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"*Our similarities are different*" The relationship between alexithymia and depression

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ABSTRACT

Alexithymia is a multi-faceted personality trait, which is the inability to recognize and describe emotions. It is associated with a multitude of mental health problems, and its implication for the diagnosis and treatment of depression remains unclear. The current study explored the nuances of the relationship between alexithymia and depression in a sample of 210 patients with depression. We assessed alexithymia with the 20-Item Toronto Alexithymia Scale (TAS-20) and depression with the Beck Depression Inventory (BDI-I). The mean TAS-20 score was 57.47 ± 10.63, and the mean BDI-I score was 49.33±9.24. We explored the network structure of alexithymia and depression. Items related to difficulties in identifying, describing, and expressing feelings were prominent in the alexithymia network. Joy, guilt, and self-dislike stand out in the depression network. In our analysis, we were able to show the crescent relationship between depression and alexithymia, with an inflection point at a TAS-20 score of 53. Although the correlation-concordance index was moderate (0.41; 95 %CI: 0.29–0.51), both scales greatly overlap. In the joint network of alexithymia and depression, we could identify bridge (i.e., connecting) items between alexithymia and depression. These were difficulties understanding and relating feelings to physical and body sensations on the alexithymia side, and self-dislike, crying, and somatic concern on the depression side. Taken together, they point to the pivotal role of alexithymia in the somatization/embodiment of emotions and feelings in depression.

1. Introduction

Alexithymia, a Greek-rooted word meaning *"lack of words for emotion,"* was first described in the 1970s by U.S. psychiatrist Peter Emanuel Sifneos (1920–2008) together with his colleague John Case Nemiah (1918–2009). Since then, the definition of alexithymia has been refined as a meta-emotional process involving deficits in identifying, labeling, remembering, and describing emotions and foreseeing emotions in different situations in oneself and others (Lundh et al., 2002). In alexithymia, an externally orientated cognitive style is exhibited, with a heightened focus on the external world and its happenings rather than one's internal world. Furthermore, imaginative processes are limited, including an impoverished ability to indulge in fantasy. These characteristics lead to difficulty identifying and describing one's feelings, and distinguishing between feelings and bodily sensations (Bagby et al., 2020; Nemiah, 1977).

Nowadays, alexithymia is considered a personality trait, with a normal distribution in the general population (Taylor and Bagby, 2021). The presence of alexithymia is associated with an increased risk for psychological and psychosomatic disorders (Lumley et al., 2007). These conditions may include depression (Li et al., 2015), anxiety and panic disorders (Oussi et al., 2023; Palser et al., 2018), alcohol and substance use disorders (Honkalampi et al., 2022), post-traumatic stress disorder (Edwards, 2022), eating disorders (Westwood et al., 2017), gastrointestinal diseases (Carrozzino and Porcelli, 2018), and fibromyalgia (Habibi Asgarabad et al., 2023). Moreover, the presence of alexithymia seems to negatively impact the course of disease (Sagar et al., 2021), long-term mental health and well-being (Honkalampi et al., 2010). Additionally, alexithymia is related to suicide and self-harm (Iskric et al., 2020).

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Many studies have shown that alexithymia and depression coexist (Hemming et al., 2019; Sagar et al., 2021), with different features of alexithymia positively correlated with depression (Bamonti et al., 2010; Leweke et al., 2012; Li et al., 2015). Likewise, alexithymia decreases as depression decreases; therefore, an improved ability to recognize and identify one's feelings as one's mood improves (Saarijarvi et al., 2002). Some authors even suggest that the measures of depression and alexithymia are constructs indistinguishable from one another (Marchesi et al., 2014). Nevertheless, single features of alexithymia seem to behave differently. Externally oriented thinking remains even though the ability to identify and describe feelings improves (Rufer et al., 2010; Saarijarvi et al., 2006). Thus, although it has been established that a relationship between alexithymia and depression exists, the nature and nuances of this relationship are yet unclear.

