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Defense mechanisms and symptoms of depression, anxiety, and stress in bereaved individuals: A network analysis

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ABSTRACT

This study explored the network relationships between defense mechanisms and symptoms of depression, anxiety, and stress in a sample of 327 Italian bereaved adults (M = 46.92, SD = 14.66). The 30-item Defense Mechanism Rating Scales Self-Report (DMRS-SR-30) and the Depression Anxiety Stress Scale-21 (DASS-21) were administered. The network revealed a dense structure comprising 39 significant edges. High adaptive defenses emerged as the most central and influential node, showing strong negative associations with depression and anxiety symptoms. Minor image-distorting defenses were negatively associated with depression but positively related to anxiety. Stability analyses indicated acceptable overall reliability. However, some edges showed lower stability and should be interpreted with caution. These findings underscore the pivotal role of high adaptive defenses in emotional regulation following bereavement and suggest differential contributions of defense levels to psychological symptoms. Future research is needed to further investigate these associations.

Introduction

Over the course of time, researchers and clinicians have long sought to understand grief reactions and their relationship with other symptoms. Sigmund Freud first introduced the idea of "grief work" in his 1917 seminal work "Mourning and Melancholia" (Freud, 1917). He also distinguished between these two states, highlighting that mourning represents a normal reaction to the loss, whereas melancholia is characterized by a pathological condition potentially leading to suicide. Grief work, in his view, entails the gradual detachment of libido from the lost loved one, allowing for reattachment to a new object. Despite the widespread endorsement of this perspective, empirical evidence remains surprisingly limited (Bonanno, 2008). The inclusion of Prolonged Grief Disorder (PGD) in both the DSM-5 text revision (APA, 2022) and the ICD-11 (WHO, 2019) reflects the ongoing debate around grief and its potentially psychopathological expressions. Research has shown that prolonged grief is distinct from depression, anxiety, and post-traumatic stress symptoms (PTS) (Boelen & Lenferink, 2020; Prigerson et al., 2021; Yan et al., 2021), although these symptoms frequently co-occur in bereaved individuals (Rueger et al., 2024; Sardella et al., 2023). A recent meta-analysis found that grief symptoms co-occur with severe depression in 63% of cases, anxiety in 54%, and post-traumatic stress in 49% (Komischke-Konnerup et al., 2021). Despite their high prevalence, depression, anxiety, and post-traumatic stress symptoms remain conceptually and diagnostically distinct from prolonged grief symptoms, highlighting the need for further research.

Nevertheless, focusing solely on the prevalence and comorbidity of symptoms, without addressing the underlying psychological factors, is insufficient to identify bereaved individuals at risk of mental disorders (Lenzo et al., 2022). Since Freud introduced the concept of defense mechanisms in another seminal work "The Neuro-Psychoses of Defence (Freud, 1894)," they have remained a cornerstone of psychoanalytic theory. Recent definitions describe them as primarily automatic psychological processes that respond to internal or external stressors and emotional conflicts (Di Giuseppe & Perry, 2021). They are considered crucial by clinicians and researchers across different theoretical models, as they contribute to explaining how individuals cope with stress and adversity

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(Lingiardi & McWilliams, 2017). Among the numerous classifications proposed over time, Vaillant's hierarchical model (1977, 1992), later operationalized by Perry (1990), has become one of the most influential. It organizes defense mechanisms according to their level of maturity and adaptiveness (Di Giuseppe & Perry, 2021), grouping them into conceptually and empirically coherent levels (APA, 1994). At the highest level, high-adaptive defenses (e.g., sublimation) allow individuals to clearly perceive stressors, integrate thoughts and affects, and seek support when necessary. Obsessional defenses (e.g., isolation of affects) maintain cognitive awareness through distancing from related emotions. Neurotic defenses (e.g., repression) keep out the cognitive elements of distressing experiences. Minor image-distorting defenses (e.g., idealization and devaluation) protect self-esteem through image distortions of stressors but hinder adaptation. Disavowal defenses (e.g., projection) involve the refusal to acknowledge aspects of reality, attributing distress to external sources. Major image-distorting defenses (e.g., splitting) produce rigid and polarized representations of self and others, disrupting relational functioning. Finally, at the lowest level of the hierarchy, action defenses (e.g., acting out) involve perceiving the source of stress as external and intolerable, leading to impulsive actions toward the environment or oneself.

