Item Content and Overlap Analysis of common Depression and Anxiety Scales

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Abstract

Background: Although overlap between depression and anxiety scales has been investigated separately, research examining shared and unique symptom profiles across both domains is limited. Given that comorbidity between depressive and anxiety disorders can reach up to 65%, understanding symptom-level overlap could provide valuable insights for improving diagnostic accuracy and developing targeted transdiagnostic assessments. **Methods:** We conducted a content analysis of 18 widely used clinical scales, assessing both depression and anxiety domains individually and together. Using the Jaccard Index (0 = no overlap; 1 = complete overlap), we quantified overlap across individual depression scales, individual anxiety scales, and combined depression and anxiety scales to capture symptom-level intersections. **Results:** Our findings indicated low mean overlap within each domain (0.29 and 0.26 for depression and anxiety, respectively) and even lower mean overlap (0.13) when depression and anxiety scales were analyzed together, underscoring significant heterogeneity among scales. The Hamilton Rating Scale for Depression (HRDS) and Hamilton Anxiety Rating Scale (HAM-A) displayed the highest cross-domain overlap (0.41), suggesting these scales may assess overlapping symptom dimensions. **Conclusion:** Results reveal distinct symptom structures in depression and anxiety scales, with only a limited degree of shared content. This suggests that many current scales may inadequately capture the mixed symptoms often present in clinical populations. Our findings underscore the importance of developing transdiagnostic measures capable of assessing both shared and distinct symptom dimensions across affective disorders, which may ultimately enhance clinical precision in assessing comorbid presentations and inform future revisions of existing assessment tools.

Keywords: Content analysis, Depression, Anxiety, Assessment, Symptom overlap

Introduction

Comorbidity between depressive and anxiety disorders is common, with some studies indicating rates as high as 65%, and has important implications for assessment, diagnosis and clinical practice (Beesdo et al., 2010; Groen, et al., 2020;Spijker et al., 2020) . This high comorbidity is consistently associated with greater symptom severity, chronicity, increased suicide risk, impairment in daily functioning, and reduced quality of life (Almeida et al., 2012; Belzer & Schneier, 2004; Lamers et al., 2011).

Major depressive disorder manifests through recurring feelings of sadness, hopelessness, lack of interest or pleasure, guilt or low self-esteem, as well as physical symptoms such as exhaustion or changes in eating and sleeping patterns (Friedman & Anderson, 2014). Anxiety disorders involve persistent feelings of fear or dread, often accompanied by physical symptoms such as sweating or heart palpitations (Emmelkamp & Ehring, 2014).

The relationship between these conditions has been conceptualized in various ways: as points on a continuum, manifestations of a common underlying condition, linked syndromes, conditions that may evolve into each other, or distinct phenomena (Stulz & Crits-Christoph, 2010). Current clinical practice diagnoses them separately while acknowledging comorbidity (Spijker et al., 2020).

The Tripartite model suggested that anxiety and depression share a nonspecific component of general affective distress while being distinguished by specific features: physiological hyperarousal in anxiety and absence of positive affect in depression (Clark & Watson, 1991) This view suggests that a comprehensive description of the affective domain necessitates evaluating both the shared and distinct components of those syndromes (Clark et al., 1991). Recently, these ideas have been incorporated into the Hierarchical Taxonomy of Psychopathology (HiTOP, Kotov et al., 2017), a hierarchical dimensional approach to psychiatric classification. In the last decades research

on anxiety and depression has shifted from disorder-level to symptom-level analysis. The most evident example of this is the network analysis perspective, that conceptualizes depression and other mental disorders as nets of causally connected symptoms and highlights the importance of individual symptoms and symptom-to-symptom relationships (Borsboom, 2017; Fried et al., 2016). Evidence from this framework indicates that the links between symptoms of anxiety and depression within each disorder are stronger than the links between disorders (Beard et al., 2016). Studies of correlated symptoms across disorders have revealed valuable insights about their interactions (Ma et al., 2022). By examining depression and anxiety symptoms simultaneously, researchers can identify their unique, shared, and interactive features - a transdiagnostic approach that helps recognize mixed presentations and potential intervention targets (Kircanski et al., 2017; Cuijpers et al., 2023).

Another relevant finding from the symptom level perspective is that comorbidity between anxiety and depression could be explained in terms of presence of the symptoms of one disorder acting as a risk factor for the development of symptoms of the other (Beesdo et al., 2010; Jacobson & Newman, 2017; Struijs et al., 2021). Taken together, this evidence suggests that the associations between anxiety and depression may be better understood at a symptom rather than a disorder level.

Recently, a number of studies have measured the overlap in item content across self-report measures in order to identify core symptoms of different mental disorders and to highlight the potential degree of heterogeneity between questionnaires (Chrobak et al., 2018; Gauld et al., 2023; Karstoft & Armour, 2023; Visontay et al., 2019).

For depression, Fried (2017) analysed seven common scales showing moderate overlap (0.41), with symptoms appearing in an average of three scales, supporting evidence of heterogeneity between scales assessing depression. Similarly, an examination of 13 anxiety scales revealed 60 distinct symptom categories, with many symptoms (21.7%) appearing in only one scale, and on average, each measure covering only 31% of all symptoms (Wall & Lee, 2022). These findings

indicate that self-report measures for these mental illnesses seem not interchangeable as they often assess different aspects of the conditions. Each symptom or sign appears to have its own nosological entity, expressed through various subscales.