Depression itself is a heterogeneous disorder without pathognomonic symptoms, where increasing severity manifests more symptoms (DSM-5, 2013). Our study aimed to explore the relationship between alexithymic features (as assessed by the Toronto Alexithymia Scale (Bagby et al., 1994): TAS-20) and depressive symptoms (as assessed by the Beck Depression Inventory I (Beck et al., 1961): BDI-I) for future clinical diagnosis and treatment. First, we aim to confirm previously depicted relationships between alexithymia features and depression symptoms. Second, we explore the network structure of alexithymia and depression. Finally, we illustrate how alexithymia and depression relate to one another. In doing so, we refine the understanding of the previously described relationship between alexithymia and depression.

2. Methods

2.1. Study design and population

We designed a prospective, randomized, and controlled study to evaluate the effect of Internet Cognitive Behavioural Therapy (ICBT) (Rauen et al., 2020). We recruited patients with self-reported depressive symptoms online, which were later diagnosed by a psychologist or psychiatric resident. After recruitment, participants were randomized to one of two treatment arms. The first arm consisted exclusively of ICBT, and the second arm of ICBT with additional face-to-face psychotherapy. We used the participants' baseline demographic and clinical characteristics for the current analysis. The local ethics committee of the Canton of Zurich in Switzerland approved the study (BASEC-Nr. 2013-0542). It was registered after approval (clinicaltrials.gov NCT02112266). We conducted the study according to the principles of the Declaration of Helsinki- all subjects provided electronic informed consent before participation.

2.2. Clinical assessment

2.2.1. Toronto alexithymia scale (TAS-20)

The TAS-20 is a self-rated scale that evaluates, through 20 questions (items), the three most relevant components of alexithymia: externally oriented thinking, difficulties in identifying feelings, and difficulties in describing feelings (Leising et al., 2009; Li et al., 2015; Lumley, 2000; Taylor et al., 2003). Each item (for a list of the single TAS-20 items, see Fig. 1) is rated by a 5-point Likert scale from one (strongly disagree) to five (strongly agree). The TAS-20 ranges from "20″ to "100″ points, where a higher score reflects a more severe case of alexithymia (Bagby et al., 1994, 2020; Taylor et al., 1992). The TAS-20 scale used in this study is the validated German version, which showed good reliability, indicated by a Cronbach's alpha of 0.80 (Popp et al., 2008).

2.2.2. Beck Depression Inventory I (BDI-I)

The BDI-I was developed to measure the behavioral manifestations of depression in adults. Although initially designed to be administered by trained interviewers, it is most often self-rated (Beck et al., 1988, 1961). The BDI-I is a self-report questionnaire with 21 symptom statements (items). The severity of each item (for a list of the single BDI-I items see Fig. 2) is rated along an ordinal continuum from absent (zero) to severe (three). The BDI-I ranges from zero "0″ to "63″ points, with higher scores representing more severe depression (Beck et al., 1988). The BDI, in all its versions, shows good psychometric properties in clinical and non-clinical populations (Beck et al., 1988). It is widely used in treatment outcome and quality of care studies (Kammer, 1983). The BDI-I scale used in this study is the validated German version, which showed good reliability, indicated by a Cronbach's alpha of 0.82 (Kammer, 1983).

2.3. Statistical analysis

In the final analysis, we included only participants who completed the BDI-I and TAS-20 questionnaires without missing items to avoid imputation bias. Descriptive statistics (proportion, mean, and standard

