate to the biological and the sociocultural context, it seems reasonable that psychological theories of suicide are the ideal theoretical context for understanding the suicide phenomenon, from the identification of the modifiable variables to be treated to the mechanisms by which the factors involved are concatenated.

Without obviating the exploratory purpose of the study, we believe that the integrated motivational–volitional model of suicidal behavior (IMV; O'Connor, 2011) may be a good theoretical background to advance the research, consistent with our findings and the network analysis approach. The reasons for this assertion are several: 1) a considerable number of studies have provided empirical evidence for the IMV model (e.g., Branley-Bell et al., 2019; Dhingra et al., 2016; Li et al., 2020; Lucht et al., 2020); 2) the model is intended to combine previous empirical evidence and proposes a (moderating) role for variables from other theories (e.g., perceived burdensomeness and thwarted belongingness); in addition, although there are variables in this study that are not assigned a role in the IMV model, for example psychological pain, there is already empirical evidence to support the role of psychological pain as a motivational moderator in the context of the IMV model (Ordóñez-Carrasco et al., 2020b); 3) its most relevant variables (i.e., defeat and entrapment) have been shown to be central to our network, so they are considered to be particularly relevant to network activation, propagation, and maintenance; and 4) the IMV model could be considered a "meta-framework" in that it draws on four theoretical perspectives (i.e., the diathesis–stress model, Schotte & Clum, 1982, 1987; the theory of planned behavior, Ajzen, 1991; the cry of pain, Williams, 1997; and the differential activation hypothesis, Teasdale & Dent, 1987; Williams et al., 2005).

Conceptualizing suicidal ideation as a network not only provides a new way of understanding suicidal ideation and analyzing the relationship between the variables involved in its development but also has implications for approaching it clinically. This study proposes that focusing on the variables involved in the development of suicidal ideation could have a positive impact on its prevention and intervention. Furthermore, we estimate that better identification, treatment, and prevention of suicidal ideation through these variables could motivate a reduction in attempts and suicides (e.g., Zuromski et al., 2019) since, as the ideation-to-action framework shows, suicidal ideation is the first (and probably

necessary, Jobes & Joiner, 2019) step toward suicidal behavior (Klonsky et al., 2018). According to Borsboom (2017), there are three ways to intervene (or foci of intervention) in a network, one of suicidal ideation in our case: a) intervening in specific nodes, emphasizing the most central nodes in the network (e.g., defeat); b) intervening in causes external to the network (e.g., external events or predisposing factors) that trigger the activation of nodes (e.g., incarceration, physical illness, self-esteem, or family conflicts in the case of perceived burdensomeness; Van Orden et al., 2010); and c) intervening in the network itself through psychological therapy (e.g., cognitive–behavioral) that provides the individual with coping or management skills to limit the association between nodes (symptom–symptom).

This study is not without limitations. The network analysis carried out was cross-sectional and did not allow research on the dynamic interactions and directionality between the variables. However, the purpose of this work was to explore the concomitance between the variables as a starting point for new research to analyze these relationships. In addition, probably because the sample was from the general population, the variables included in the network analysis showed relatively narrow dispersion. Due to the dimensional operationalization of the variables, future studies should combine clinical and community samples as well as multigroup approaches to provide additional evidence regarding the weaker connections between the variables. Likewise, it is necessary to highlight as a limitation the absence of variables that, either because of the moderating role that they play in the analyzed variables (e.g., the ruminative process) or because of their direct relationship with suicidal desire (e.g., past suicidal ideation), could increase the percentage of explained variance. Nevertheless, in the present study, the percentage of explained variance of suicidal desire is not negligible, and therefore it seems that the variables included in the network are essential to explain the development of suicidal ideation in young adults. Finally, it is necessary to expand the knowledge about the conceptual or measurement overlap of all the variables included in this study (especially defeat–entrapment and defeat–hopelessness) through classical techniques such as factor analysis or through a network analysis that includes the items of all the measures as nodes to determine how they are clustered.