This study aims to examine the overlap between commonly used anxiety and depression scales, both within each domain and across both domains together. By identifying shared and unique symptoms, we seek to improve understanding of the complex comorbidity between anxiety and depression, support transdiagnostic assessment approaches, and inform future scale development. This integrated analysis may reveal insights into symptom heterogeneity, ultimately aiding in the creation of more precise and clinically relevant diagnostic tools for affective disorders.

Methods

Selection of Depression and Anxiety Questionnaires

In this research, we used search techniques previously described in analogous content analysis studies (Fried, 2017; Visontay et al., 2019; Wall et al., 2022). We adopted a systematic strategy for the selection of anxiety and depression scales. The results, including newly identified relevant scales, were compared with findings from Fried (2017) and Wall et al (2022). After item retrieval, we conducted a comprehensive content analysis, which involved consolidating similar items within scales and juxtaposing consolidated items across scales. Item attributes were documented, and overarching symptom categories were identified (see **Supplementary Material**). Jaccard analysis was used to assess scale similarity and calculate average similarity across scales, producing three separate indices: for depression scales, for anxiety scales, and one combining both depression and anxiety

Depression and anxiety scales were identified through a review that was conducted in Scopus in May 2023. In the search strategy, several terms relevant to the assessment of depression were used: "depression scale" OR "depression measurement" OR "depression inventory" OR

"depression assessment" OR "depression questionnaire". An analogous criterion was used for anxiety: "anxiety scale" OR "anxiety measurement" OR "anxiety inventory" OR "anxiety rating" OR "anxiety questionnaire". For inclusion in this review, scales had to be designed for adult populations, frequently cited, and currently in use as evidenced by their presence in recent studies.

The review identified scales to assess depression and anxiety separately, and 2 scales that assessed both conditions. For depression, the 7 scales identified were the Beck Depression Inventory- Second Edition (BDI-II; Beck et al., 1996), the Center for Epidemiological Studies Depression (CESD-R; Radloff, 1977), the Hamilton Depression Rating Scale (HRSD/HAM-D; Hamilton, 1960), the Patient Health Questionnaire (PHQ9; Spitzer et al., 1999), the Zung Self-Rating Depression Scale (SDS; Zung, 1965), the Montgomery-Asberg Depression Rating Scale (MADRS; Montgomery & Asberg, 1979), and the Quick Inventory of Depressive Symptomatology (QIDS-C; Rush et al., 2003). For anxiety, the 6 scales were the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983), the Beck Anxiety Inventory (BAI; Beck et al., 1988), the Hamilton Anxiety Rating Scale (HAM-A; Hamilton, 1959), the Zung Self-Rating Anxiety Scale (SAS; Zung, 1971), the Generalised Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006), the Taylor Manifest Anxiety Scale (TMAS; Taylor, 1953). The instruments used to assess both conditions were the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) and Depression Anxiety Stress Scales (DASS-21; (Lovibond & Lovibond, 1995).

Extraction of Symptoms from Items

We compared our scale review with Fried's (2017) study. We excluded the Inventory of Depressive Symptoms (IDS; Rush et al., 1996), as in our review, the IDS was not identified as one of the relevant scales for assessing depression, as it was also not frequently cited and not currently in use. We added the Patient Health Questionnaire (PHQ9; Spitzer et al., 1999) and depression

items from both the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) and Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995).

Also, for anxiety, our review differed from Wall & Lee (2022). The following scales were not retrieved from the review: the Mood and Anxiety Symptom Questionnaire (MASQ; Watson & Clark, 2012), the State Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree et al., 2000), the Costello-Comrey Depression and Anxiety Scale (CC-DAS; Costello, 1967) and the Clinical Anxiety Scale (CAS; Snaith et al., 1982).The 12-item somatic, 7-item phobia and 10-item anxiety subscales of the Symptom Checklist 90-R (SCL-90R; Derogatis, 1994) and the 12-item anxiety and 16-item somatic subscales of the Four-Dimensional Symptom Questionnaire (4DSQ; Terluin et al., 2006) were also not included. Finally, the Generalised Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006) and the Hamilton Anxiety Rating Scale (HAM-A; Hamilton, 1959), which were not included in their study were added. These differences are summarised in **Table S1**.

Next, the content of the items of the additional scales, which had not been analyzed in prior studies (e.g., the HADS or the DASS) was reviewed. It was examined whether each item of these scales addressed one of the symptoms already derived from prior studies or required the inclusion of a new symptom. In this step, we also eliminated those symptoms that belong to the scales or subscales that were removed from the analyses in our study (e.g., IDS).

Items were coded individually by two raters (AT, RC-O). Any items with discrepancies between raters were reviewed iteratively until agreement on the coding was reached. At the end of this procedure, we obtained a new matrix for the scales assessing depression and another matrix for the scales assessing anxiety. This matrix was unified and then all items of all scales were checked again to code them as anxiety, if they were depression scales; or to code them as depression if they were scales assessing anxiety. In this case, if a symptom category was present in both conditions, the categorisation of the symptom was unified and checked.

