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Investigating the *DSM–5* and the ICD-11 PTSD Symptoms Using Network Analysis Across Two Distinct Samples

Maj Hansen[1], Cherie Armour[2], Emily McGlinchey[2], Jana Ross[3], Sophie Lykkegaard Ravn[1, 4], Tonny Elmose Andersen[1], Nanna Lindekilde[1], Mette Elmose[1], Sidsel Karsberg[5], and Eiko Fried[6]

[1] ThRIVE, Department of Psychology, University of Southern Denmark
[2] School of Psychology, Queens University Belfast
[3] School of Applied Social and Policy Sciences, Ulster University
[4] Specialized Hospital for Polio and Accident Victims, Odense M, Denmark
[5] Centre for Alcohol and Drug Research, Aarhus BSS
[6] Department of Clinical Psychology, Leiden University

Objective: Posttraumatic stress disorder (PTSD) has long been debated with a recent focus on the consequences of having two different diagnostic descriptions of PTSD (i.e., the *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* [*DSM–5*] and the International Classification of Diseases-11th Edition [ICD-11]). Research has modeled PTSD as a network of interacting symptoms according to both diagnostic systems, but the relations between the two systems remain unclear regarding which symptoms are more central or interconnected. To answer this question, the present study is the first study to investigate the combined network structure of PTSD symptoms according to both systems using validated measurements (i.e., the International Trauma Questionnaire [ITQ] and the Posttraumatic Stress Disorder Checklist 5 [PCL-5] across two distinct trauma samples [a community sample, N = 2,367], and a military sample, N = 657). ***Method:*** We estimated two Gaussian Graphical Models of the combined ICD-11 and *DSM–5* PTSD symptoms across the two samples. ***Results:*** Five of the six most central symptoms were the same across both samples. ***Conclusions:*** The results underline that a combination of five symptoms representing both diagnostic systems may hold central positions and potentially be important for treatment. However, the implications depend on if the different diagnostic descriptions can be reconciled in an indexical rather than constitutive perspective.

Maj Hansen https://orcid.org/0000-0002-8328-0807
Cherie Armour https://orcid.org/0000-0001-7649-3874
Emily McGlinchey https://orcid.org/0000-0002-7423-8762
Jana Ross https://orcid.org/0000-0003-2794-1268
Sophie Lykkegaard Ravn https://orcid.org/0000-0002-2908-5832
Tonny Elmose Andersen https://orcid.org/0000-0002-9045-7500
Nanna Lindekilde https://orcid.org/0000-0002-4212-6838
Sidsel Karsberg https://orcid.org/0000-0001-6664-603X
Eiko Fried https://orcid.org/0000-0001-7469-594X

Maj Hansen served as lead for conceptualization, investigation, project administration, resources, supervision, writing – original draft and writing – review and editing, contributed equally to methodology and served in a supporting role for formal analysis. Cherie Armour served as lead for funding acquisition, investigation, supervision, and writing – review & editing, contributed equally to conceptualization, data curation, methodology, and writing – original draft. Emily McGlinchey served as lead for formal analysis and writing – review and editing, contributed equally to writing – original draft and served in a supporting role for conceptualization. Jana Ross served as lead for writing – review and editing, contributed equally to data curation, formal analysis, methodology, software, visualization, and writing – original draft. Sophie Lykkegaard Ravn served in a supporting role for writing – review and editing. Tonny Elmose Andersen served in a supporting role for writing – review and editing. Nanna Lindekilde served in a supporting role for writing – review and editing. Mette Elmose served in a supporting role for writing – review and editing. Sidsel Karsberg served in a supporting role for writing – review and editing. Eiko Fried served as lead for methodology, software, supervision, and Writing – review and editing, contributed equally to conceptualization, data curation, formal analysis, visualization, and writing – original draft.

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The data reported in present study have been collected as part of a larger data collection. Findings from the larger data collection have been reported in a separate article (MS1). MS 1 has a different aim, uses a different methodology, and sampling than the present study. MS1 is a confirmatory factor analytic study of the distinct PTSD symptoms across the two diagnostic systems in a larger sample (N = 4,213). MS also includes two additional samples not included in the present study. In contrary, the present study focuses on the network structure of combined PTSD symptoms in a subsample of the larger study (N = 2,367). At the same time, the present study also includes a second data set, which it has not previously been compared with.

Correspondence concerning this article should be addressed to Maj Hansen, ThRIVE, Department of Psychology, University of Southern Denmark, Campusvej 55, 5230 Odense M, Denmark. Email: mhansen@health.sdu.dk

Clinical Impact Statement

Five identical posttraumatic stress disorder (PTSD) symptoms representing both diagnostic systems were identified across two distinct trauma exposed samples using network analysis. These symptoms may hold important positions compared with the remaining symptoms of the network and potentially be central for treatment. However, the implications depend on whether the results can be reconciled by viewing the two diagnostic descriptions of PTSD as indexical.