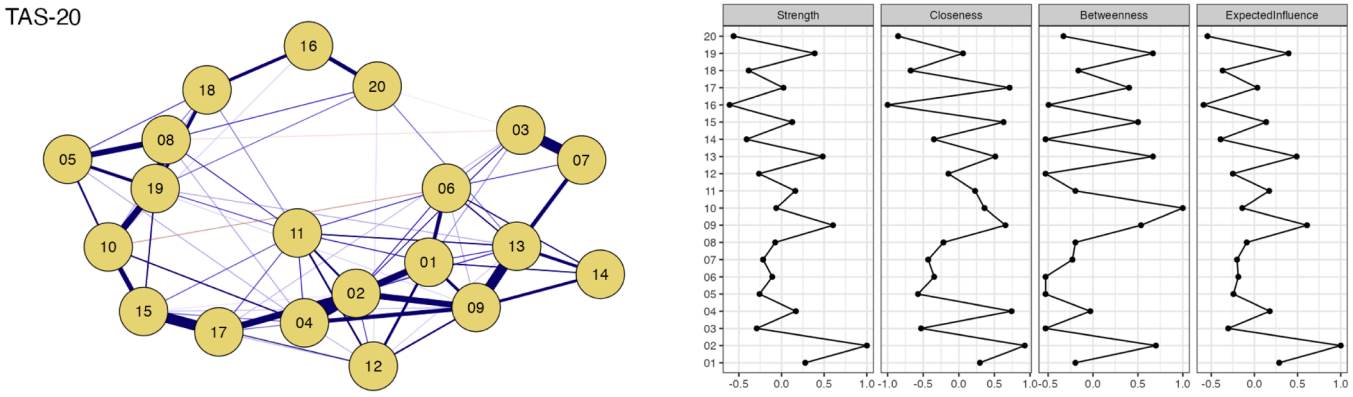

Fig. 1. Network Analysis and Centrality Indices of the TAS-20. **TAS-20 Items.** Item 01: Confused about emotions; Item 02: Difficulty finding words; Item 03: Physical sensations; Item 04: Describe feelings; Item 05: Analyze problems; Item 06: Upset; Item 07: Puzzled by sensations; Item 08: Let things happen; Item 09: Cannot identify feelings; Item 10: Touch with emotions; Item 11: Feel about people; Item 12: Describe feelings; Item 13: Have feelings I cannot identify Item 14: Angry; Item 15: Talking about activities; Item 16: Light entertainment; Item 17: Reveal feelings; Item 18: Feel close; Item 19: Examination of feelings; Item 20: Looking for hidden meanings.
Cluster 1: Identifying and naming feelings (items: 1, 2, 3, 4, 6, 7, 9, 11, 12, 13, 14). Cluster 2: Externally oriented thinking (items: 5, 8, 10, 15, 16, 17, 18, 19, 20). Within the graphical representation, edges are the lines between the nodes (items) representing regularized partial correlations, which estimate the relationship between two variables while controlling for all other variables. A line (edge) indicates an association between variables; the absence of a line indicates no association. Blue lines represent positive associations, while red lines represent negative ones. The wider and more saturated an edge is, the stronger the association.