Declarations

Ethic approval

This study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee in Human Research of the University of Almería (Ref: UALBIO2018/018)

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Data

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

References

Aguilar, E., Hidalgo, M., Cano, R., López, J., Campillo, M., & Hernández, J. (1995). Estudio prospectivo de la desesperanza en pacientes psicóticos de inicio: características psicométricas de la escala de desesperanza de Beck en este grupo [Prospective study of hopelessness in early psychotic patients: psychometric characteristics of Beck Hopelessness Scale in this group]. *Anales de Psiquiatría, 11*(4), 121-125.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Beck, A. T., Brown, G. K., & Steer, R. A. (1997). Psychometric characteristics of the Scale for Suicide Ideation with psychiatric outpatients. *Behaviour research and therapy, 35*(11), 1039-1046. https://doi.org/10.1016/S0005-7967(97)00073-9

Beck, A. T., Steer, R., & Brown, G. (1996). *Manual for the Beck Depression Inventory-II*. Psychological Corporation.

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), 861–865. https://doi.org/10.1037/h0037562

Bloch-Elkouby, S., Gorman, B., Schuck, A., Barzilay, S., Calati, R., Cohen, L. J., Begum, F., & Galynker, I. (2020). The suicide crisis syndrome: A network analysis. *Journal of counseling psychology, 67*(5), 595–607. https://doi.org/10.1037/cou0000423

Borsboom D. (2017). A network theory of mental disorders. *World psychiatry, 16*(1), 5–13. https://doi.org/10.1002/wps.20375

Bousoño, M. S., Al-Halabí, S., Burón, P., Garrido, M., Díaz-Mesa, E. M., Galván, G., García-Álvarez, L., Carli, V., Hoven, C., Sarchiapone, M., Wasserman, D., Bousoño, M., García-Portilla, M. P., Iglesias, C., Sáiz, P. A., & Bobes, J. (2017). Substance use or abuse, internet use, psychopathology and suicidal ideation in adolescents. *Adicciones, 29*(2), 97–104. https://doi.org/10.20882/adicciones.811

Branley-Bell, D., O'Connor, D. B., Green, J. A., Ferguson, E., O'Carroll, R. E., & O'Connor, R. C. (2019). Distinguishing suicide ideation from suicide attempts: Further test of the Integrated Motivational-Volitional Model of Suicidal Behaviour. *Journal of Psychiatric Research, 117*, 100–107. https://doi.org/10.1016/j.jpsychires.2019.07.007

Cha, B. C., Franz, P. J., Guzman, E. M., Glenn, C. R., Kleiman, E. M., & Nock, M. K. (2018). Annual research review: Suicide among youth –Epidemiology, (potential) etiology, and treatment. *The Journal of Child Psychology and Phychiatry, 59*(4), 460-482. https://doi.org/10.1111/jcpp.12831

Chen, J., & Chen, Z. (2008). Extended Bayesian information criteria for model selection with large model spaces. *Biometrika*, *95*(3), 759–771. https://doi.org/10.1093/biomet/asn034

Chu, C., Buchman-Schmitt, J. M., Stanley, I. H., Hom, M. A., Tucker, R. P., Hagan, C. R., Rogers, M. L., Podlogar, M. C., Chiurliza, B., Ringer, F. B., Michaels, M. S., Patros, C. H. G., & Joiner, T. E., Jr. (2017). The interpersonal theory of suicide: A systematic review and meta-analysis of a decade of cross-national research. *Psychological Bulletin, 143*(12), 1313–1345. https://doi.org/10.1037/bul0000123Costantini, G., Epskamp, S., Borsboom, D., Perugini, M., Mõttus, R., Waldorp, L. J., & Cramer, A. O. J. (2015). State of the aRt personality research: A tutorial on network analysis of personality data in R. *Journal of Research in Personality*, *54*, 13–29. https://doi.org/10.1016/j.jrp.2014.07.003