Keywords: PTSD, *DSM-5*, ICD-11, network analysis, diagnostics

Supplemental materials: https://doi.org/10.1037/tra0001281.supp

Since posttraumatic stress disorder (PTSD) was introduced into the diagnostic nomenclature over 40 years ago, it has been debated and subjected to several changes. Recently, these debates have focused on the potential consequences of having two different descriptions of PTSD across diagnostic systems (Hansen et al., 2017), the *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* (*DSM–5*; American Psychiatric Association, 2013) and the 11th edition of the International Classification of Diseases (ICD-11; World Health Organization, 2018). It is not surprising that the two systems describe PTSD in different ways, as they were intended to serve different purposes. The *DSM–5* was set forward to "*conceptualize PTSD broadly and provide full coverage of its clinical presentations*" (Weathers, 2017, p. 122), whereas the ICD-11 had the goal to "*simplify the diagnosis and direct clinicians' attention to its core elements*" (Maercker et al., 2013, p. 1684). Thus, in the *DSM–5*, PTSD is described by 20 symptoms belonging to four symptom clusters of intrusion (B1-B5), avoidance (C1-C2), negative alternations in cognitions and mood (D1-D7), and alternations in arousal and reactivity (E1-E6), whereas the ICD-11 PTSD features three symptom clusters of reexperiencing (B), avoidance (C), and persistent sense of current threat (D), which is often operationalized by two symptoms belonging to each symptom clusters (B1-B2, C1-C2, and D1-D2) in the International Trauma Questionnaire (ITQ; Cloitre et al., 2018).

At first glance, the ICD-11 PTSD criteria may appear like a condensed version of the *DSM–5* PTSD criteria. However, there are important differences between the two diagnostic descriptions not only in the number of symptoms and symptom clusters, but also regarding some of the "shared" symptoms. Specifically, the intrusion criterion in the ICD-11 requires that reexperiencing is more explicit, occurring in the here and now in the form of disturbing dreams and/or flashbacks compared with a broader definition in the *DSM-5* (Brewin et al., 2017). These differences may affect the estimated PTSD prevalence rates quantitively (i.e., the same group of patients has different PTSD prevalence rates, depending on the diagnostic criteria) and qualitatively (i.e., different patients are identified as meeting the two different diagnostic criteria for PTSD with κ values ranging between .60–68; Hansen et al., 2017) as well as the effect of treatment (Andersen et al., 2022).

Numerous studies have investigated the factor structure of PTSD in both diagnostic systems (cf. Armour et al., 2016, 2017). These latent variable models explain the shared variance of symptoms as underlying factors. Such factors can be understood as common causes, where changes in the latent variable (i.e., factor) cause changes in the observed symptoms (Caspi & Moffitt, 2018), which puts the causal focus on the relations between the factor and the symptoms. Network theory, on the other hand, postulates that disorders are emergent properties stemming from the *relations* among symptoms. Thus, symptoms are correlated not because they share a common origin, but because they causally affect each other (Borsboom, 2017; Borsboom & Cramer, 2013). Network theory allows for the possibility that some symptoms have many causal associations and others have few. In a recent dynamic network analysis study, data was collected from 94 participants exposed to rocket fire during the Israel–Gaza War in 2014 over the course of 1 month, participants completed up to 60 assessments of PTSD (Greene et al., 2018). Modeling PTSD symptoms over time, the authors found that startle response at a given time-point predicted the presence of many other PTSD symptoms at the next time-point (i.e., had many outgoing associations), whereas physiological reactivity, for instance, did not predict future symptoms. On the other hand, the sleep disturbances symptom had little predictive quality, but was predicted by other symptoms (i.e., had many incoming connections). It has been suggested that targeting such "central" symptoms, especially if they predict other symptoms over time (outgoing connections), could potentially be clinically beneficial, because it might have causal downstream effects on other symptoms (Borsboom & Cramer, 2013). In other words, these symptoms may hold important positions compared with the remaining symptoms, which is central for diagnosis and treatment, but at the same time, central symptoms are not necessarily clinically severe symptoms (Cero & Kilpatrick, 2020). This notion is contentious, however, and requires detailed investigations (for a critical discussion, see Bringmann et al., 2019; Fried et al., 2018).

Studies of PTSD symptom network structures are rapidly emerging (Birkeland et al., 2020). No studies to date have examined the centrality of PTSD symptoms in a combined network using validated measurements of both the *DSM–5* and the ICD-11 PTSD. We argue that network analysis presents an alternative way forward to understand PTSD both within and specifically for the present study between diagnostic systems by understanding PTSD from the relations between symptoms and mapping out the complexity in more detail than comparing prevalence rates and common causes. We are especially interested in central symptoms, because given a set of assumptions (Fried, 2020), they are potential mechanisms that sustain the disorder (Borsboom, 2017). Of note this does not automatically make them the best intervention targets: this requires experimental, within-subjects follow-up work, rather than investigations at between-subjects level. At the same time, our aim is not to identify "correct" PTSD symptoms

nor to develop a new combined scale across the two diagnostic systems, which is not substantively meaningful as they are built on different rationales. Instead, we aim to make an explorative comparison of the two PTSD descriptions using network analysis to identify PTSD symptoms across the diagnostic systems that hold important positions compared with the remaining symptoms. We hope that this presents an alternative way of looking at the debate concerning the different diagnostic criteria of PTSD and potentially if taking an indexical approach to the results (see later description in Implications) introducing a framework to integrate the two conceptualizations of PTSD rather than separating them. Of note, this does not preclude PTSD having common causes as well, of which traumatic exposure is an obvious one. Hence, a way forward may be to understand PTSD both within and between diagnostic systems as having some common causes, but also relations between symptoms (Fried, 2020).