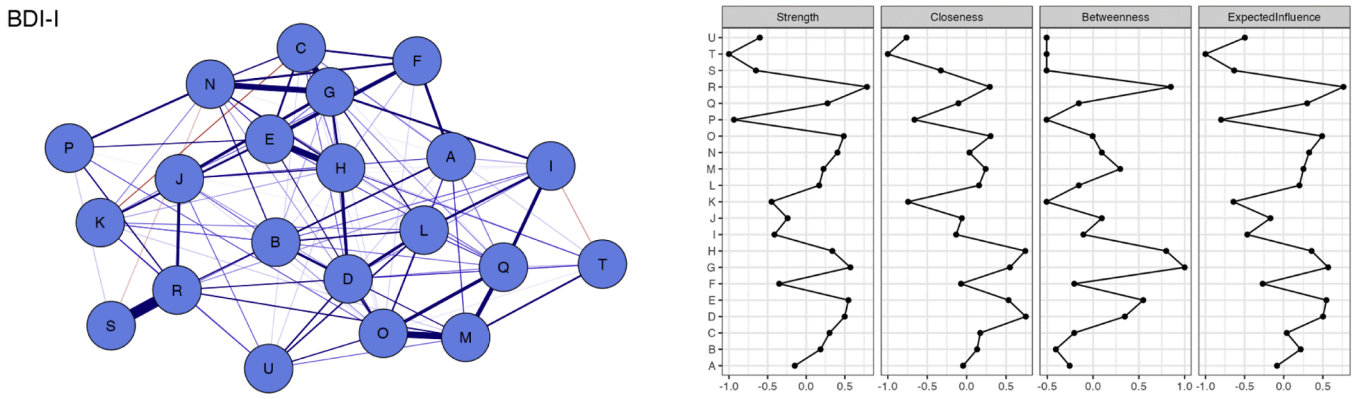

Fig. 2. Network Analysis and Centrality Indices of the BDI-I. **BDI-I Items.** Item A: Sadness; Item B: Pessimism; Item C: Sense of failure; Item D: Joy; Item E: Guilt; Item F: Punishment; Item G: Self-dislike; Item H: Self-accusations; Item I: Suicidal ideas; Item J: Crying; Item K: Irritability; Item L: Social withdrawal; Item M: Indecisiveness; Item N: Body image change; Item O: Work difficulty; Item P: Insomnia; Item Q: Fatigability; Item R: Loss of appetite; Item S: Weight loss, Item T: Somatic preoccupation; Item U: Loss of libido. Cluster 1: Exhaustion and coping (items D, L, M, O, Q); Cluster 2: Self-contempt (items A, C, E, F, K, G, H, N); Cluster 3: Hopelessness (items A, B, D, and L); Cluster 4: Bodily sensations (items J, P, R, S).
Within the graphical representation, edges are the lines between the nodes (items) representing regularized partial correlations, which estimate the relationship between two variables while controlling for all other variables. A line (edge) indicates an association between variables; the absence of a line indicates no association. Blue lines represent positive associations, while red lines represent negative ones. The wider and more saturated an edge is, the stronger the association.

deviation) were presented for patients' demographics, baseline, and outcome characteristics. We used Cronbach's alpha coefficient to examine the internal consistency of the BDI-I and the TAS-20. We calculated an alexithymia and a depression network. We explored the relationship between alexithymia and depression before calculating a joint depression and alexithymia network.

We calculated the Networks using an "Extended Bayesian Information Criterion" (EBIC) and the "Least Absolute Shrinkage and Selection Operator" (LASSO) regularization method, implemented within a single Gaussian random fields network. For the degree of shrinking, we used a low hyperparameter (gamma = 0.0) to maximize the stability of the network and balance sensitivity and specificity (Epskamp et al., 2018). To test the accuracy and stability of the network, we estimated confidence intervals on the edge weights and the correlation stability coefficient using non-parametric bootstrapping (Epskamp and Fried, 2018).

We calculated centrality indices (closeness, betweenness, and strength) and the expected influence of each item within the respective depression and alexithymia network. Centrality indices are measures used to capture the importance of an item in a network. For the joint alexithymia depression network, we also calculated a bridge-expected influence strength to quantify the influence of depressive symptoms and alexithymia features on the joint network. Bridge symptoms are broadly defined as symptoms (or features) that connect different networks, regardless of any overlap between them (Jones et al., 2019).

The BDI-I sum score was correlated to the TAS-20 sum score using Pearson's correlation coefficient. We further examined the correlation using the general additional model (GAM); within the correlation line, we searched for a point of inflection using the bisection extremum distance estimator method. To determine the level of accuracy and precision between the BDI-I and the TAS-20, we calculated the concordance correlation coefficient using z-scores (King and Chinchilli, 2001; Lin, 1989). To evaluate the agreement between the two scales, we used the Bland-Altman Plot. The difference between both scales was plotted on the y-axis, while the mean was plotted on the x-axis. Finally, the confidence interval and the limits of agreement for both scales were calculated (Bland and Altman, 1986; Carkeet, 2015).

For statistical analyses and figures, we used RStudio (2023.06.1 + 524); the statistical software R (4.3.1); and the R packages: tidyverse (2.0.0); ltm (1.2–0); blandr (0.5.1); inflection (1.3.6); qgraph (1.9.5); bootnet (1.5.3); and networktools (1.5.0).

3. Results

A total of 839 persons responded to the online questionnaire, and 319 reported a current depressive disorder. All 210 participants who completed the BDI-I and TAS-20 questionnaires without missing items were included in the analysis. The mean age of the sample was 36.87 (32.46) years, with three-quarters being females (77.6 %, $n = 163$). The participants had an average education of 15.16 (5.08) years, with a completed apprenticeship or a college/university degree (71.9 %, $n = 151$), most participants were either employed (46.7 %, $n = 98$) or in training/formation (27.6 %, $n = 58$). All participants had at least one previous depressive episode; the duration of the current episode was 26.18 (72.49) days (for further details, see Table 1).

The mean TAS-20 score was 57.47 (10.63). The internal consistency of the TAS-20 was good, with a Cronbach's alpha of 0.81. The alexithymia network showed good properties with a network stability index

Table 1
Demographic and clinical characteristics of the sample ($n = 210$).