Compared to fields such as psychotherapy research (Perry & Bond, 2017), where the role of defense mechanisms is well documented, their role in grief remains underexplored in both clinical and bereavement contexts. There is, indeed, substantial evidence linking defense mechanisms to psychopathology and the progression of chronic medical conditions. In one of the earliest empirical studies, Vaillant (1977) found that the use of immature defense mechanisms, such as denial, dissociation, and projection, was associated with psychiatric disorders. Subsequent systematic reviews confirmed the association between more adaptive defenses and better mental health (Bond, 2004; Cramer, 2015; Fiorentino et al., 2024). Further studies have shown that high-adaptive defenses are related to better physical and emotional functioning in individuals with cancer (Di Giuseppe et al., 2018, 2019). Few available studies have investigated defense mechanisms in the context of bereavement, even though the loss of a loved one is widely recognized as one of the most stressful life events (Stroebe et al., 2007). In a study involving a sample of 72 bereaved elderly individuals, Gana and K'Delant (2011) found that an immature defense style (e.g., acting out, denial, projection, splitting, withdrawal, and other maladaptive defense mechanisms) was significantly associated with the severity of grief symptoms, as assessed with the Inventory of Complicated Grief-Revised (ICG-R). Another study, conducted with a sample of 226 individuals who had lost a family member to cancer, also used the ICG-R to assess symptom severity and found that a neurotic defense style–including defenses such as reaction formation or undoing–was significantly related to the severity of grief symptoms, while a mature defense style showed the opposite effect (Boogar & Talepasand, 2015).

This study employed a network analysis approach to explore the complex connections between defense mechanisms and symptoms of depression, anxiety, and stress in a sample of bereaved individuals. Specifically, our objectives were to: (1) examine the network structure and the interrelationships among the variables; (2) identify the most central variables within the network, focusing on node strength and expected influence as primary indices, and including closeness and betweenness for exploratory purposes; and (3) assess the stability and accuracy of the network structure.

Methods

Participants and procedure

The present study was part of a broader research project investigating psychological factors underlying grief reactions among individuals who have experienced a loss. A total of 407 participants took part in this cross-sectional study and 406 agreed to participate. Two cases with missing or incomplete data on defense mechanisms were excluded. Furthermore, we examined the "time since loss" variable to identify potential extreme values, given its strong influence on grief reactions. Using Tukey's (1977) method based on the interquartile range (IQR), we identified 77 cases with values more than 1.5 times the IQR from the median, indicating significant deviations from the normal distribution. These cases were excluded from the analyses to ensure sample homogeneity and to enhance the interpretability of current grief-related symptoms. Therefore, the final sample of this study consisted of 327 participants recruited from the general population.

Participants were enrolled between May and June 2023 through university communication systems, social networks, online blogs, and other analogous sources (e.g., WeChat groups). An anonymous online survey was created on the Google Cloud platform. All participants gave electronically informed consent. The inclusion criteria required participants to be at least 18 years old and to have experienced the loss of a loved one prior to participating in the survey. Participants were excluded if they did not meet the age criteria or if they showed extreme values on time since loss, as previously described. The research was carried out in accordance with the 1964 Helsinki Declaration and its subsequent amendments. The privacy of the participants was ensured in accordance with the European Union General Data Protection Regulation 2016/679 (General Data Protection Regulation, 2016). The study has been approved by the Ethical Review Board of Psychology Research of the University of Catania (Prot. n° Ierb-Edunict-2023.06.08/02).

Measures

Demographic information included age, gender, and educational background. Bereavement-related information comprised time since the loss, kinship relationship to the deceased, cause of death, and condition of being the main caregiver.

The following instruments were administered:

Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report instrument used for measuring depression, anxiety, and stress. It consists of 21 items on a 4-point Likert response format ranging from "never" (0) to "always" (3). Items are grouped into three subscales as follows: depression (DASS-21 Depression), which assesses dysphoria, self-deprecation, anhedonia, devaluation of life, and hopelessness; anxiety (DASS-21 Anxiety), which includes autonomic arousal, skeletal muscle effects, and subjective experience; stress (DASS-21 Stress), which evaluates irritability, impatience, difficulty relaxing, and nervous arousal. Scores for each subscale can be calculated by summing the scores of the relevant items. Additionally, cutoff scores can be determined by multiplying the final score of each subscale by 2. In the current study, the Italian version of the DASS-21, which demonstrates excellent psychometric properties, was used (Bottesi et al., 2015). In this sample, excellent internal consistency was achieved, with a Cronbach's alpha of 0.94 for the DASS-21 total score, 0.84 for the Depression subscale, 0.89 for the Anxiety subscale, and 0.85 for the Stress subscale.