Cramer, R. J., Rasmussen, S., & Tucker, R. P. (2019). An examination of the Entrapment Scale: Factor structure, correlates, and implications for suicide prevention. *Psychiatry Research, 282*, 112550. https://doi.org/10.1016/j.psychres.2019.112550

De Beurs, D., Fried, E. I., Wetherall, K., Cleare, S., O' Connor, D. B., Ferguson, E., O'Carroll, R. E., & O' Connor, R. C. (2019). Exploring the psychology of suicidal ideation: A theory driven network analysis. *Behaviour research and therapy, 120*, 103419. https://doi.org/10.1016/j.brat.2019.103419

De Beurs, D. P., van Borkulo, C. D., & O'Connor, R. C. (2017). Association between suicidal symptoms and repeat suicidal behaviour within a sample of hospital-treated suicide attempters. *BJPsych Open*, *3*(3), 120–126. https://doi.org/10.1192/bjpo.bp.116.004275

Dhingra, K., Boduszek, D., & O'Connor, R. C. (2016). A structural test of the Integrated Motivational-Volitional model of suicidal behaviour. *Psychiatry Research, 239*, 169–178. https://doi.org/10.1016/j.psychres.2016.03.023

Dhingra, K., Klonsky, E. D., & Tapola, V. (2019). An Empirical Test of the Three-Step Theory of Suicide in U.K. University Students. *Suicide and Life-Threatening Behavior, 49*(2), 478–487. https://doi.org/10.1111/sltb.12437

Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating Psychological Networks and their Accuracy: A Tutorial Paper. *Behavior Research Methods, 50,* 195-212. http://doi.org/10.3758/s13428-017-0862-1

Epskamp, S., Cramer, A., Waldorp, L., Schmittmann, V. D., & Borsboom, D. (2012). qgraph: Network visualizations of relationships in psychometric data. *Journal of Statistical Software, 48*(4), 1–18. https://doi.org/10.18637/jss.v048.i04

Epskamp, S., & Fried, E. I. (2018). A tutorial on regularized partial correlation networks. *Psychological Methods, 23*(4), 617–634. https://doi.org/10.1037/met0000167

Epskamp, S., Waldorp, L. J., Mõttus, R., & Borsboom, D. (2018). The Gaussian Graphical Model in Cross-Sectional and Time-Series Data. *Multivariate Behavioral Research, 53*(4), 453–480. https://doi.org/10.1080/00273171.2018.1454823

Fonseca-Pedrero, E., Inchausti, F., Pérez-Gutiérrez, L., Aritio Solana, R., Ortuño-Sierra, J., Sánchez-García, M., Lucas-Molina, B., Domínguez, C., Foncea, D., Espinosa, V., Gorría, A., Urbiola-Merina, E., Fernández, M., Merina Díaz, C., Gutiérrez, C., Aures, M., Campos, M. S., Domínguez-Garrido, E., & Pérez de Albéniz Iturriaga, A. (2018). Suicidal ideation in a community-derived sample of Spanish adolescents. *Revista de Psiquiatría y Salud Mental, 11*(2), 76–85. https://doi.org/10.1016/j.rpsm.2017.07.004

Fonseca-Pedrero, E., & Pérez-de-Albéniz, A. (2020). Evaluación de la conducta suicida en adolescentes: a propósito de la escala Paykel de suicidio [Evaluation of suicidal behavior in adolescents: The Paykel Suicide Scale]. *Papeles del Psicólogo, 41*(2), 106-115. https://doi.org/10.23923/pap.psicol2020.2928

Forkmann, T., & Teismann, T. (2017). Entrapment, perceived burdensomeness and thwarted belongingness as predictors of suicide ideation. *Psychiatry Research, 257*, 84–86. https://doi.org/10.1016/j.psychres.2017.07.031