Several studies have examined the network structure of *DSM–5* PTSD symptoms using measurements developed for *DSM–5* PTSD (Armour et al., 2017; Bartels et al., 2019; Benfer et al., 2018; Birkeland et al., 2020; Cero & Kilpatrick, 2020; Mitchell et al., 2017; Moshier et al., 2018; Ross et al., 2018; Spiller et al., 2017; von Stockert et al., 2018) and investigated symptom centrality. Strength centrality—the absolute sum of all associations of a symptom with its neighbors—is the most reported centrality metric, likely because it is the most accurately estimated metric of the three commonly used centrality indices implemented originally in the R-package qgraph (compared with betweenness and closeness; Epskamp et al., 2018). While the ICD-11 PTSD symptoms as operationalized by the ITQ are not just a subset of the *DSM–5* PTSD symptoms, it is possible to make cautious assumptions about the centrality of the ICD-11 symptoms and *DSM–5* symptoms by looking at the *DSM–5* networks due to the partial overlap between the two diagnostic systems. Since ICD-11 PTSD has been operationalized in the ITQ with six symptoms (Cloitre et al., 2018) of PTSD, we are especially interested in which six symptoms have been identified as the most central ones in the existing *DSM–5* network studies. We have summarized the results of strength centrality in existing studies in Table 1.

Across all the studies, the *DSM–5* D4 (negative feelings) symptom was identified among the top six most central symptoms, but otherwise mixed results were found and did not consistently point to the six overlapping or shared the ICD-11 symptoms as being most central. We see several potential explanations for this, which also highlights why PTSD network studies need to be compared with caution. First, the sample sizes differed (N = 106–1,458). Network models require fairly large numbers of observations to reliably estimate network parameters such as edge weights and centrality indices (Epskamp et al., 2018). This means that even if a symptom was the most central symptom in the true network of all data sets, it is likely that this symptom would not be reliably identified as the most central symptom in smaller samples due to lack of power. Second, the estimated PTSD rates differed (7.9–100%), and it is possible that network structures differ according to clinical severity of the samples. Third, the samples differed in experienced traumatic events. Different trauma types may impact differently on the network structures, and lead to different centrality estimates (Fried et al., 2018).

To date, two existing network studies have explicitly sought to shed more light on the implications of *DSM–5* network models for ICD-11 (Cero & Kilpatrick, 2020; Mitchell et al., 2017). While the both studies featured large samples, both the *DSM–5* and the ICD-11 PTSD were assessed using the PCL-5, which only maps directly onto the *DSM–5* PTSD criteria, but not the ICD-11 criteria. The present study is the first study seeking to identify the six most central PTSD symptoms across the two diagnostic systems by providing a more complete coverage of PTSD according to both diagnostic systems using validated measurements of both diagnostic systems in combined ICD-11/*DSM–5* PTSD symptom networks across two distinct samples, a community sample and a military veteran sample. Furthermore, we compare the average centrality of both sets of symptoms. Unlike Mitchell et al. (2017) and Cero and Kilpatrick (2020) our aim is not to evaluate the ICD-11 model, but rather to shed more light on the relations between the diagnostic systems by estimating the combined networks of PTSD symptoms according to both diagnostic systems across the two individual samples.

Method

Participants and Procedure

Sample 1: Community Sample

Data was obtained from a cross-sectional electronic e-mail questionnaire survey on interpersonal violence and wellbeing conducted in 2016 at a Danish university (N = 5,277). All necessary ethical and legal approval according to Danish legislation were granted for conducting the present study and carried out in accordance with the APA ethical standards (i.e., parts that are relevant for the present study). A total of 4,213 (79.8%) participants reported exposure to at least one lifetime traumatic event indicated as an index trauma. A total of 1,585 participants were excluded from the analyses due to unclarities regarding the index trauma meeting the A criterion (unspecified trauma [n = 804] and loss [n = 781]). Furthermore, 261 participants (6.2%) were excluded due to ≥20% missing data on the PTSD items, leaving an eligible sample size of 2,367 (62.7% females, M_{age} = 24.84 years, SD = 5.21, range = 18–74).

Sample 2: Military Sample

Data was obtained from a cross-sectional questionnaire examining health and wellbeing among Northern Irish military veterans conducted between December 2017 and June 2019 (N = 1,329) and was available online and in pen-and-paper format. Ethical approval was granted by the Queen's University Belfast's Engineering and Physical Sciences Faculty Research Ethics Committee, and the study was carried out in accordance with the American Psychological Association (APA) ethical standards (i.e., parts that are relevant for the present study). All participants provided informed consent before completing the questionnaire. A total of 1,022 (76.9%) participants reported exposure to at least one lifetime traumatic event indicated as an index trauma. A total of 126 participants were further excluded from the analyses due to unclarities regarding the index trauma meeting the A criterion (unspecified trauma [n = 26] and loss [n = 100]). Furthermore, 239 participants were excluded from the analyses due to ≥20%

Table 1

Symptom Mapping for the PCL-5, the ITQ-11 PTSD Items, and Top Six Most Central Symptoms According to Strength Centrality Across DSM-5 Based Network Studies