The 30-item Defense Mechanism Rating Scales Self-Report (DMRS-SR-30; Di Giuseppe et al., 2020). The DMRS-SR-30 is the self-report version of the Defense Mechanism Rating Scales (DMRS; Perry, 1990) and assesses a hierarchy of 28 defense mechanisms. Each item is rated on a 5-point Likert response format ranging from "not all" (0) to "very often/much" (4). The DMRS-SR-30 provides scores for individual defenses, an Overall Defensive Functioning (ODF) score, summary scores for 7 defense levels, and 5 defensive categories. For the aim of this study, we used the 7 defensive levels, reflecting the hierarchical organization of defenses described by Vaillant (1971, 1992) and operationalized by Perry (1990). These levels, ranked from less to more adaptive, are: action defenses (Level 1), major image-distorting defenses (Level 2), disavowal defenses and autistic fantasy (Level 3), minor image-distorting defenses (Level 4), neurotic defenses (Level 5), obsessional defenses (Level 6), and high adaptive defenses (Level 7). The Italian version of the DMRS-SR-30 demonstrated adequate psychometric properties (Di Giuseppe et al., 2020), including excellent internal consistency for the ODF and acceptable to good internal consistency for the seven defense levels (Prout et al., 2022). In the current sample, McDonald's Omega coefficients indicated acceptable to good internal consistency: 0.95 for the Overall Defensive Functioning (ODF), 0.75 for high adaptive defenses (Level 7), 0.89 for obsessional defenses (Level 6), 0.84 for neurotic defenses (Level 5), 0.73 for minor image-distorting defenses (Level 4), 0.72 for disavowal defenses and autistic fantasy (Level 3), 0.77 for major image-distorting defenses (Level 2), and 0.60 for action defenses (Level 1).

Statistical analysis

Data were analyzed using R version 4.3.3 (R Core Team, 2024) and the R package qgraph (Epskamp et al., 2012). The network analysis included the following 11 variables: the seven defensive levels from the DMRS-SR-30—action defenses (Level 1), major image-distorting defenses (Level 2), disavowal defenses and autistic fantasy (Level 3), minor image-distorting defenses (Level 4), neurotic defenses (Level 5), obsessional defenses (Level 6), and high adaptive defenses (Level 7)—as well as the three symptom dimensions from the DASS-21: depression, anxiety, and stress. Each variable was represented as a node, while each association between variables was represented as an edge. The "EBICglasso" method was used for estimating the model. This method estimated the network through a graphical Least-Absolute-Shrinkage-and-Selection-Operator (LASSO). The hyperparameter λ was selected using the Extended Bayesian Information criterium (EBIC) with the setting of 0.5 (Foygel & Drton, 2010; Friedman et al., 2008). All variables included in the network analysis were standardized (z-scores) prior to model estimation to ensure comparability across scales and to meet the assumptions of the graphical LASSO method. The network was plotted using Fruchterman and Reingold's algorithm (Fruchterman and Reingold 1991). To investigate how influential nodes are in the network, four centrality indices were computed: node strength, closeness, betweenness, and expected influence (Epskamp et al., 2012). Given that our network includes both positive and negative edges, expected influence was included alongside strength for comparability and interpretability. Closeness and betweenness were retained for exploratory purposes, in line with prior research, but their interpretation was made with caution, given their lower stability and more complex assumptions in psychological networks (Bringmann et al., 2019). Node strength measures the total strength of a given node, reflecting how connected it is within the network. Higher strength values indicate that a particular node, such as a specific defense mechanism or psychological symptom (e.g., depression, anxiety, or stress), is more strongly connected to other nodes in the network, reflecting its centrality in the overall structure. Closeness centrality is defined as the inverse of the sum of the shortest distances from a node to all other nodes in the network. Nodes with higher closeness values are, on average, more proximal to all other nodes in terms of path length. Betweenness centrality quantifies the number of times a node lies on the shortest path between pairs of other nodes. Higher values indicate that a node, such as symptoms or defense mechanisms, plays a key role in facilitating indirect connections between other elements in the network. Expected influence centrality estimates the total influence a node has on the network, considering not only its direct connections but also the influence it exerts indirectly through its neighbors. This measure helps determine whether a specific defense level or symptom indirectly influences others. The Zhang and Horvath clustering coefficient was also computed (Costantini & Perugini, 2014; Zhang & Horvath, 2005). It measures the tendency of nodes in a network to cluster together, forming tightly connected groups. A high clustering coefficient for a specific node, such as a defensive mechanism level, indicates that it tends to form tightly connected groups with related defense mechanisms or symptoms, which may suggest common underlying processes or patterns. Lastly, the accuracy of estimated edge weights and stability of the centrality indices were estimated using two distinct procedures (Epskamp et al., 2018). A nonparametric bootstrap with 1,000 samples was used to estimate the accuracy of edge weights, while a case-dropping bootstrap with 1,000 samples was used to evaluate the stability of the centrality indices. Stability bootstrapping for the edge weights with 1,000 samples was also conducted to estimate confidence intervals for each estimated edge (Burger et al., 2023; Epskamp et al., 2018). Edges whose bootstrap confidence intervals did not include zero were considered stable and reliable, while edges with intervals including zero were interpreted with caution.