Demographic Variables	
	Mean (S.D.)
Age (years)	36.87 (32.46)
	n (%)
Sex	
Male	44 (22.4 %)
Female	163 (77.6 %)
Education	
Regular School	13 (6.2 %)
High School	46 (21.9 %)
Apprenticeship	69 (32.9 %)
College/University	86 (39.0 %)
	Mean (S.D.)
Education (years)	15.16 (5.08)
	n (%)
Work	
Employed (Full/Part Time)	98 (46.7 %)
At Home	10 (4.8 %)
In Training/Formation	58 (27.6 %)
Unemployed	44 (20.9 %)
Clinical Variables	
	Mean (S.D.)
Age at First Episode (years)	19.94 (10.93)
Duration of Current Episode (days)	26.18 (72.49)
BDI-I Score	49.33 (9.24)
TAS-20 Score	57.47 (10.63)

of 0.671. The Items with the highest centrality indices were item 2 (*difficult to find the right words for my feelings*), item 9 (*not able to describe feelings*), item 13 (*have feelings I cannot identify*), and item 19 (*examination of feelings is useful*). In the alexithymia network, we can identify two clusters, one identifying and naming feelings (Items: 1, 2, 3, 4, 6, 7, 9, 11, 12, 13, 14) and another corresponding to externally oriented thinking (Items: 5, 8, 10, 15, 16, 17, 18, 19, 20) (For further details, see Fig. 1).

Our sample's mean BDI-I score was 49.33 (9.24) points. The internal consistency of the BDI-I was good, with a Cronbach's alpha of 0.84. The depression network shows good properties with a network stability index of 0.752. The Items with the highest centrality indices were item D (*joy*), item E (*guilt*), item G (*self-dislike*), item H (*self-criticism*), and item R (*appetite*). They were followed by item Q (*fatigability*), item O (*work difficulty*), item N (*body image*), item M (*indecisiveness*), and item L (*social withdrawal*). In the depression network, we can identify several overlapping clusters: one related to exhaustion and coping (items D, L, M, O, Q), one related to self-contempt (items A, C, E, F, K, G, H, N), one related to hopelessness (items A, B, D, and L), and one related to bodily sensations (items J, P, R, S) (For further details, see Fig. 2).

The Pearson's correlation coefficient for the TAS-20 and BDI-I scales was 0.41 (95 %CI: 0.29–0.52). In the GAM correlation curve, we found an inflection point at a TAS-20 score of 53; the correlation coefficient for lower scores was 0.006, and 0.45 for higher scores (see Fig. 3A). The correlation concordance coefficient was 0.41 (95 %CI: 0.29–0.51). In the bland Altman plot, we could see an overlap of the values, with eight outliners (0.038 %), thus showing a great overlap between both scales (see Fig. 3B).

The joint network between depression and alexithymia showed good network stability with an index of 0.692. The bridge symptoms on the depression scale side are item G (*self-dislike*), item J (*crying*), and item T (*somatic concern*); for the alexithymia scale, there are three bridge symptoms: item 3 (*physical sensations, not even doctors understand*), item 7 (*puzzled by sensation in my body*), and item 17 (*difficulty for me to reveal my innermost feelings*). In the Joint BDI-I and TAS-20 network, the single cluster within the networks remains stable (For further details, see Fig. 4).

4. Discussion

In the current study, we explored the relationship between depressive and alexithymia symptoms in a sample of individuals diagnosed (either self or externally) with depression. Here we have examined through a network analysis approach how different symptoms influence the relationship between alexithymia and depression.

The alexithymia network we found and its clustering represent the "attention-appraisal" model of alexithymia (Preece et al., 2017). This model depicts difficulties during the validation of the emotions process, limiting the quality of information about emotion through either diminished attention or appraisal (Gross, 2015; Preece et al., 2023). When considering externally oriented thinking in persons with high levels of alexithymia, the decreased attention to inner feelings potentiates difficulties in identifying and describing emotions (Preece et al., 2023). It impairs insight and understanding of one's emotional state and hinders the ability to convey feelings to others (Luminet et al., 2021). The connectivity and relation of the alexithymia network's components confirm previous findings (Ma et al., 2022) using the TAS-20 scale, especially the relations and clustering (Briganti and Linkowski, 2020).