DSM-5 PTSD symptoms *(ICD-11 symptoms)* Sample	Armour et al. (2017) U.S. veterans (*N* = 221)	Bartels et al. (2019) Children and adolescents (*N* = 475)[c]	Benfer et al. (2018) Mixed community samples (*N* = 106–554)[d]	Cero and Kilpatrick (2020) Replication sample Mitchell (*N* = 173) Community sample (*N* = 2,953)	Mitchell et al. (2017) U.S. veterans (*N* = 1,458)	Moshier et al. (2018)[e] U.S. veterans (*N* = 378)	Spiller et al. (2017) Asylum seekers and refugees (*N* = 151)	Ross et al. (2018) U.K. treatment-seeking military veterans (*N* = 331)	von Stockert et al. (2018)[f] U.S. military veterans (*N* = 611)
Intrusion									
B1: Unwanted memories	—	—	SA/POL	—	X	PCL-5/ CAPS-5	—	X	—
B2: Disturbing dreams *(ICD-11 B1 not identical)*[a]	X	—	—	—	X	—	—	X	X
B3: Reliving*(ICD-11 B2 not identical)*[a]	X	—	SAD/MVA	REP	—	—	—	—	—
B4: Feeling upset	X	X	SAD	COM/REP	—	PCL-5	X	—	—
B5: Physical reactions	X	—	MVA	—	—	CAPS-5	X	—	—
Avoidance									
C1: Internal avoidance*(ICD-11 C1 nearly identical)*[b]	—	X	—	COM/REP	X	—	—	—	X
C2: External avoidance*(ICD-11 C2 identical)*	—	—	SAD	COM	X	PCL-5	—	X	X
Negative alternations in cognition and mood									
D1: Amnesia	—	—	—	—	—	—	—	—	—
D2: Negative self-beliefs	—	X	SA/SAD	COM	—	PCL-5	—	—	—
D3: Self-blame	—	—	MVA	—	—	—	—	—	—
D4: Negative feelings	X	X	ALL 4	COM/REP	X	PCL-5/ CAPS-5	X	X	X
D5: Loss of interest	—	—	MVA	COM/REP	—	—	—	—	—
D6: Distant	X	X	SA	REP	—	PCL-5/ CAPS-5	—	X	X
D7: No positive feelings	—	X	SA/MVA/POL	—	X	CAPS-5	—	—	—
Alternations in arousal and reactivity									
E1: Aggression	—	—	—	—	—	—	—	—	—
E2: Risky behavior	—	—	POL	—	—	—	X	—	—
E3: Hypervigilance*(ICD-11 D1 identical)*	—	—	—	—	—	CAPS-5	X	—	—
E4: Easily startled*(ICD-11 D2 identical)*	—	—	SAD/POL	—	—	PCL-5	X	X	—
E5: Concentration	—	—	SA/MVA/POL	—	—	—	—	—	X
E6: Sleep problems	—	—	—	—	—	—	—	—	—

Note. *DSM-5* = *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition*; ICD-11 = International Classification of Diseases-11th Edition; ITQ = International Trauma Questionnaire; PCL-5 = Posttraumatic Stress Disorder Checklist 5; PTSD = posttraumatic stress disorder.

[a] The ICD-11 intrusion criterion requires that reexperiencing is more explicit in the here and now, whereas the *DSM-5* allows for a broader definition of re-experiencing (Brewin et al., 2017). [b] Different examples are given in questionnaire but otherwise the question is identical. [c] Treatment seeking children and adolescents in United States, Norway, and Germany, caregivers' perspective not included. [d] Three different subsamples and one pooled sample of undergraduates from United States were investigated. MVA (motor vehicle accident, *N* = 226), SA (sexual assault, *N* = 222), SAD (sudden accidental/violent death of loved one, *N* = 106), and POL (pooled sampled, *N* = 554). Top seven symptoms are included from the MVA sample as centrality for B3, D3, and D4 were highly similar. [e] PTSD network using two different *DSM-5* measurements PTSD Checklist (PCL-5) and Clinical-Administered PTSD Scale (CAPS-5) were compared in the same sample. Top seven symptoms are included from the PCL-5 network as centrality for D2 and E4 appear highly similar. [f] The results from T1 are included.

missing data on the PTSD items, leaving an eligible sample size of 657 (91.9% males, M_{age} = 55.62 years, *SD* = 10.71, range = 27–99).

Measures

In the community sample, the index trauma for assessing PTSD symptoms was identified using a modified version of the Life Event Checklist-5 (LEC-5; Weathers, Blake, et al., 2013). The LEC-5 was modified both according to the context of Danish students as well as to explicitly assess childhood traumatic exposure (i.e., neglect, physical assault, sexual abuse, and assault; see Hansen et al., 2017, for more details).

In the military veteran sample, the index trauma for assessing PTSD symptoms were identified using 17 binary (yes/no) items, 13 items from the Stressful Life Events Screening Questionnaire for *DSM–5* with a focus on interpersonal trauma (SLESQ; Elhai et al., 2012), and four items from the LEC-5 (Weathers, Blake, et al., 2013). The additional four items from LEC-5 asked about the experiences of natural disasters, fire or explosion, exposure to a toxic substance, and whether participants had caused serious injury, harm, or death to someone else.