A total of 120 items for depression, 166 items for anxiety, and 49 assessing both conditions were assessed, totalling 335 items for the combined matrix. Following Fried, (2017), the content analysis described above resulted in a number of distinct symptoms and information on whether these symptoms were (a) not included in a scale, (b) included as part of a composite symptom, or (c) included as a specific symptom. The matrices of the original studies, the matrices constructed separately for anxiety and depression, the unified matrix, and the content analysis results, are available in the **Supplementary Material** (https://osf.io/j3znm/?view_only=6cbdeeafb74548648bad9d5cf2e8e9a6).

Statistical Analysis

We used the Jaccard index, a similarity coefficient for binary data that ranges from 0 (no overlap between scales) to 1 (complete overlap). This index is calculated by $s/(u1 + u2 + s)$, where s is the number of items (i.e., symptoms) shared by the two questionnaires, and $u1$ and $u2$ are the number of items unique to each of the two scales. Following the criteria described by Evans (1996, cited in Fried, 2017), this index can be interpreted as a correlation coefficient where: 0.00-0.19 is interpreted as very weak; 0.20-0.39- weak; 0.40-0.59, moderate; 0.60-0.79, strong and 0.80-1.0, very strong.

In addition, we calculated the rate of specific vs. composite symptoms per scale and the rate of idiosyncratic symptoms per scale, as Fried, (2017) did. Analyses were performed using R Studio (RStudio Team, 2020); data and code are available in the **Supplementary Material** (https://osf.io/j3znm/?view_only=6cbdeeafb74548648bad9d5cf2e8e9a6).

Results

Content analysis

Following previous research (Fried, 2017; Karstoft et al., 2019; Wall et al., 2022), we conducted content analyses of depression and anxiety scales. Analysis of 120 items across 9

depression scales yielded 46 distinct depression symptoms (**Fig. 1**), while 166 items across 9 anxiety scales yielded 54 distinct anxiety symptoms (**Fig. 2**). A combined analysis of 335 items across all 18 scales identified 89 distinct symptoms (**Fig. 3**).

For depression scales, of the 46 symptoms, only *sad mood*, feature across all instruments, while 34.78% of the total symptoms (16 items) feature in one single instrument. The symptoms most commonly captured by all scales are *sad mood* (featured in 9 scales); *early-, middle-, late-insomnia, appetite decrease, suicidal ideation, tiredness/fatigue* (7 scales); and *concentration problems, pessimism/hopeful about future, loss of energy* (6 scales).

For anxiety scales, of the 54 symptoms, only two symptoms, *relaxed* and *nervous*, feature across all instruments, while 18.52% of the total symptoms (10 items) appear in one single instrument. The symptoms most commonly captured by all scales are *relaxed* and *nervous* (featured in 9 scales); *fear* (8 scales); and t*ension, restlessness, worry* (7 scales).

For depression and anxiety scales, considered altogether, of the resulting 89 symptoms, none is featured across all instruments, and 17.98% of the total symptoms (16 items) appear only in one single instrument. The symptoms most commonly captured by all scales are *early- insomnia, middle-insomnia, fear,* and *psychomotor agitation/rattled* (featured in 11 scales); *late-insomnia, sad mood, nervous, pessimism/hopeful about future, tiredness/fatigue, restlessness* (10 scales); and *loss of pleasure and relaxed* (9 scales).

Tables S2 and **S3** show in how many scales the symptoms of depression and anxiety are included. For depression, 23.91% of the symptoms (11 of 46) appear concentrated across a subset of 3 scales. For anxiety, 18.52% of the anxiety symptoms (10 of 54) appear across a subset of 5 scales. **Table S4** displays in how many scales the symptoms of depression and anxiety are included when

both depression and anxiety are considered together; 16.85% of the symptoms (15 of the 89) appear across a subset of 3 scales.

Scale properties and performance

Tables S5, S6 and **S7** show to what degree the symptoms in each scale are idiosyncratic (i.e., do not appear in other scales) and specific (i.e. capture an item such as "*early-, middle- or late-insomnia*" instead of a compound item like "*sleep problems*"), along with the number of specific symptoms captured per scale and the adjusted scale length.

For depression scales, the CESD has the most idiosyncratic items (29%), whereas the PHQ9, the HADS depression subscale and the DASS have none. The QIDS has the largest amount of compound items (90%), while the PHQ (82,4) and the SDS (77.3%) have the largest number of specific items.

For anxiety scales, HAM-A has the highest percentage (15%), followed by the STAI (trait and state, 7%) and the TMAS (6%). The HAM-A also has the largest number of compound symptoms (58.5%) and, while the STAI-S has the largest number of specific symptoms, with all of them in this category (100%).

For depression and anxiety scales considered altogether, the HAM-A has, again, the largest number of idiosyncratic items (14%). Only 6 of the other 17 scales, have idiosyncratic items: the BDI, the CESD, the SDS, the MADRS, the HRSD and the TMAS (ranging from 0.02 to 0.09). The STAI-S has the highest number of specific items (93.8%), while the QIDS has the highest number of compound items (87.5%).

Scale overlap

Tables 1, 2 and **3** show the overlap between scales using the Jaccard Index calculated for 1) individual depression scales; 2) individual anxiety scales, and 3) depression and anxiety scales considered altogether.

Overall, the *mean overlap* among depression and anxiety scales, considered separately, is similarly low: 0.29 and 0.26, respectively This suggests the heterogeneity of the scales measuring either depression or anxiety.