The depression network we have uncoved resembles depression with melancholic features (DSM-5, 2013). Melancholia, in this case, is defined as a type of depression that presents itself with a set of somatic symptoms such as psychomotor disturbances, weight loss, and insomnia (Kendler, 2020). From a clinical point of view, the identification of melancholia might have therapeutic implications since it tends to respond to pharmacologic rather than psychotherapeutic treatment and exhibits a diminished placebo response (Brown, 2007; Kendler, 2020). The prevalence of melancholic features seems to increase with the severity of depression (Tondo et al., 2021). Due to the severity of depression symptoms in our sample, the melancholic features could be an artifact. The centrality index of our depression network confirms previous findings, where somatic symptoms were closely related to depressive ones (Ma et al., 2022).

The combined network analysis depicts a correlation between alexithymia and depression. The point of inflection (Fig. 3A; cut-off value) lies in the boundaries of the initially stipulated TAS-20 score indicative of alexithymia. Thus confirming a directly proportional relationship between depression and alexithymia (Loas et al., 2001; Taylor et al., 1992). Our results further indicate that variations in the perception of depressive symptoms are positively related to the presence of alexithymia features.

The combined results also highlight the expression of alexithymia with physical symptoms, like the somatization of feelings (e.g., unexplained physical symptoms), and the embodiment of feelings (e.g., crying) (see Fig. 4). These results contribute to the notion that alexithymia is associated with emotion regulation difficulties associated with affective symptoms (Preece et al., 2022, 2023). Therefore, the interplay between depression and alexithymia involves the awareness, identification, and expression of feelings and bodily sensations, with an over- and under-responding facet of alexithymia (Luminet et al., 2021).

The under-responding facet of alexithymia seems to be related to

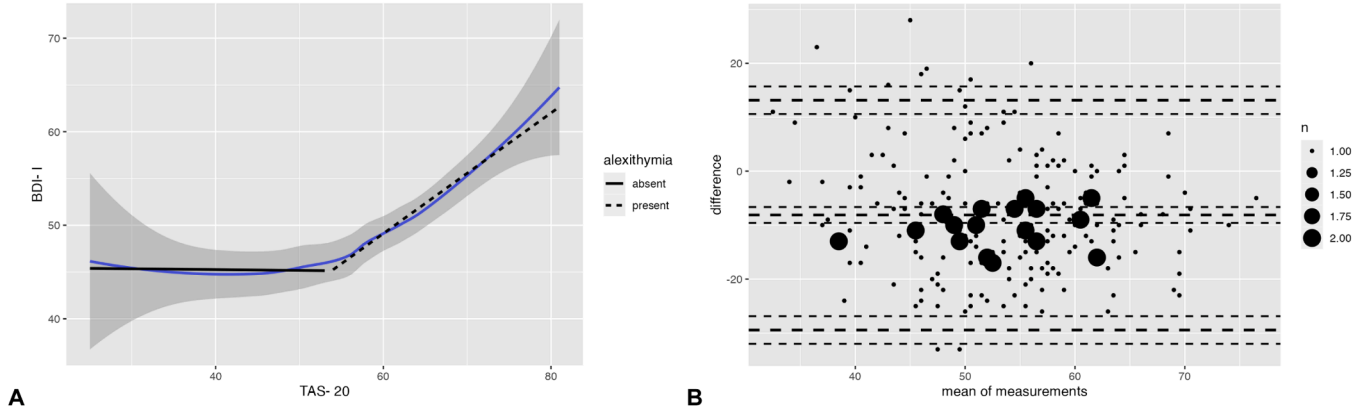

Fig. 3. A: Correlation between the TAS-20 and BDI-I Scales. The blue line represents the correlation using the general additional model (GAM). Black lines represent Pearson's correlation according to the presence (continuous line) or absence (dotted line) of alexithymia. 3B: Bland Altman plot for the depression and alexithymia scales. For each participant, the **difference** between the TAS-20 and BDI-I scores was plotted on the y-axis, while the **mean** of the TAS-20 and BDI-I scores was plotted on the x-axis.