In both samples, PTSD symptoms were assessed according to both the *DSM–5* and the ICD-11 diagnostic criteria. *DSM–5* PTSD was assessed using the PCL-5 (Weathers, Litz, et al., 2013), which measures the four *DSM–5* symptom clusters with 20 items rating each *DSM–5* PTSD symptom on a 5-point Likert-type scale 0 = *not at all* to 4 = *extremely*, indicating how much a specific symptom has bothered the respondent in the past month. An estimated PTSD *DSM–5* diagnosis is met if the participants endorse at least one symptom of intrusion, one symptom of avoidance, two symptoms of negative alternations in cognitions and mood, and two symptoms of alternations in arousal and reactivity; indicated by a score ≥2 (*moderately*). The PCL-5 has shown acceptable validity and reliability (Bovin et al., 2016). The α values for the total score were .95 for sample one and .98 for sample two.

The ICD-11 PTSD symptoms in the past month were assessed using the ITQ, which measures each of the three ICD-11 PTSD symptom clusters with six items rated on a five-point Likert-type scale identical to the PCL-5 (Cloitre et al., 2018). Due to the exact same wording on the PCL-5, we removed three of the six ITQ items. Thus, in total we included three ITQ items in the present study with the remaining three items represented by the PCL-5 (see Table 1). An estimated ICD-11 PTSD diagnosis is met if the participants endorse at least one symptom of reexperiencing, avoidance, and sense of threat; indicated by a score ≥2 (*moderately*). The ITQ has shown acceptable validity and reliability (Cloitre et al., 2018; Hansen et al., 2021). The α values for the total score were .86 for sample one and .94 for sample two.

Data Analysis

Reliability testing and descriptive statistics were computed in SPSS 26. No multicollinearity was detected using as indicated by the majority of all variance inflation factor ($\sqrt{}$VIF) values being below 5 and no $\sqrt{}$VIF values exceeding 6 (Myers, 1990). R Version 4.2 was used for estimating and visualizing the network, and for carrying out stability analyses.

Network Estimation and Visualization

Both networks consisting of 23 PTSD symptoms (20 PCL-5 and three ITQ items) were estimated and visualized using the R package *bootnet* (Epskamp et al., 2018). All items were treated as ordinal. A Gaussian Graphical model consisting of nodes (items) and edges (relations) was estimated based on the polychoric correlation matrix. As a robustness check a network based on spearman correlations were also estimated for both samples. Both adjacency matrices were highly correlated; therefore, the polychoric correlation matrix was used. The edges are weighted and can be interpreted as conservative partial correlations (i.e., the correlations between each pair of variables after controlling for all other variables in the network). We used the graphical LASSO, a regularization technique that shrinks all the edges and sets the very small ones to zero (Friedman et al., 2008), leading to a sparse network structure. To visualize each network, we used the Fruchterman and Reingold (1991) algorithm. Positive edges are depicted as green lines and negative edges are depicted as red lines. The thicker and more saturated the edge, the stronger the connection.

Centrality, Network Accuracy, and Stability

In the present study, we estimated expected influence (EI) centrality (Robinaugh et al., 2016), using the R package *qgraph* (Epskamp et al., 2012). EI is the sum of edges (compared with the absolute sum of edges for strength centrality; i.e., in a network of only negative edges, EI would be negative for all nodes, while it would be positive for strength). Research suggests that EI may be an indicator of centrality better suited in networks which contain negative edges (Robinaugh et al., 2016). For each network, we compared average symptom centrality of all symptom sets using a permutation test described in detail in Fried et al. (2016). We did so in two ways: by comparing the 17 *DSM–5* and three ICD-11 symptoms that do not overlap, and, as a robustness check, the 20 *DSM–5* and six ICD-11 symptoms (with the three overlapping symptoms included in both groups). Finally, accuracy and stability analyses were carried out using the procedures outlined in Epskamp et al. (2018) and are described in the online supplemental materials.

Results

Community Sample

The estimated *DSM–5* PTSD prevalence rate was 13.6% (*n* = 321) and ICD-11 PTSD was 7.5% (*n* = 177). The most common traumatic events indicated as the index trauma for assessing PTSD symptoms were witnessing serious illness (22.6%, *n* = 534), experienced a serious accident (12.8%, *n* = 303) and witnessed a serious accident (6.6%, *n* = 156), directly experienced childhood neglect (6.4%, *n* = 152), and directly experienced physical assault after the age of 18 (5.7%, *n* = 135). With the three overlapping symptoms excluded, the standard deviation (*SD*) levels for both the *DSM–5* and ICD-11 symptoms were 1.07 and .86, respectively; *DSM–5* symptoms had a somewhat higher average mean than ICD-11 symptoms (*DSM–5*: .64, ICD-11: .41). In the robustness analyses where the three overlapping symptoms were assigned to both diagnostic systems, *SD* levels were 1.07 and .99

for the *DSM–5* and ICD-11 symptoms, respectively, with more pronounced mean level differences (*DSM–5*: .64, ICD-11: .55).