For depression scales (**Table 1**), the largest overlap among *individual scales* is observed for the PHQ9 and the QIDS16 (0.61), and the PHQ and the BDI (0.61). Alternatively, the lowest overlap is found for the HADS depression subscale and the SDS (0.12) and the HADS and the MADRS (0.12). Thus, suggesting that the content of these scales may be significantly different. On *average*, the BDI and the QIDS16 exhibit the largest average overlap with all other scales (0.36) yet none of them reached the point of moderate overlap (i.e., 0.40). The HADS depression scale has the lowest mean overlap with other instruments (0.17).

For anxiety scales (**Table 2)**, the largest overlap among *individual scales* -besides the STAI-S and STAI-T (0.65) which belong to the same instrument for assessing anxiety-, is observed for the SAS and the HAM-A (0.50). By contrast, the lowest overlap is found between the STAI-T and the BAI (0.07), suggesting, again, that the content is heterogenous. On average, the DASS anxiety subscale exhibits the largest mean overlap with all other scales (0.32). The STAI-T and the SAS have the lowest mean overlap with other instruments (0.23).

The *mean overlap* between depression and anxiety scales, considered altogether (**Table 3**), is, according to our analysis, even lower than when considered separately (0.13). Some results merit some consideration. First, consistent with the general finding, we found some pairs of scales show no overlap (e.g., BAI-QIDS16; BAI-BDI; BAI-PHQ; GAD-HADS(D); GAD-DASS(D)). This suggests

that anxiety and depression could apparently be distinguishable through their application. This seems particularly true for the HADS and the DASS, which both are instruments that have subscales to measure both anxiety and depression. Second, the HDRS and the HAMA show the highest overlap at individual level (0.41). This may indicate that with the application of the HDRS, depressive, but also anxiety symptoms, may be assessed. In a similar fashion, by applying the HAM-A, anxiety, but also depressive symptoms, may be assessed. Critically, this pattern of findings, despite attenuated, also emerges at the average level, with the HAMA being the anxiety scale that has the largest mean overlap (0.26) with instruments measuring depression. Finally, at item level, there are some items related to self-perception and physiological symptomatology present in the same measure in depression and anxiety scales (**Figure 3**). These include the following: *self-worth, lonely, sensitive, steady, secure, confusion, numbness/tingling, cold body temperature, faint/lightheaded* and *physical weakness.* Altogether, these results point to the distinctiveness of depression and anxiety questionnaires at the mean and individual-scale level, with the exception of the HAMA and the HRSD. At the same time, a degree of shared content at the item level is apparent.

Discussion

Measuring depression and anxiety is challenging for various reasons. In this study, we aimed to examine the overlap between a number of depression scales, a number of anxiety scales and also anxiety and depression scales, considered altogether. While the overlap between depression and anxiety measures has been separately examined in prior research (Fried, 2017; Wall et al., 2022), no such research exists that has examined, using the same approach, the overlap across domains. Thus, some issues addressed before are retrieved, re-analyzed and expanded in this study.

Consistent with prior findings from Fried (2017), the overlap between depression measures is overall low. Thus, suggesting that depression measures should not be considered interchangeable, because scale content differs, in some cases significantly. For example, the depression subscale of

the HADS showed the smallest overlap with both the SDS and the MADRS, suggesting only a limited degree of shared content between the HADS depression subscale and these depression measures. Equally, anxiety measures should not be considered interchangeable because, consistent with prior findings, the overlap between anxiety measures is also low (Wall et al., 2022). Though we used slightly different measures, our results are quantitatively similar to these previous studies.

This lack of overlap found in several studies may have several explanations. These are essentially related to how depression and anxiety are conceptualized and measured (Monroe & Anderson, 2015; Fried et al., 2022). In brief, depression and anxiety are both heterogeneous and multi-layered. Thus, to comprehensively reflect the complexity of these clinical syndromes, a myriad of symptom descriptions is needed. Yet, due to the absence of a unified theory of depression and anxiety, different instruments emphasize various symptoms based on their underlying conceptual models, resulting in differences on scale content (Fried, 2017; Fried et al., 2022). Additionally, there might be also inherent limitations or deficiencies related to how questionnaires, including those in this study assessing depression and anxiety, are constructed (e.g., test-construction strategies, quality of the items, Clark & Watson, 2019). This is not trivial, as these issues were largely overlooked, and measures have been routinely used in clinical contexts without acknowledging such constraints (Fried et al., 2022). Growing literature suggests that better and more comprehensive strategies to assess these common conditions are needed, with initiatives like the HiTOP emerging to reorganize psychopathology quantitatively, based on symptom covariation (Kotov et al., 2017; Simms et al., 2022; Watson et al., 2022). Thus, a comparison between old and new paradigms is, at this point, essential and yet pending.

The central finding of this study is the lack of overlap between anxiety and depression measures, considered *altogether*. This is important because one possible explanation for the high rates of comorbidity between anxiety and depression may be that measures contain, indeed, items so

unspecific that are present in both kinds of scales to different degrees. On the one hand, this might be viewed as a pernicious obstacle for research and/or clinical purposes, a sort of undesired methodological contamination. Thus, something that should be explicitly avoided with "pure versions" of depression and anxiety measures (Stulz et al., 2010). On the other hand, if the premises of classical models of depression and anxiety are correct (Clark et al., 1991; Simms et al., 2008), valid and reliable instruments that allow for the assessment of both shared and unique features of these conditions are needed (see Watson et al., 2007, 2012 for an example of such king of measure). Thus, overlap across domains would be expected.