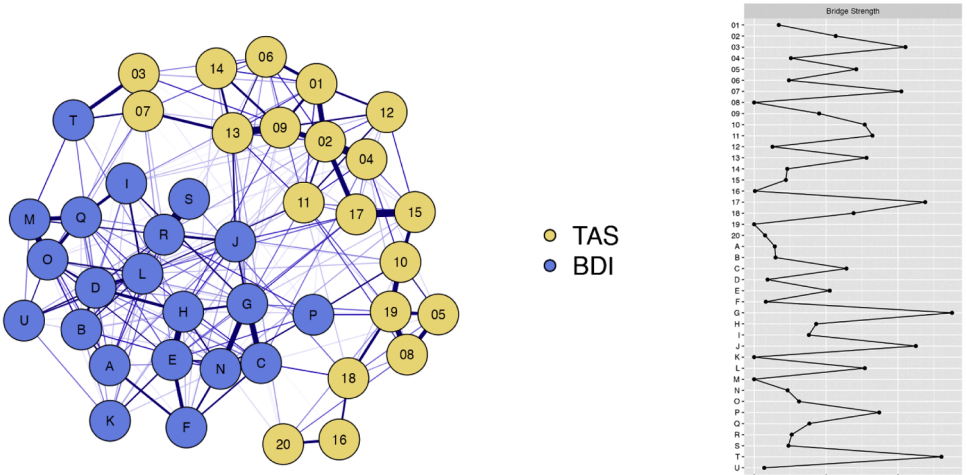

Fig. 4. Network Analysis and Bridge Strength Indices of the joint Network BDI-I and TAS-20. **TAS-20 Items.** Item 01: Confused about emotions; Item 02: Difficulty finding words; Item 03: Physical sensations; Item 04: Describe feelings; Item 05: Analyze problems; Item 06: Upset; Item 07: Puzzled by sensations; Item 08: Let things happen; Item 09: Cannot identify feelings; Item 10: Touch with emotions; Item 11: Feel about people; Item 12: Describe feelings; Item 13: Have feelings I cannot identify; Item 14: Angry; Item 15: Talking about activities; Item 16: Light entertainment; Item 17: Reveal feelings; Item 18: Feel close; Item 19: Examination of feelings; Item 20: Looking for hidden meanings.
BDI-I Items. Item A: Sadness; Item B: Pessimism; Item C: Sense of failure; Item D: Joy; Item E: Guilt; Item F: Punishment; Item G: Self-dislike; Item H: Self-accusations; Item I: Suicidal ideas; Item J: Crying; Item K: Irritability; Item L: Social withdrawal; Item M: Indecisiveness; Item N: Body image change; Item O: Work difficulty; Item P: Insomnia; Item Q: Fatigability; Item R: Loss of appetite; Item S: Weight loss, Item T: Somatic preoccupation; Item U: Loss of libido. Within the graphical representation, edges are the lines between the nodes (items) representing regularized partial correlations, which estimate the relationship between two variables while controlling for all other variables. A line (edge) indicates an association between variables; the absence of a line indicates no association. Blue lines represent positive associations. The wider and more saturated an edge is, the stronger the association.

somatization, where a somatic symptom emerges in the absence of a detectable pathology or illness (Ebert and Martus, 1994; Simon et al., 1999). If these patients are, additionally, in an altered mood state such as depression, they might lose their ability to identify these feelings and interpret them only as physical symptoms (Mattila et al., 2008; Scarpazza et al., 2014, 2022). The over-responding facet of alexithymia corresponds to the central position of "crying" in the joint network of depression and alexithymia (Fig. 4). Crying can be seen as an example of intense embodiment of feelings (e.g., sadness, grief), because it is frequently, although not consistently, reported in patients with depression (Vingerhoets et al., 2007).

Our study has several limitations. First, the sample size of 210 participants is rather small. However, it is higher than the median of studies conducted to analyze the relationship between depression and alexithymia (Li et al., 2015), and it is large enough to analyze the BDI-I and TAS-20 at the item level (Burger et al., 2022). Furthermore, the network stability index yields the obtained networks as stable. The primary aim of our analysis was exploratory; therefore, to avoid any interference from treatment (i.e., psychoeducation and psychotherapy), we only included the baseline assessment. Thus, the results show the relationship and overall positioning of symptoms of depression and alexithymia, and we cannot infer causality from our results.