The 23-item combined PTSD community network is presented in online supplemental materials Figure S1. The six strongest edges emerged between *DSM–5* disturbing dreams and ICD-11 upsetting dreams (.60), *DSM–5*/ICD-11 hypervigilance and *DSM–5*/ICD-11 easily startled (.51), *DSM–5* concentration problems and *DSM–5* sleep problems (.49), *DSM–5* distant and *DSM–5* no positive feelings (.38), *DSM–5* disturbing dreams and *DSM–5* unwanted memories (.38) and *DSM–5* interest and *DSM–5* distant (.36). The edge weights bootstrap (online supplemental materials Figure S2) showed that the 95% confidence intervals (CI) for many of the edges were overlapping, and the order should be interpreted with some caution. The edge weights significance test (online supplemental materials Figure S3) indicated that the above-mentioned edges were significantly stronger than the majority of the weaker edges in the network.

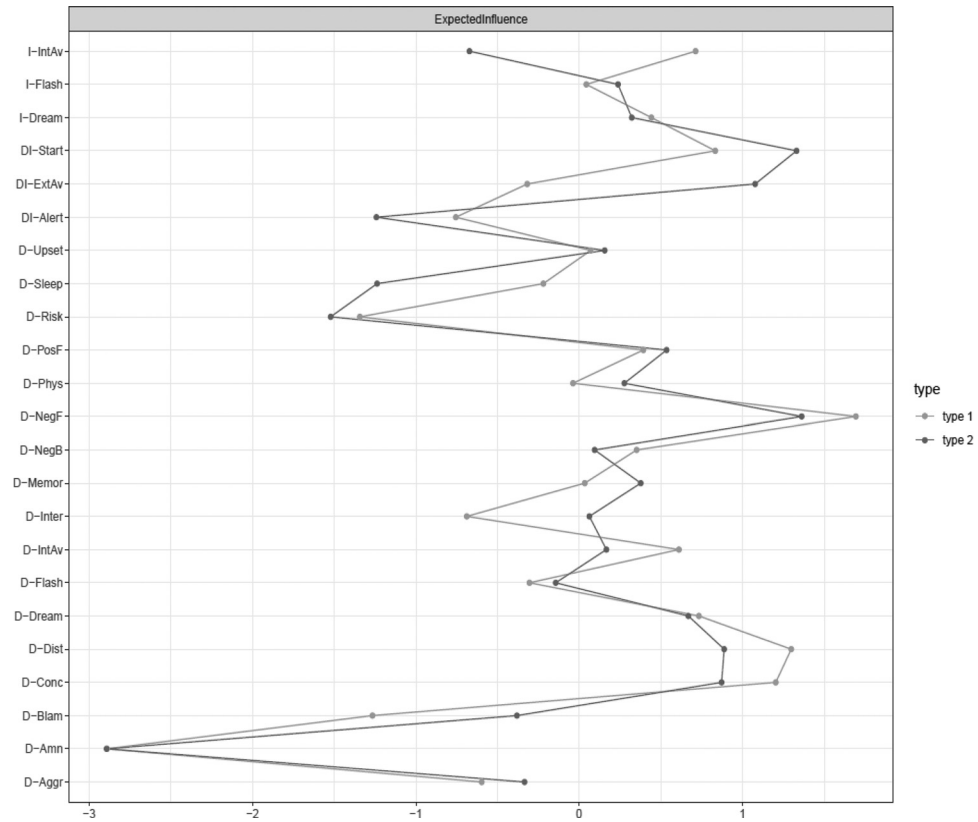
Standardized EI centrality for the PTSD items is presented in Figure 1. Stability analyses indicated a stable order of EI with a CS coefficient of .75 (online supplemental materials Figure S4); this means that at least 75% of the data can be dropped to retain a correlation of .7 between the initial order of centrality in the full dataset, and the centrality in the bootstrapped subsetted data sets. The six items with the highest EI centrality were *DSM–5* negative feelings (1.69), *DSM–5* distant (1.30), *DSM–5* concentration (1.20), *DSM–5*/ICD-11 easily startled (.83), *DSM–5* disturbing dreams (.73) and ICD-11 avoiding thoughts (.71; Figure 1). The difference tests showed that the symptoms *DSM–5* negative feelings, *DSM–5* distant, *DSM–5* concentration and *DSM–5* easily startled were significantly more central than at least half of the other symptoms. *DSM–5* disturbing dreams and ICD-11 avoiding thoughts were significantly more central than several others (online supplemental materials Figure S5). The item with the lowest centrality was *DSM–5* amnesia (−2.89), which was significantly lower in EI than all remaining items. On average, the 17 unique *DSM–5* symptoms had a somewhat lower average unstandardized EI (.95) than the three unique ICD-11 symptoms (1.02); a permutation test showed that these do not differ from each other significantly (p = .20). As a robustness test, we also included the three overlapping symptoms in both diagnostic systems (i.e., we compared 20 *DSM–5* symptoms with six ICD-11 symptoms). This led to more similar average EI values (*DSM–5*: .94; ICD-11: .97; p = .61).