Forkmann, T., Teismann, T., Stenzel, J. S., Glaesmer, H., & de Beurs, D. (2018). Defeat and entrapment: more than meets the eye? Applying network analysis to estimate dimensions of highly correlated constructs. *BMC Medical Research Methodology, 18,* 16. https://doi.org/10.1186/s12874-018-0470-5

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), 187–232. https://doi.org/10.1037/bul0000084

Fried, E.I., Epskamp, S., Nesse, R.M., Tuerlinckx, F., & Borsboom, D. (2016). What are 'good' depression symptoms? Comparing the centrality of DSM and non-DSM symptoms of depression in a network analysis. *Journal of Affective Disorders, 189*, 314–320. https://doi.org/10.1016/j.jad.2015.09.005

Fried, E. I., van Borkulo, C. D., Cramer, A. O. J., Boschloo, L., Schoevers, R. A., & Borsboom, D. (2017). Mental disorders as networks of problems: a review of recent insights. *Social Psychiatry and Psychiatric Epidemiology, 52*(1), 1–10. https://doi.org/10.1007/s00127-016-1319-z

Fruchterman, T., & Reingold, E. (1991). Graph drawing by force-directed placement. *Software: Practice and Experience, 21*(11),1129–1164. https://doi.org/10.1002/spe.4380211102

Gilbert, P., & Allan, S. (1998). The role of defeat and entrapment (arrested flight) in depression: an exploration of an evolutionary view. *Psychological Medicine, 28*(3), 585–598. https://doi.org/10.1017/s0033291798006710.

Gunn, J. F., & Lester, D. (2015). *Theories of suicide: Past, present and future*. Charles C Thomas Publisher.

Haslbeck, J. M. B., & Fried, E. I. (2017). How predictable are symptoms in psychopathological networks? A reanalysis of 18 published datasets. *Psychological Medicine, 47*(16), 2767–2776. https://doi.org/10.1017/s0033291717001258

Haslbeck, J. M. B., & Waldorp, L. J. (2016). mgm: Structure Estimation for Time-Varying Mixed Graphical Models in high-dimensional Data. *Journal of Statistical Software.* http://arxiv.org/abs/1510.06871v2.

Haslbeck, J., & Waldorp, L. (2020). mgm: Estimating Time-Varying Mixed Graphical Models in High-Dimensional Data. *Journal of Statistical Software*, *93*(8), 1 - 46. http://dx.doi.org/10.18637/jss.v093.i08

Have, M. ten, de Graaf, R., van Dorsselaer, S., Verdurmen, J., van't Land, H., Vollebergh, W., & Beekman, A. (2009). Incidence and Course of Suicidal Ideation and Suicide Attempts in the General Population. *The Canadian Journal of Psychiatry*, *54*(12), 824–833. https://doi.org/10.1177/070674370905401205

Holden, R. R., Mehta, K., Cunningham, E. J., & McLeod, L. D. (2001). Development and preliminary validation of a scale of psychache. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement*, *33*(4), 224–232. https://doi.org/10.1037/h0087144

Instituto Nacional de Estadística [INE]. (2019). *Estadísticas de defunción por causa de muerte 2018 [Death statistics by cause of death 2018]*. https://www.ine.es/dynt3/inebase/es/index.htm?padre=6181&capsel=6182

Joiner, T. E. (2005). *Why people die by suicide*. Harvard University Press.

Kleiman E. M. (2020). Suicidal thinking as a valuable clinical endpoint. *EClinicalMedicine*, *23*, 100399. https://doi.org/10.1016/j.eclinm.2020.100399

Klonsky, E. D., & May, A. M. (2015). The Three-Step Theory (3ST): A New Theory of Suicide Rooted in the "Ideation-to-Action" Framework. *International Journal of Cognitive Therapy*, *8*(2), 114–129. https://doi.org/10.1521/ijct.2015.8.2.114