Second, the BDI-I and the TAS-20 are self-rated instruments; therefore, our results lack external validation by an observer-rated instrument. However, the BDI-I and TAS-20 are instruments that have proven valid and reliable in many studies (Nemiah, 1976). One major concern is that persons with alexithymia may be unable to assess their deficits on a self-report scale (Lane et al., 2015). However, although people with alexithymia may not spontaneously identify their feelings, they can accurately answer a specific question regarding their current state of mind (Bagby et al., 2020). Another peculiarity of our study is using the BDI-I instead of the nowadays widespread BDI-II. The BDI-I allows an evaluation of the somatic aspects (non-mental aspects) of depression and their relationship with emotional state better than the BDI-II (Ebert and Martus, 1994; Simon et al., 1999).

Lastly, we lack information on our sample's origin, socialization, and cultural background. Some studies could also show that alexithymia is associated with lower social status, low educational level, and age (Franz et al., 2008; Kim et al., 2009; Leweke et al., 2012). Some authors also found a gender association with males being postulated as more alexithymic than women (Iskric et al., 2020). However, other studies have argued against such an association (Bamonti et al., 2010; Franz et al., 2008; Luca et al., 2013). Thus, a conclusion concerning gender differences in alexithymia is yet to be made. We could not find any association between alexithymia and the demographic characteristics in our sample. Accordingly, we cannot contribute to the ongoing debate (Li et al., 2015).

Previous research using both observer and self-rated scales gave important insight into the relationship between alexithymia and depression (Montebarocci and Surcinelli, 2018). Since individuals are likely to have the same answer style on self-report tools (such as the TAS-20 and the BDI-I) and different styles in structured interviews and observer-rated scales (Lumley et al., 2007; Taylor et al., 2016). The next logical step is to analyze the relationship between depression and alexithymia in controlled settings, with a structured interview and observer-rated scales. For example, the Toronto Structured Interview for Alexithymia (TSIA) was developed as an alternative to the TAS-20 to measure the presence of alexithymia (Bagby et al., 2006). In the case of depression, there are several well-validated and widely used observer-rated scales, such as the Hamilton Depression Rating Scale (Williams, 1988) and the Montgomery Asberg Depression Rating Scale (Williams and Kobak, 2008).

Despite the limitations, our use of advanced statistical methods yields a differentiated picture of the relationship between alexithymia and depression (Luminet et al., 2021). Our findings contribute to a better understanding of both. The crescent relationship between alexithymia and depression is indicative of their mutual role in emotional regulation (Preece et al., 2023). Thus, adding to the notion that alexithymia should be considered a phenomenon in psychiatric disorders, especially depression, with relevance for diagnosis and treatment (Preece et al., 2023).

The results dispel the notion that alexithymia is confounded by

depression but can explain different symptoms of depression. We could also depict the pivotal role of the embodiment of emotions and feelings in this relationship (Scarpazza et al., 2022). Furthermore, the results could help to identify how different treatment approaches (such as online vs. face-to-face psychotherapy) influence the symptom network and the burden of depression. These findings important for understanding the ongoing psychological process of depression. We consider that alexithymia must be addressed in the screening and diagnostic procedures of persons presenting general distress and depression.

Author statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript.

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CRediT authorship contribution statement

Monika Kieraité: Conceptualization, Writing – original draft, Writing – review & editing. **Jael Jessica Bättig:** Conceptualization, Writing – original draft, Writing – review & editing. **Aleksandar Novoselac:** Conceptualization, Writing – review & editing. **Vanessa Noboa:** Writing – review & editing. **Erich Seifritz:** Supervision, Writing – review & editing. **Michael Rufer:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Stephan T. Egger:** Conceptualization, Formal analysis, Methodology, Software, Visualization, Writing – original draft, Writing – review & editing. **Steffi Weidt:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Writing – review & editing.

Declaration of competing interest

The authors have no competing interests to declare.

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The full quote, *"You can't compare me to my father. Our similarities are different"* in the title, is attributed to American baseball player Dale Berra.

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