Results

Characteristics of the sample

Table 1 shows the characteristics of the sample. Participants ranged in age from 18 to 82 ($M = 46.92$, $SD = 14.66$). The sample was well balanced by gender (52% female, $n = 170$). Participants had the option to indicate "prefer not to say" for gender, but no one opted for this response. The largest proportion of the bereaved were sons or daughters of the deceased (36.7%, $n = 120$) and had a university degree (49.8%, $n = 163$). The time since the loss was on average 6.90 years ($SD = 7.71$ years) and 78.6% ($n = 257$) had lost their loved one from chronic disease (i.e., cancer, dementia, neurodegenerative disorder).

Network structure

The network structure of the bereaved individuals is visualized in Figure 1(a). The mean edge weight was 0.35 and the network density was 0.87. Edge weights in the network ranged from −0.84, representing the association between the disavowal defenses and

Table 1. Characteristics of the sample.

Characteristics	*n* (%)	*M*	*SD*
Age (in years)		46.92	14.66
Gender			
Male	157 (48)		
Female	170 (52)		
Education			
Middle school diploma	28 (8.6)		
High school diploma	128 (39.1)		
Graduate	163 (49.8)		
Other	8 (2.4)		
Relation with the deceased loved one			
Son or daughter	120 (36.7)		
Grandson or granddaughter	68 (20.8)		
Spouse	37 (11.3)		
Sibling	29 (8.9)		
Son	2 (0.6)		
Other (for example, brother-in-law)	71 (21.7)		
Time since the loss (years)		6.90	7.71
Cause of death			
Illness	257 (78.6)		
Old age	38 (11.6)		
Accidents	29 (8.9)		
Suicide	2 (0.6)		
Other	1 (0.3)		