Klonsky, E. D., May, A. M., & Saffer, B. Y. (2016). Suicide, Suicide Attempts, and Suicidal Ideation. *Annual Review of Clinical Psychology*, *12*(1), 307–330. https://doi.org/10.1146/annurev-clinpsy-021815-093204

Klonsky, E. D., Saffer, B. Y., & Bryan, C. J. (2018). Ideation-to-action theories of suicide: a conceptual and empirical update. *Current Opinion in Psychology*, *22*, 38–43. https://doi.org/10.1016/j.copsyc.2017.07.020

Li, X., Ren, Y., Zhang, X., Zhou, J., Su, B., Liu, S., Cai, H., Liu, J., & You, J. (2020). Testing the Integrated Motivational-Volitional Model of Suicidal Behavior in Chinese Adolescents. *Archives of suicide research*. https://doi.org/10.1080/13811118.2019.1690607

Lim, K. S., Wong, C. H., McIntyre, R. S., Wang, J., Zhang, Z., Tran, B. X., Tan, W., Ho, C. S., & Ho, R. C. (2019). Global Lifetime and 12-Month Prevalence of Suicidal Behavior, Deliberate Self-Harm and Non-Suicidal Self-Injury in Children and Adolescents between 1989 and 2018: A Meta-Analysis. *International journal of environmental research and public health, 16*(22), 4581. https://doi.org/10.3390/ijerph16224581

Lucht, L., Höller, I., Forkmann, T., Teismann, T., Schönfelder, A., Rath, D., Paashaus, L., Stengler, K., Juckel, G., & Glaesmer, H. (2020). Validation of the motivational phase of the integrated motivational-volitional model of suicidal behavior in a German high-risk sample. *Journal of affective disorders, 274*, 871–879. https://doi.org/10.1016/j.jad.2020.05.079

Ma, J., Batterham, P. J., Calear, A. L., & Han, J. (2016). A systematic review of the predictions of the Interpersonal-Psychological Theory of Suicidal Behaviour. *Clinical Psychology Review, 46,* 34-45. https://doi.org/10.1016/j.cpr.2016.04.008

Navarro-Gómez, N. (2017). El suicidio en jóvenes en España: cifras y posibles causas. Análisis de los últimos datos disponibles [Suicide among young people in Spain: Facts and posible causes. An analysis of latest data available]. *Clínica y Salud, 28*(1), 25-31. https://doi.org/10.1016/j.clysa.2016.11.002

Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., Bruffaerts, R., Chiu, W. T., de Girolamo, G., Gluzman, S., de Graaf, R., Gureje, O., Haro, J. M., Huang, Y., Karam, E., Kessler, R. C., Lepine, J. P., Levinson, D., Medina-Mora, M. E., Ono, Y., … Williams, D. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British journal of psychiatry, 192*(2), 98–105. https://doi.org/10.1192/bjp.bp.107.040113

O'Connor, R. C. (2011). The Integrated Motivational-Volitional Model of Suicidal Behavior. *Crisis, 32*, 295–298. https://doi.org/10.1027/0227-5910/a000120

O'Connor, R. C., & Kirtley, O. J. (2018). The integrated motivational–volitional model of suicidal behaviour. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *373*(1754), 20170268. https://doi.org/10.1098/rstb.2017.0268

O'Connor, R. C., & Nock, M. K. (2014). The psychology of suicidal behaviour. *The Lancet Psychiatry*, *1*(1), 73–85. https://doi.org/10.1016/s2215-0366(14)70222-6

O'Connor, R. C., & Portzky, G. (2018). Looking to the Future: A Synthesis of New Developments and Challenges in Suicide Research and Prevention. *Frontiers in Psychology*, *9*, 2139. https://doi.org/10.3389/fpsyg.2018.02139

Ordóñez-Carrasco, J. L., Cuadrado, I., & Rojas-Tejada, A. J. (2019). Escala de dolor psicológico: adaptación de la Psychache Scale al español en jóvenes adultos [Psychological pain scale: adaptation of the Psychache Scale to Spanish context in young adults]. *Revista de Psiquiatría y Salud Mental*. https://doi.org/10.1016/j.rpsm.2019.04.003