Military Veteran Sample

The estimated *DSM–5* PTSD prevalence rate was 39.9% (n = 262) and ICD-11 PTSD was 35.3% (n = 232). The most common traumatic events indicated as the index trauma for assessing PTSD symptoms were directly experiencing a fire or explosion (21.2%,

Figure 1

Standardized Expected Influence Centrality Estimates for Both Samples (Black and White Version)



Note. Type 1 (light grey) = community sample; Type 2 (dark grey) = military sample); scores are presented as *Z* scores.

n = 132), witnessing another person being killed, seriously injured, or sexually or physically assaulted (18.0%, n = 112), being in a situation where you were seriously injured or your life was in danger (10.6%, n = 66), experiencing a life-threatening illness (10.3%, n = 64) and repeated exposure to vivid trauma details (9.8%, n = 61). Moreover, with the three overlapping symptoms excluded, *DSM–5* and ICD-11 symptoms had comparable *SD* levels (1.41 and 1.40, respectively) and average mean levels (1.46 and 1.37, respectively). In the robustness analyses where the three overlapping symptoms were assigned to both diagnostic systems, levels were largely unchanged (1.41 and 1.44 for the *DSM–5* and ICD-11 symptoms, respectively), and mean level differences were more pronounced (*DSM–5*: 1.50, ICD-11: 1.61).

The combined 23-item PTSD military network is presented in online supplemental materials Figure S1. The six strongest edges emerged between *DSM–5*/ICD-11 external avoidance and *DSM–5* internal avoidance (.56), ICD-11 upsetting dreams and ICD-11 flashbacks (.52), *DSM–5*/ICD-11 hypervigilance and *DSM–5*/ICD-11 easily startled (.49), *DSM–5* no positive feelings and *DSM–5* distant (.43), *DSM–5* unwanted memories and *DSM–5* disturbing dreams (.39), *DSM–5* self-blame and *DSM–5* negative feelings (.34; online supplemental materials Figure S1). The edge weights bootstrap (online supplemental materials Figure S6) showed that the 95% CI for many of the edges were overlapping. The edge weights significance test (online supplemental materials Figure S7) indicated that the above-mentioned edges were significantly stronger than most of the weaker edges in the network. However, the six strongest edge weights were not significantly different from one another indicating that the above edges should not be interpreted as being different from each other, but they are stronger than most other edges in the network.

Standardized EI centrality for the PTSD items is presented in Figure 1. Stability analyses indicated a stable order of EI with a CS coefficient of .75 (online supplemental materials Figure S8). The six items with the highest EI were *DSM–5* negative feelings (1.36), *DSM–5*/ICD-11 easily startled (1.33), *DSM–5*/ICD-11 external avoidance (1.08), *DSM–5* distant (.89), *DSM–5* concentration (.87) and *DSM–5* disturbing dreams (.67). The item with the lowest EI was *DSM–5* amnesia (−2.89), this item was significantly lower in EI than all remaining items. Overall, the difference tests showed that the symptoms *DSM–5* negative feelings and *DSM–5*/ICD-11 easily startled were significantly more central than at least half of the other symptoms. However, most of the strongest items did not statistically differ from one another in terms of EI (online supplemental materials Figure S9). On average, the 17 unique *DSM–5* symptoms had comparable average unstandardized EI (.94) to the three unique ICD-11 symptoms (.95); a permutation test showed that these do not differ from each other significantly (p = .95). When the three overlapping symptoms from both diagnostic systems were included (i.e., we compared 20 *DSM–5* symptoms with six ICD-11 symptoms), the average EI values were similar (*DSM–5*: .95; ICD-11: .95; p = .95).

Discussion

The present explorative study examined the network structure of the combined *DSM–5* and ICD-11 PTSD symptoms in two trauma exposed samples with the attempt to identify the six most central symptoms of PTSD, and thereby contribute to shedding more light on the relations between the two diagnostic descriptions of PTSD beyond focusing on prevalence rates and common causes. Overall, the results showed that the six most central PTSD symptoms across the two samples included both *DSM–5* and ICD-11 PTSD symptoms. Across the two samples five of the six most central symptoms were identical with four *DSM–5* symptoms (D4 negative feelings, D6 distant, E5 concentration, B2 disturbing dreams, and the shared symptom *DSM–5* E4/ICD-11 easily startled). In the community sample, the remaining most central symptom was the ICD-11 symptom avoiding thoughts, whereas it was the shared symptom *DSM–5* C2/ICD-11 external avoidance in the military veteran sample. Thus, symptoms from four *DSM–5* different symptom clusters were identified across both samples. There were no significant differences between the diagnostic systems in terms of average centrality in any of the two samples.

Some of the results are specifically worth discussing. First, the *DSM–5* symptom D1 amnesia was identified the least central symptom in both PTSD networks, which is consistent with prior PTSD network studies. However, it is important to stress that this does not necessarily indicate that amnesia is not a key symptom of PTSD as concluded by prior factor analytic research (Miller et al., 2013), but it indicates that that amnesia does not appear to be a central PTSD symptom (i.e., suffering from posttraumatic amnesia is not highly associated with the other PTSD symptoms but that does not mean that amnesia is not an important symptom). Instead, the growing body of literature including both samples in the present study seem to suggest that the *DSM–5* negative feelings (D4) symptom is a central PTSD symptom. Of note, in the present study, we identified the same two symptoms from the *DSM–5* cluster of negative alterations in cognitions and mood as being among the six most central ones in both the community and the military veteran samples (D4 negative feelings and D6 distant). This finding is interesting, but it does not preclude that emotional numbing symptoms have been considered as "nonspecific" symptoms of PTSD, as they are often found in other mood and anxiety-related disorders (Armour et al., 2012). Indeed, recent work on transdiagnostic perspectives and treatment targets (e.g., the HiTOP, Kotov et al., 2017) would indicate that internalizing disorders may share some treatment targets. Second, while it is important to stress that the diagnostic systems did not differ much from each other in terms of average centrality across the two samples as five out of six most central symptoms were identical across the two samples. This is important to stress as aforementioned, past network-based studies of PTSD have generally yielded inconsistencies regarding symptom importance (i.e., symptom centrality; see Table 1). To the authors' knowledge, the present study is the first to establish consistency (in relation to symptom centrality) across two different samples, where a degree of variation in relation to traumatic exposure and other factors would be expected. As such, while it is important to remain tentative at this stage, the current findings lay an important foundation or useful starting point for future replication-based network studies and for the formal testing of whether or not these symptoms are also identified as the most central symptoms across the two diagnostic systems in additional populations.