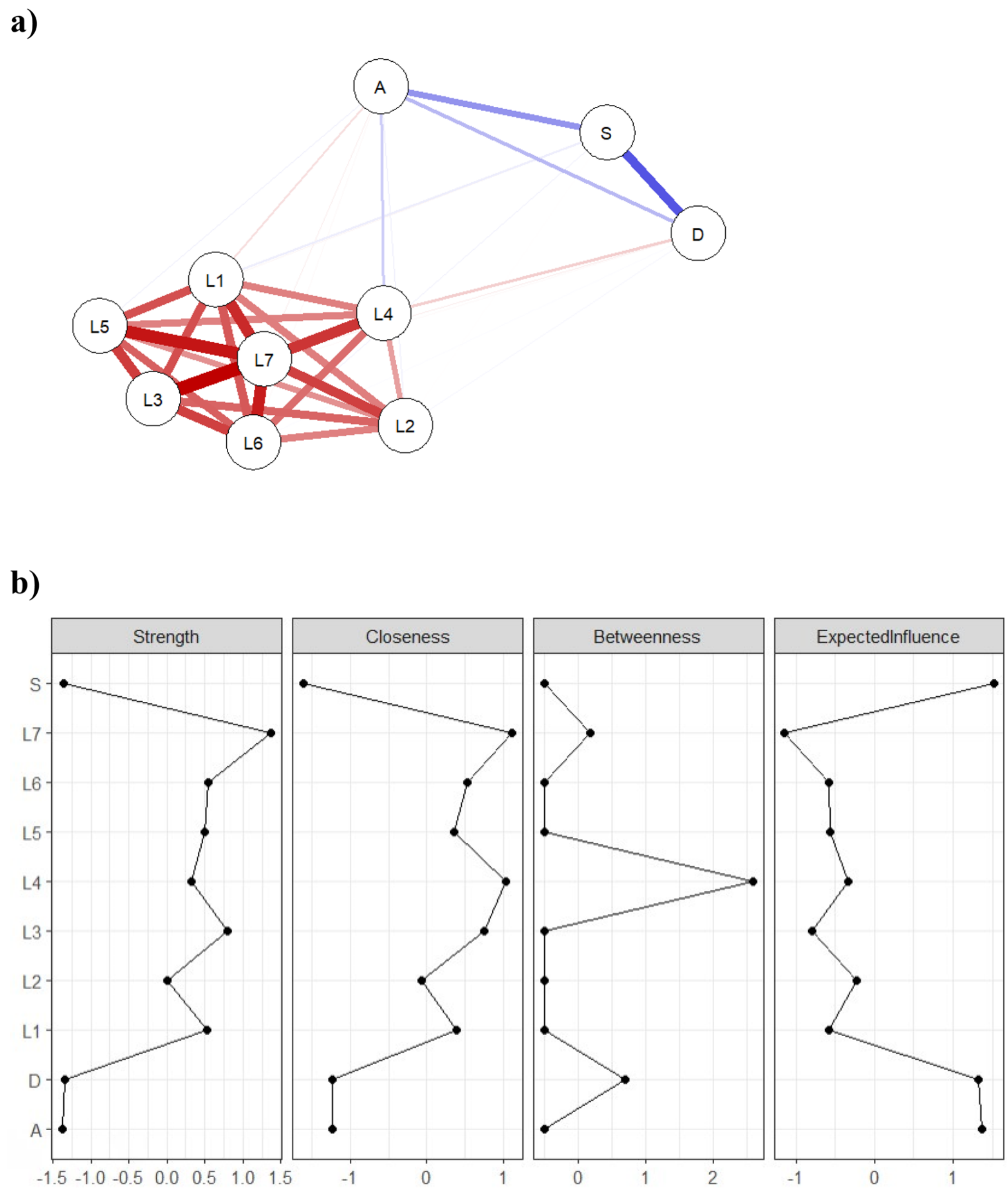

Figure 1. a) Network of psychopathological symptoms, defense levels mechanisms, and time since the loss. Each node indicates a variable and each edge represents a significant association between two nodes. Edge thickness represents the magnitude of the association, in which thicker lines denote stronger associations. Blue lines indicate positive association while red lines denote negative association. b) Centrality indices of the variables within the network. Centrality indices of node betweenness, closeness, strength, and expected influence are shown as standardized *z*-scores. Abbreviations: L1: action defenses; L2: major image-distorting defenses; L3: disavowal defenses and autistic fantasy; L4: minor image-distorting defenses; L5: neurotic defenses; L6: obsessional defenses; L7: high adaptive defenses; D: depression; A: anxiety; S: stress.

autistic fantasy level (Level 3) and the high adaptive defenses (Level 7) as measured by the DMRS-SR-30, to 0.56, representing the association between depression and stress as measured by the DASS-21. The network showed many connections with a number of 39 non-zero edges on a total of 45. The values of all the edge weights are shown in Supplementary Table S1. Nodes from defense mechanisms levels measured by the DMRS-SR-30 were highly, even though inversely, interconnected within the domain. In particular, the high adaptive defenses level (Level 7) showed the highest values ranging from −0.84 for the disavowal defenses and autistic fantasy level (Level 3) to −0.63 for the major image distorting one (Level 2). Within the symptoms domain as measured by the DASS-21, depression and stress were strongly associated with a value of 0.56, followed by the relationship between anxiety and stress ($r = 0.35$), and the connection between depression and anxiety ($r = 0.23$). Concerning the relationship of defense mechanisms with symptoms, results indicated that the strongest edges were between the minor image-distorting defense level (Level 4) and both depression ($r = -0.16$) and anxiety ($r = 0.16$).

Centrality and predictability

As shown in Figure 1(b), centrality analyses indicated that the high adaptive defenses level (Level 7) represented the most central node according to strength and closeness, followed by the minor image distorting level and the disavowal defense level, respectively. Also, the betweenness centrality of the minor image distorting level (Level 4) was the highest in the network. For expected influence, stress showed the highest value followed by anxiety and depression. With respect to the Zhang and Horvath clustering coefficient, the neurotic defense level (Level 5) showed the highest value.

Network stability and accuracy

Figure 2 shows the plot of the average correlation between the edge weights for the estimated network and the case-dropping subset bootstrap procedure based on 1,000 iterations. Results indicated an adequate average correlation coefficient (more than 0.7) even after dropping up to 30% of the sample. Figure 3 shows the plot of the average correlation between the centrality measures for the estimated network and the bootstrapped network with 1,000 iterations. The Correlation Stability (CS) coefficients were 0.284 for betweenness, 0.673 for closeness, 0.673 for strength, and 0.749 for expected influence. Figure 4 shows the bootstrapped confidence intervals of the edge weights. Several edges showed narrow confidence intervals that did not include zero, indicating stable and robust associations between specific variables in the network (e.g., between L7 High adaptive defenses and stress, or between depression and anxiety). However, other edges exhibited wider intervals including zero, suggesting that these connections should be interpreted with caution due to their lower stability (e.g., between L4 Minor image-distorting defenses and stress).