Ordóñez-Carrasco, J. L., Cuadrado, I., & Rojas-Tejada, A. J. (2020a). Frustrated Interpersonal Needs as a Motivational Moderator in the Integrated Motivational-Volitional model. *Death Studies.* https://doi.org/10.1080/07481187.2020.1783031

Ordóñez-Carrasco, J. L., Cuadrado-Guirado, I., & Rojas-Tejada, A. J. (2020b). Entrapment and Psychological Pain as Proximal Variables of Suicidal Ideation: Study of Moderation. *Revista Argentina de Clínica Psicológica*, *29*(5), 192-199. https://doi.org/10.24205/03276716.2020.1020

Ordóñez-Carrasco, J. L., Cuadrado, I., & Rojas-Tejada, A. J. (2021). Adaptación al español de las escalas de derrota y atrapamiento en jóvenes adultos: propiedades psicométricas [Adaptation to spanish of the scales of defeat and entrapment in young adults: psychometric properties]. *Terapia Psicológica*, *39*(1), 17-37.

Ordóñez-Carrasco, J., Salgueiro, M., Sayans-Jiménez, P., Blanc-Molina, A., García-Leiva, J., Calandre, E., & Rojas, A. (2018). Psychometric properties of the Spanish version of the 12-item Interpersonal Needs Questionnaire in fibromyalgia syndrome patients. *Anales de Psicología*, *34*(2), 274–282. https://doi.org/10.6018/analesps.34.2.293101.

Posner, K., Oquendo, M. A., Gould, M., Stanley, B., & Davies, M. (2007). Columbia Classification Algorithm of Suicide Assessment (C-CASA): Classification of Suicidal Events in the FDA's

Pediatric Suicidal Risk Analysis of Antidepressants. *American Journal of Psychiatry, 164*(7), 1035–1043. https://doi.org/10.1176/ajp.2007.164.7.1035

Revelle, W. (2018) psych: Procedures for Personality and Psychological Research, Northwestern University, Evanston, Illinois, USA, https://CRAN.R-project.org/package=psych Version = 1.8.12.

Sanz, J., & García-Vera, M. P. (2013). Rendimiento diagnóstico y estructura factorial del Inventario de depresión de Beck-II (BDI-II) [Diagnostic performance and factorial structure of the Beck Depression Inventory–Second Edition (BDI-II)]. *Anales de Psicología, 29*, 66-75. https://doi.org/10.6018/analesps.29.1.130532

Sayans- Jiménez, P., Harreveld, F., Dalege, J., & Rojas Tejada, A. J. (2018). Investigating stereotype structure with empirical network models. *European Journal of Social Psychology*, *49*(3), 604–621. https://doi.org/10.1002/ejsp.2505

Schotte, D. E., & Clum, G. A. (1982). Suicide ideation in a college population: a test of a model. *Journal of consulting and clinical psychology, 50*(5), 690–696. https://doi.org/10.1037//0022-006x.50.5.690Schotte, D. E., & Clum, G. A. (1987). Problem-solving skills in suicidal psychiatric patients. *Journal of Consulting and Clinical Psychology, 55*(1), 49–54. https://doi.org/10.1037/0022-006x.55.1.49

Shneidman E. S. (1993). *Suicide as psychache: A clinical approach to self-destructive behavior*. Jason Aronson.

Siddaway, A. P., Taylor, P. J., Wood, A. M., & Schulz, J. (2015). A meta-analysis of perceptions of defeat and entrapment in depression, anxiety problems, posttraumatic stress disorder, and suicidality. *Journal of Affective Disorders, 184*, 149–159. https://doi.org/10.1016/j.jad.2015.05.046

Stritzke, W. G. K., & Page, A. C. (2020). Suicide is about life. In C. Page y W. Stritzke (eds.), *Alternatives to Suicide: Beyond Risk and Toward and Life Worth Living* (pp. 3-14). Elsevier inc.