Because the overlap between anxiety and depression measures is rather low, our results indicate that this may not be the case. Hence, it seems unlikely that the high correlations and rates or comorbidity between anxiety and depression are due to the same items being present in both types of scales. However, we did find an exception: the HRDS and the HAM-A, from the HAMILTON rating system (Hamilton 1959: 1960), showed the highest overlap between anxiety and depression symptoms. Such an overlap is not only on the moderate threshold (i.e., 0.41) but also notable, given that a similar overlap is not observed for other assessment systems in our study, such as the DASS and the HADS.

Although this lack of overlap is consistent with the literature on the discriminant validity of the measures (Endler et al., 1998; Koeter et al., 1992), it still points out to the limitations of the current assessment system to hypothetically capture the unique and shared features of anxiety and depression. Therefore, the utility of the assessment instruments currently available and most commonly used to identify the purported core of shared overlapping features between anxiety and depression may be limited (see Watson et al., 2007, 2012 for an exception). Yet, as outlined above, if classical models were correct, and transdiagnostic approaches are indeed feasible (Watson et al., 1995; Watson et al., 2022b) unique specific features, but also, shared, overlapped features should be

assessed when assessing affective problems. Our results suggest that, in this sense, "gold-standard" measures do not seem specifically keyed to "gold-standard" conceptualizations (Clark et al., 1990; Clark et al., 1991; Watson, 2005). Hence, a new approach for the assessment of anxiety and depression, and scale development methods sensitive to this reality seems urgently needed (Simms et al., 2022).

An important caveat underlying the present research is its focus on *narrow forms* of psychopathology (i.e., *symptoms*) to better disentangle the relations between anxiety and depression symptomatology. While it is undoubtedly true that this approach has gained traction in the last decades new research is needed to replicate and expand findings focused on the symptom rather than the disorder/scale- level. Key reasons for doing so include a better understanding of symptoms centrality and the potential to provide new insights regarding the clinical significance of specific symptoms (Borsboom, 2017; Fried et al., 2016).

Implications for research and clinical practice

First and foremost, by investigating the content overlap of depression and anxiety scales considered *altogether,* we expand prior research on the assessment of these conditions. Despite the overall lack of overlap, the moderate overlap between the HRDS and the HAM-A raises the question of whether these instruments are, indeed, *operationally distinct*. In our view, this is important because they are highly cited and widely used in clinical practice (Kølbæk et al., 2024). The HRDS, indeed, was among the first to appear in the early years of research on depression along with other so-called "gold-standards" such as the BDI or the CESD-R (Shafer, 2006). Then, this suggests that depression research may require revision in light of recent findings.

Second, by having examined the limitations of the current instruments to assess both the unique and also the *overlapping* features of anxiety and depression, this research may be helpful for the transdiagnostic research agenda, and, in particular the current HiTOP efforts to achieve an

assessment tailored to the model (Kotov et al., 2017; Simms et al., 2022; Watson et al., 2022a, 2022b). The ideas and findings we present here build upon recent calls for integrating, in the same comprehensive assessment system the wide range of internalizing psychopathology, including depression and anxiety (Watson et al., 2022). Our findings strengthen the view that a transdiagnostic assessment of anxiety and depression has the potential to contribute to a better understanding of their phenomenology.

Limitations

The most salient limitation of this research is the notably subjective nature of the process followed to examine the content of the scales and item overlap. This limitation has been recurrently highlighted in prior and similar works (Fried, 2017; Karstoft et al., 2023; Wall et al, 2022). Despite we have been transparent about our methods and have provided the code and all the materials necessary to understand and replicate our procedures, a degree of subjectivity is present in every step of this process. This includes the decisions on the scales to be included in the study, the content analysis, itself, and the categorization of the items selected. As an illustration of this, in the current study, scales not included by Fried (2017) and Wall et al., (2022) were included (e.g., the HADS, the DASS). Although this can be viewed as a virtue or an extension of previous works, it is exemplifying, at the same time, this subjectivity underlying the process. In addition, two raters participated in the categorization of items and a consensus solution was achieved, which can be viewed as a strength of our approach compared to prior research. At the same time, a quantification of the magnitude of the agreement/disagreement between them was not conducted. Thus, overall, our results, like those of prior research, should be taken with caution because of the implications it may have, the absence of a common objective system to conduct this kind of studies. Another important limitation is that, so far, research of this kind has been only applied to questionnaire methods, for the very characteristics of the analyses required. However, other assessment methods

such as interviews are commonly used. Our conclusions in this regard are limited and analogous analysis may be needed to further support these results, considering other assessment methods.

Conflicts of Interest

The authors report no conflicts of interest.