Discussion

This study is the first to apply network analysis to explore the complex relationships between defense mechanisms and symptoms of depression, anxiety, and stress in bereavement. Although the relationship between mature or high adaptive defenses and mental health has already been demonstrated (see for example, Bond, 2004; Cramer, 2015; Fiorentino et al., 2024), there is a surprising paucity of studies investigating the role of defense in grief (Boogar & Talepasand, 2015; Gana & K'Delant, 2011). To address this gap, we relied on a well-consolidated hierarchical model

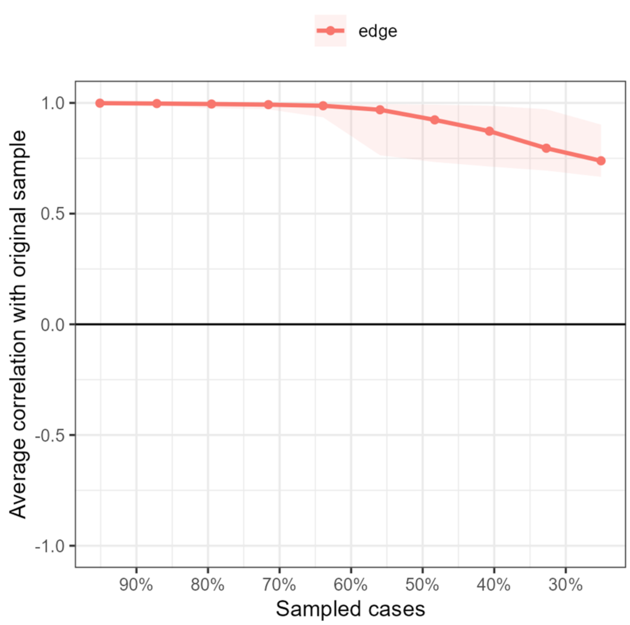

Figure 2. The plot shows the correlation between the edge weights for estimated network and the bootstrapped network. The red line indicates the mean correlation and the area around the line indicates the 2.5th till the 97.5th quantile.

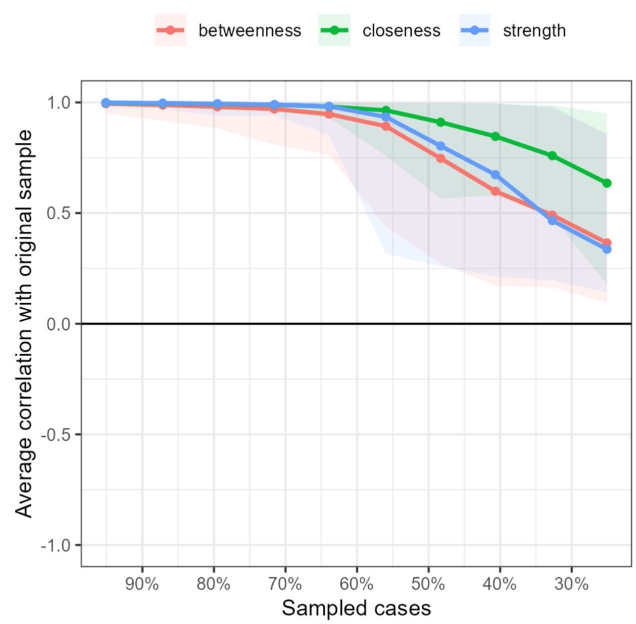

Figure 3. The plot shows the average correlation between the centrality measures for the estimated network and the bootstrapped network. The lines indicate the mean correlation between centrality measures and the area around the indicates the 2.5th till the 97.5th quantile.