Tarsafi, M., Kalantarkousheh, S. M., & Lester, D. (2015). The defeat-entrapment theory versus Beck's hopelessness theory of depression and suicidality: A cross-national analysis in Iran and the

United States. *International Journal of Social Psychiatry, 61*(8), 777–780. https://doi.org/10.1177/0020764015583921

Taylor, P. J., Wood, A. M., Gooding, P., Johnson, J., & Tarrier, N. (2009). Are defeat and entrapment best defined as a single construct? *Personality and Individual Differences, 47*, 795–797. https://doi.org/10.1016/j.paid.2009.06.011

Teasdale, J. D., & Dent, J. (1987). Cognitive vulnerability to depression: An investigation of two hypotheses. *British Journal of Clinical Psychology, 26*(2), 113–126. https://doi.org/10.1111/j.2044-8260.1987.tb00737.x

Troister, T., Davis, M. P., Lowndes, A., & Holden, R. R. (2013). A Five-Month Longitudinal Study of Psychache and Suicide Ideation: Replication in General and High-Risk University Students. *Suicide and Life-Threatening Behavior, 43*(6), 611–620. https://doi.org/10.1111/sltb.12043

Tucker, R. P., O'Connor, R. C., & Wingate, L. R. (2016). An Investigation of the Relationship Between Rumination Styles, Hope, and Suicide Ideation Through the Lens of the Integrated Motivational-Volitional Model of Suicidal Behavior. *Archives of Suicide Research, 20*(4), 553–566. https://doi.org/10.1080/13811118.2016.1158682

Van Orden, K., Cukrowicz, K., Witte, T., & Joiner, T. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychological Assessment, 24*(1), 197–215. https://doi.org/10.1037/a0025358

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E. (2010). The interpersonal theory of suicide. *Psychological Review, 117*(2), 575–600. https://doi.org/10.1037/a0018697

Verrocchio, M. C., Carrozzino, D., Marchetti, D., Andreasson, K., Fulcheri, M., & Bech, P. (2016). Mental Pain and Suicide: A Systematic Review of the Literature. *Frontiers in Psychiatry, 7*, 108. https://doi.org/10.3389/fpsyt.2016.00108

Wetherall, K., Robb, K. A., & O'Connor, R. C. (2018). An Examination of Social Comparison and Suicide Ideation Through the Lens of the Integrated Motivational-Volitional Model of Suicidal Behavior. *Suicide and Life-Threatening Behavior, 49*(1), 167–182. https://doi.org/10.1111/sltb.12434

Williams, J.M.G. (1997). *Cry of Pain: Understanding suicide and self harm*. Penguin.Williams, J. M. G., Barnhofer, T., Crane, C., & Beck, A. T. (2005). Problem Solving Deteriorates Following Mood Challenge in Formerly Depressed Patients With a History of Suicidal Ideation. *Journal of Abnormal Psychology, 114*(3), 421–431. https://doi.org/10.1037/0021-843x.114.3.421

World Health Organization [WHO]. (2019). *Suicide*. https://www.who.int/en/news-room/fact-sheets/detail/suicide

Yang, L., Liu, X., Chen, W., & Li, L. (2018). A Test of the Three-Step Theory of Suicide among Chinese People: A Study Based on the Ideation-to-Action Framework. *Archives of Suicide Research, 23*(4), 648–661. https://doi.org/10.1080/13811118.2018.1497563

Zuromski, K. L., Bernecker, S. L., Gutierrez, P. M., Joiner, T. E., King, A. J., Liu, H., Naifeh, J. A., Nock, M. K., Sampson, N. A., Zaslavsky, A. M., Stein, M. B., Ursano, R. J., & Kessler, R. C. (2019). Assessment of a Risk Index for Suicide Attempts Among US Army Soldiers With Suicide Ideation: Analysis of Data From the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA network open, 2*(3), e190766. https://doi.org/10.1001/jamanetworkopen.2019.0766

Figure Captions

Fig. 1 Estimated network

Note. The final representation of the network is displayed using a modified version of the Fruchterman–Reingold algorithm (Fruchterman & Reingold, 1991) for weighted networks (Epskamp et al., 2012), which allows connected nodes to be plotted next to one another. Continuous edges represent positive correlations while dashed edges represent negative ones. The percentage of shared variance is shown by the grey pie surrounding each node, whereas the normalized accuracy (suicidal desire) is symbolized with a black pie.