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Contributions

AT: Methodology -Scale Selection, Item categorization, Item Content Analysis; Writing - original draft, review & editing, Funding acquisition. BD-A: Methodology- Scale Overlap, Visualization; Writing -original draft, review & editing. RC-O: Methodology -Item Content Analysis, Writing- review & editing. DG-P: Conceptualization, Writing- review & editing, Supervision, Funding acquisition

Author Agreement

Our manuscript has been approved by all authors.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Claude.ai to reduce the length of the Introduction section of the original draft of the manuscript. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article

Table 1. Overlap of item content of 9 depression scales

	QIDS16	BDI	CESD	SDS	MADRS	HRSD	PHQ9	HADS	DASS21
QIDS16	1								
BDI	0.61	1							
CESD	0.28	0.35	1						
SDS	0.44	0.52	0.34	1					
MADRS	0.39	0.37	0.37	0.36	1				
HRSD	0.50	0.42	0.26	0.47	0.31	1			
PHQ9	0.61	0.56	0.40	0.39	0.45	0.39	1		
HADS	0.18	0.15	0.17	0.12	0.12	0.17	0.21	1	
DASS21	0.23	0.23	0.17	0.21	0.19	0.16	0.14	0.44	1
Mean overlap	0.36	0.36	0.26	0.32	0.28	0.30	0.35	0.17	0.20

Note: The Jaccard Index ranges from 0 (no overlap) to 1 (total overlap)

Table 2. Overlap of item content of 9 anxiety scales

	HADS	DASS	STAIT	STAIS	TMAS	SAS	BAI	GAD	HAMA
HADS	1								
DASS	0.35	1							
STAIT	0.22	0.18	1						
STAIS	0.29	0.27	0.65	1					
TMAS	0.18	0.39	0.28	0.28	1				
SAS	0.22	0.37	0.15	0.15	0.46	1			
BAI	0.26	0.40	0.07	0.11	0.31	0.14	1		
GAD	0.40	0.45	0.35	0.42	0.29	0.22	0.16	1	
HAMA	0.19	0.43	0.14	0.14	0.44	0.50	0.36	0.25	1
Mean overlap	0.24	0.32	0.23	0.29	0.28	0.23	0.3	0.28	0.27

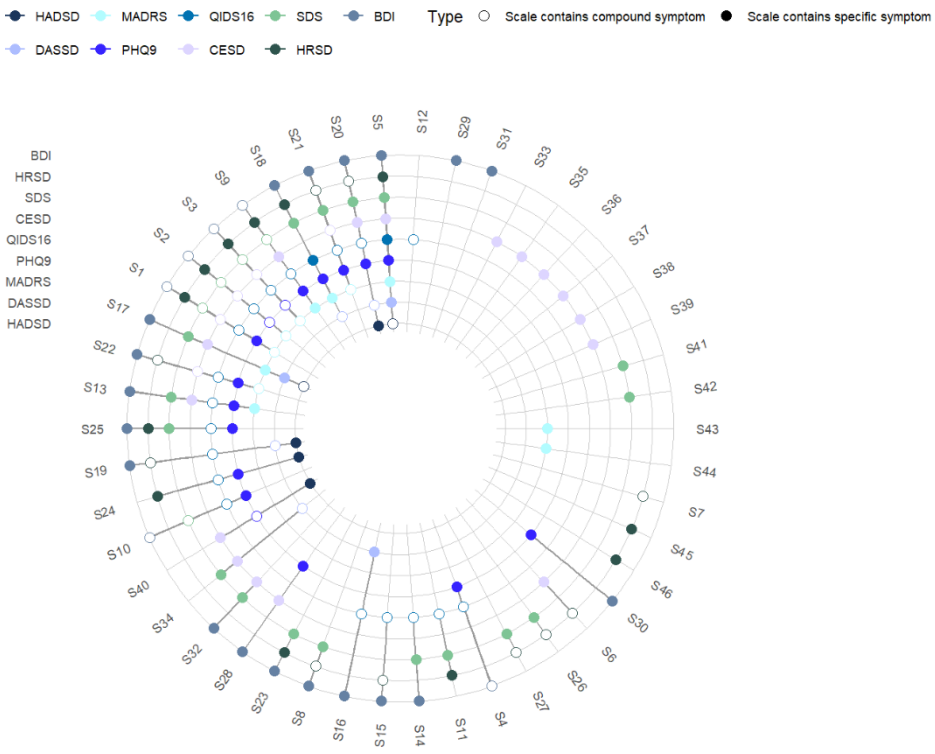
Note: The Jaccard Index ranges from 0 (no overlap) to 1 (total overlap)

Table 3. Overlap of item content of 9 depression scales and 9 anxiety scales

	HADS (A)	**DASS(A)**	**STAIT**	**STAIS**	**TMAS**	**SAS**	**BAI**	**GAD**	**HAMA**	**Mean overlap**
QIDS16	0.04	0.06	0.26	0.15	0.25	0.14	0.00	0.06	0.35	0.10
BDI	0.03	0.06	0.16	0.10	0.26	0.13	0.00	0.06	0.33	0.08
CESD	0.04	0.03	0.22	0.11	0.25	0.14	0.06	0.07	0.22	0.13
SDS	0.04	0.09	0.16	0.15	0.30	0.20	0.09	0.13	0.28	0.16
MADRS	0.10	0.12	0.27	0.20	0.29	0.25	0.16	0.22	0.25	0.21
HRSD	0.12	0.10	0.09	0.07	0.28	0.24	0.13	0.12	0.41	0.17
PHQ9	0.04	0.06	0.23	0.12	0.29	0.21	0.00	0.06	0.28	0.14
HADS(D)	0.00	0.00	0.05	0.15	0.02	0.08	0.05	0.00	0.07	0.05
DASS(D)	0.00	0.00	0.05	0.13	0.05	0.07	0.05	0.00	0.06	0.04
Mean overlap	0.05	0.06	0.17	0.13	0.22	0.16	0.06	0.10	0.26	**0.13**