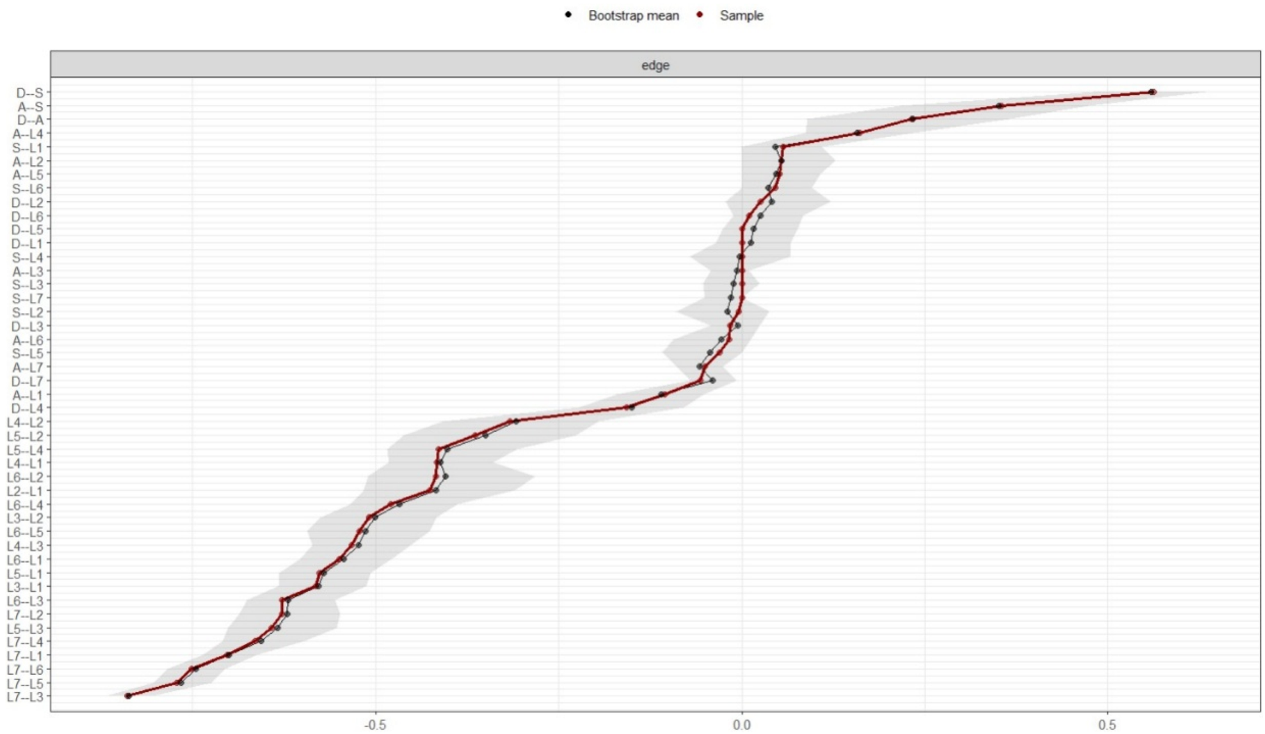

Figure 4. Bootstrap results (1,000 samples) for the edge weights in the estimated network. The plot displays the bootstrapped mean and the 95% confidence intervals for each edge. Edges whose confidence intervals do not include zero can be considered more stable and robust, while wider intervals crossing zero suggest less reliable associations.

of defenses first proposed by Vaillant (1977, 1992) and subsequently operationalized by Perry (1990). In this framework, defense mechanisms are primarily conceived as automatic psychological processes that shield individuals from becoming consciously aware of internal or external stressors (APA, 1994).

Our findings revealed a significant negative association between high adaptive defense mechanisms, such as sublimation and humor, and symptoms of depression, anxiety, and stress, coexisting with less adaptive defenses. However, given the cross-sectional design of our study, it is not possible to infer causality or determine the direction of this relationship. Specifically, it remains unclear whether high adaptive defenses reduce depression or whether depression influences the use of these defenses. As argued by Di Giuseppe and Perry (2021), adaptive responses enable individuals to fully perceive both internal and external stressors—such as the loss of a loved one—without distortion. These responses are often considered indicators of positive coping (Silverman & Aafjes-van Doorn, 2023), fostering resilience in the face of adversity, plausibly including grief. In the context of our study, these mechanisms may facilitate psychological resilience in bereavement, underscoring their potential role in helping individuals cope with its psychological impact. Nevertheless, these findings leave open the possibility that the node with the highest centrality strength (i.e., high adaptive defense mechanisms) could itself be influenced by other nodes, as centrality strength considers only paths of unitary length—direct, one-step connections (Borgatti, 2005). We also explored additional centrality indices—namely, closeness and betweenness—to provide a broader, though exploratory, perspective on the network structure. Although these indices are widely used in social network analysis, their application in psychological networks remains debated, as they rely on more complex assumptions and may yield unstable estimates (Bringmann et al., 2019). Regarding closeness centrality, results showed that high adaptive defense mechanisms obtained the highest value. This measure reflects how efficiently a particular defense mechanism is connected to others, considering both direct and indirect relationships (Epskamp et al., 2012). Even though these results are interesting, they should be considered preliminary and hypothesis-generating rather than conclusive. Psychological interventions aimed at strengthening mature defenses might hold promise in bereavement care. However, given that our findings are based on cross-sectional network models, it remains uncertain whether the identified central nodes translate to within-person change—as discussed by Hamaker (2012), who cautions against inferring causal relationships from between-person associations.