Table 1

Socio-demographic and clinical characteristics of participants

		***N* (%)**
Sex	Woman	330 (51.8%)
	Man	305 (47.9%)
	Other	2 (0.3%)
Completed education level	No studies	21 (3.3%)
	Primary education	19 (3.0%)
	Secondary education	374 (58.7%)
	Higher education	223 (35.0%)
Marital status	Single	366 (57.5%)
	Married/Domestic partner/Stable partner	249 (39.2%)
	Divorced	20 (3.1%)
	Widowed	1 (0.2%)
Work activity	Employee	301 (47.2%)
	Student	274 (43.1%)
	Unemployed	46 (7.2%)
	Homemaker	15 (2.4%)
Religion	Catholic	258 (41.0%)
	Atheist	174 (27.6%)
	Indifferent	102 (16.2%)
	Agnostic	74 (11.7%)
	Muslim	11 (1.7%)
	Protestant	11 (1.7%)
Mental and behavioural disorders (ICD-10 code)	Anxiety Disorder (F41.9)	10 (1.5%)
	Major Depressive Disorder (F32.9)	5 (0.8%)
	Mixed Anxiety-Depressive Disorder (F41.2)	3 (0.5%)
	Borderline Personality Disorder (F60.3)	3 (0.5%)
	Attention-Deficit/Hyperactivity Disorder (F90.0)	2 (0.3%)
	Obsessive-Compulsive and Related Disorder (F42.9)	2 (0.3%)
	Feeding and Eating Disorder (F50.9)	1 (0.2%)
	Substance-Related and Addictive Disorder (F19.9)	1 (0.2%)

Table 2

Variable descriptive statistics, reliability estimations, explained variance, and strength centrality

Variables	**n**	**mean**	**sd**	**min**	**max**	**sk**	**k**	**α**	**R^2**	**Str**
Suicidal Desire	644	0.22	0.42	0.00	1.00	1.32	-0.25	-	.32[1]	-0.37
Perceived Burdensomeness	644	10.93	7.39	6.00	41.00	1.83	2.72	.95	.65	0.07
Thwarted Belongingness	644	12.60	5.84	4.00	28.00	0.60	-0.24	.83	.07	-1.52
Defeat	644	17.44	12.52	0.00	63.00	1.20	1.28	.94	.81	1.56
Entrapment	644	11.83	13.67	0.00	64.00	1.52	1.86	.96	.81	0.51
Psychache	644	23.89	12.02	13.00	61.00	1.19	0.59	.96	.74	0.52
Hopelessness	644	4.43	3.95	0.00	20.00	1.51	2.00	.85	.53	-0.78

Note.sk: skeweness; k: kurtosis; Str: strength centrality index

[1] normalized accuracy

Table 3

Zero order correlations (above the diagonal) and partial correlations (below the diagonal)

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Suicidal Desire	-	.62	.45	.61	.16	.64	.60
2. Psychache	.25	-	.58	.70	.12	.81	.83
3. Hopelessness	0	0	-	.60	.21	.72	.66
4. Perceived Burdensomeness	.35	.05	.09	-	.18	.76	.76
5. Thwarted Belongingness	0	-.11	.05	0	-	.23	.20
6. Defeat	.16	.31	.35	.23	.14	-	.86
7. Entrapment	0	.42	.12	.23	0	.36	-

Figure 1