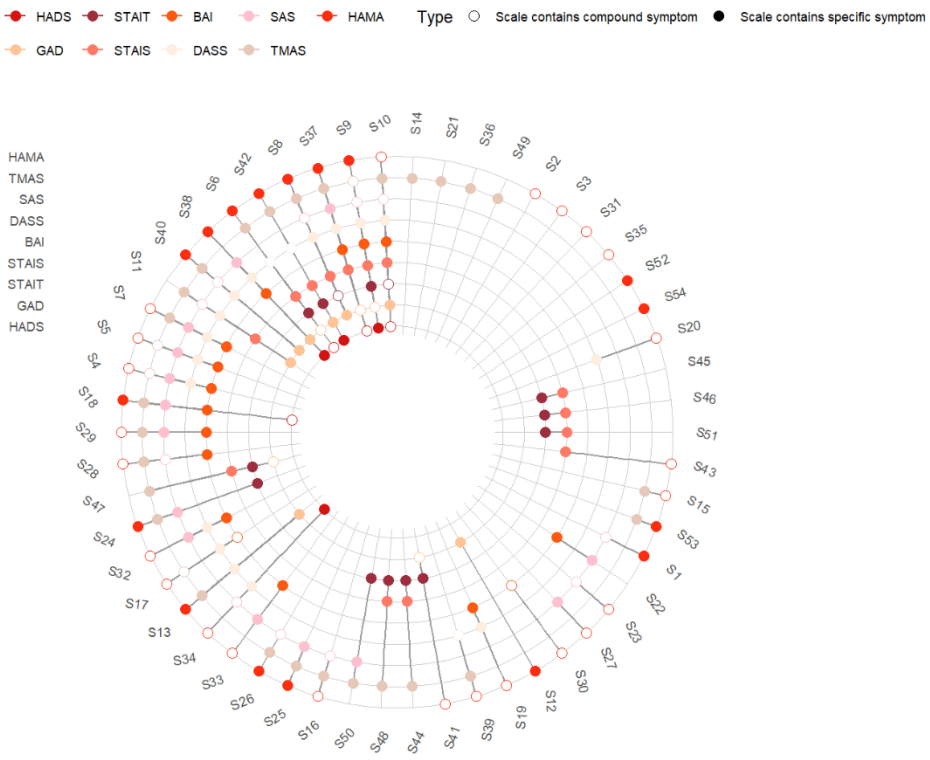
Note: The Jaccard Index ranges from 0 (no overlap) to 1 (total overlap)

Fig. 1. Co-occurrence of depression symptoms across 9 depression rating scales examined in this study



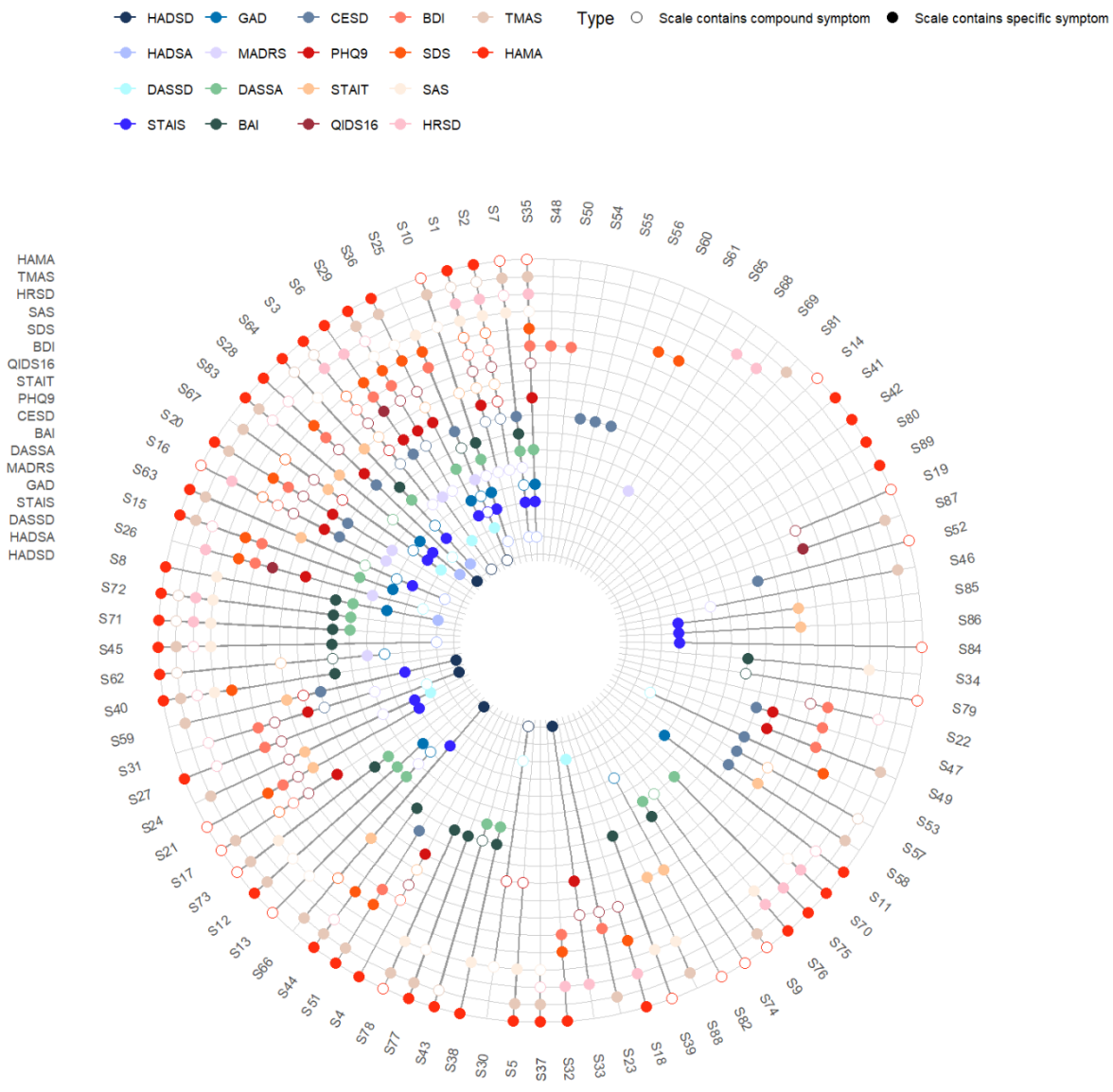
1. Early insomnia
2. Middle insomnia
3. Late insomnia
4. Hypersomnia
5. Sad mood
6. Anxious / fearful mood
7. Panic/phobic symptoms
8. Irritable mood
9. Appetite decreas
10. Appetite increase
11. Weight decrease
12. Weight increase
13. Concentration problems
14. Indescisiveness
15. Guilt
16. Worthlessness
17. Pessimism / hopeful about future
18. Suicidal ideation
19. Loss of interest
20. Loss of pleasure
21. Tiredness, fatigue
22. Loss of energy
23. Decreased libido
24. Psychomotor retardation
25. Psychomotor agitation
26. Sympathetic arousal (palpitations ,tremors, tinnitus, chest pain)
27. Gastrointestinal problems (constipation, diarrhea)
28. Past failure (I am a total failure as a person)
29. Punishment feelings
30. Self-dislike
31. Self-criticalness (blaming oneself for bad things that happen)
32. Crying
33. Lonely
34. Everything I do is an effort
35. Talked less than usual
36. People were unfriendly
37. People disliked me
38. Bothered by things that usually don't bother me
39. Feeling as good as other people+
40. Feeling Happy+
41. I am useful and needed
42. My life is pretty full
43. Inner tension
44. Inability to feel
45. Hypochondriasis
46. Loss of insight