The defense level characterized by minor image distortion emerged as having the highest betweenness centrality, highlighting its role in bridging various elements within the network (Epskamp et al., 2012). These defenses temporarily support self-esteem and bolster self-perception by employing image distortion to minimize or negate the threatening aspects of a stressor (Di Giuseppe & Perry, 2021) such as—more relevant to our study—the loss of a loved one. For example, bereaved individuals may use idealization to cope with the loss by attributing exaggerated positive qualities to the deceased, while they may use devaluation of self-image to manage feelings of guilt or perceived personal responsibility for the loss. Hence, this level of defense may serve as a critical bridge between defensive processes and psychological symptoms. However, although these defenses provide a temporary shield against the intense grief that can accompany the loss of a loved one, they do not necessarily promote long-term adaptation.

Analysis of the weights matrix, which represents the strength of connections between defense mechanisms and psychological symptoms, supports this interpretation. For instance, the minor image-distorting defense level was positively associated with anxiety and stress, while its negative relationship with depression may highlight its role, particularly in the aftermath of loss. Our findings also showed that the high adaptive defense level had negative relationships with other defense levels and symptoms, except for stress. Notably, minor image distortion exhibited the highest values and may play a key role in the immediate emotional response to bereavement, serving as a protective mechanism against overwhelming grief. In contrast, the high adaptive defense level may support long-term emotional regulation and help individuals cope with the broader challenges of loss. The negative relationship between minor image distortion and time since the loss may suggest it is more prevalent in the immediate aftermath, whereas adaptive defenses become more significant over time. However, more research, particularly longitudinal studies, is needed to explore these dynamics more comprehensively.

It is also worthwhile to point out that not all associations in the network were stable. Findings of bootstrap analyses revealed that most edge weights had narrow confidence intervals and can be considered robust, whereas others exhibited wider intervals including zero, indicating greater uncertainty in these associations. These findings seem to be coherent with previous research, highlighting how psychological networks often include both stable and exploratory connections (Burger et al., 2023; Epskamp et al., 2018). Therefore, on one hand, the stable associations provide meaningful insights into the interplay between defenses and psychological symptoms, on the other hand, the less stable edges should be interpreted with caution. Similarly, all centrality indices were associated with good correlation stability coefficients (CS-coefficients), except for betweenness, which was low—as is often the case in psychological networks—suggesting that this specific finding should be interpreted with caution.

Overall, this study offers valuable insights into the theoretical aspects of grief and defense mechanisms. While psychological interventions might consider the role of defense mechanisms in adaptation to the loss, particularly at different levels on the continuum of higher and lower adaptiveness, further research is needed to explore these implications. Enhancing high adaptive defenses may have potential benefits in clinical practice, though more evidence is required to confirm their effectiveness. Additionally, at least in the early stages of grief, minor image-distorting defenses might help the individual cope with the loss, potentially alleviating symptoms such as depression, but longitudinal studies are needed to better understand this dynamic.

Some study limitations need attention and should be addressed by forthcoming research. First, the use of a cross-sectional design does not allow us to conclude causal relationships among the observed variables. Future research adopting a longitudinal design may help clarify the directionality of these relationships. Second, the convenience sample recruitment may have introduced a selection bias and an imbalance for some characteristics, such as the cause of death, which could potentially limit the generalizability of the results—a common issue in studies on prolonged grief disorder (PGD). Third, self-report instruments for assessing defense mechanisms may not fully capture unconscious processes, which are better addressed through observer-rated measures. While recommended for large samples (Di Giuseppe et al., 2020), this approach may still present a limitation, particularly when assessing less adaptive mechanisms that typically operate outside the subject's awareness (Perry, 1990). Additionally, the use of total scores for depression, anxiety, and stress, rather than individual symptoms, may have reduced the interpretability of the network structure, as symptom-level models are more consistent with the logic of network analysis, though this approach has been used in previous studies (e.g., Fung et al., 2024).

In conclusion, the current study employed a network analysis approach to investigate the connections between defense mechanisms and symptoms of depression, anxiety, and stress in bereavement. The findings highlight the fundamental role of mature defenses in mitigating psychological symptoms and fostering positive coping, while minor image-distorting defenses act as bridges linking defenses and symptoms. Findings of this study may be useful for prevention, assessment, and psychological interventions for bereaved individuals.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Data availability statement

The data that support the findings of this study are available from the lead author upon reasonable request.

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