Fig. 2. Co-occurrence of anxiety symptoms across 9 anxiety rating scales examined in this study



1. Muscle pain
2. Chest pressure
3. Chest pain
4. Increased heart rate
5. Breathing difficulty
6. Tension (general)
7. phsyical shakiness
8. Restlessness
9. Relaxed
10. Nervous
11. Upset / rattled
12. Jumpy / startled
13. Irritable / on edge/ annoyed
14. Sensitive
15. Crying
16. Headache
17. Perspiration
18. Indigestion / nausea
19. Choking / difficulty swallowing
20. Dry mouth / dry throat
21. Hunger
22. Numbness / tingling
23. Physical weakness
24. Sleep difficulty
25. Nightmares/ Dreams
26. Tired
27. Frequent urination
28. Flushed face / blushing
29. Hot body temperature
30. Cold body temperature
31. Blurred vision / spots
32. Faint / lightheaded
33. Dizziness
34. Panic
35. Agoraphobia
36. Avoidance
37. Fear
38. Anticipated fear
39. Social fear
40. Anxiety
41. Intrusive thoughts
42. Worry
43. Confusion
44. Positive feelings
45. Steady
46. Secure
47. Negative feelings
48. Self-worth
49. Self-conscious
50. Overwhelmed
51. Indecision
52. Poor memory
53. Concentration
54. Depressed mood

Fig. 3. Co-occurrence of anxiety and depressive symptoms across 9 anxiety and 9 depression rating scales examined in this study



1. Early insomnia
2. Middle insomnia
3. Late insomnia
4. Hypersomnia
5. Nightmares/ Dreams
6. Sad mood
7. Fear
8. Anticipated fear
9. Social fear
10. Nervous
11. Jumpy / startled
12. Anxiety
13. Panic/ phobic symptoms
14. Agoraphobia
15. Irritable / on edge/ annoyed
16. Appetite decreas
17. Appetite increase
18. Weight decrease
19. Weight increase
20. Concentratio n problems
21. Indecision
22. Guilt
23. Worthlessne ss
24. Self-worth
25. Pessimism / hopeful about future
26. Suicidal ideation
27. Loss of interest
28. Loss of pleasure
29. Tiredness, fatigue
30. Physical weakness
31. Loss of energy
32. Decreased libido
33. Psychomotor retardation
34. Numbness / tingling
35. Psychomotor agitation/rattl ed
36. Restlessness
37. Headache
38. Faint / lightheaded
39. Dizziness
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42. Chest pain
43. Perspiration
44. Gastrointesti nal problems (constipation, diarrhea)
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75. Dry mouth / dry throat
76. Frequent urination
77. Flushed face / blushing
78. Hot body temperature
79. Cold body temperature
80. Blurred vision / spots
81. Avoidance
82. Intrusive thoughts
83. Worry
84. Confusion
85. Steady
86. Secure
87. Self- conscious
88. Overwhelme d
89. Poor memory

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