Whereas five out of six most central symptoms were identical across the two samples, the remaining most central symptom

differed across the two samples. However, in both samples the remaining symptom was from the "avoidance" symptom cluster ("external avoidance" in the military sample and "internal avoidance" in the community sample). These results are in line with the results of existing research indicating some heterogeneity in the results (Birkeland et al., 2020), however, as stressed above, there is more homogeneity in the present study than previously observed. The present study is the only study assessing PTSD symptoms using measurements of both diagnostic systems and is not directly comparable with previous research. Further, it is difficult to directly compare to previous studies due to differences in the type of centrality estimate explored. The differences between the samples in the present study regarding the last symptom are not likely to be caused by sample size or differences in methods as both samples had fairly large sample sizes and used the same methods. The differences in the results between the two samples of the present study may be associated with the type of index trauma or estimated prevalence rates. Although, prior PTSD network research indicates that network models may not generalize very well both between and within traumatic exposure (Birkeland et al., 2020; see also Table 1), it is important to stress that five out of the six most central identified symptoms were identical across the present samples.

Implications

Our findings identified a mixture of symptoms from both diagnostic systems as the most central symptoms across the two samples. Considering the implications for the results, whether or not the two diagnostic systems can be reconciled, depends on how we view the relationship between PTSD as a disorder and its diagnostic criteria (i.e., as indexical or constitutive; Kendler, 2017). According to the indexical view of the relationship between the DSM disorders and their criteria, the diagnostic criteria simply reflect the disorder, which is understood as a hypothetical diagnostic construct (Kendler, 2017). In relation to PTSD, this would mean that the *DSM–5* PTSD criteria and the ICD-11 PTSD criteria both refer to the same construct, labeled as PTSD, despite having some nonoverlapping symptoms. Thus, according to the indexical view, it is possible to reconcile the two diagnostic descriptions of PTSD in the sense that they both reflect shared yet also different aspects of the same PTSD construct. The constitutive view, on the other hand, suggests that the criteria *are* the disorder. Specifically, in relation to the present study, this would mean that although the *DSM–5* and ICD-11 PTSD diagnostic criteria share some features, they essentially describe two different disorders.

It is important to stress that network models, like other statistical techniques, are limited to drawing inference regarding the items included in the model (Fried & Cramer, 2017). Although the present study identified both five common symptoms and one sample specific symptom representing both diagnostic systems as the six most central symptoms across the two samples, the results cannot tell us whether the symptoms included in the *DSM–5* and the ICD-11 represent the most specific or core features of PTSD, or whether they are only reflecting an aspect of more general and common reactions to adversity (Brewin et al., 2017). Thus, in advocating for the indexical approach and seeking to reconcile the results, we would argue that it is important to consider the possibility that the two diagnostic descriptions only reflect parts of what we call PTSD and not the full symptom profile. In a similar vein, the results speak of associations between the symptoms (at the between-subjects level), and even if these turned out to be causally relevant treatment targets, less central symptoms may be more severe and deserve more attention (e.g., in depression networks, it is often observed that suicidal ideation features low centrality, but it would be odd to conclude that it hence should be ignored in treatment). The point is merely that, if we could establish symptoms that influence other symptoms causally, treating such symptoms may be beneficial for the whole system; future longitudinal and experimental research designs will have to show to what degree symptoms with central topological positions in between-subjects networks relate to causally central symptoms.

Of note, there are obvious benefits to having diagnostic descriptions, including prevention and targeted treatment of PTSD symptoms. Additionally, research indicates that both diagnostic descriptions of PTSD are supported, and the point here is not to abandon either of the diagnostic criteria, nor to criticize the work behind how the diagnostic systems were derived, but to simply point out that we need to be cautious when researching and working with individuals presenting with posttraumatic symptomatology. In practice, this is reflected in the quantitatively and qualitatively different estimated rates of PTSD according to the two diagnostic systems in both the present and previous research (Brewin et al., 2017; Hansen et al., 2017).

Limitations

The results of the present study need to be interpreted with several limitations in mind. First, the data was collected through self-report. Although research indicates that PTSD networks using different measurement methods are highly similar in the same sample (Moshier et al., 2018), further studies may benefit from using data provided from clinical diagnostic interviews for more precise information about the specific symptoms to ensure that the results reflect the diagnostic criteria and not just the specific measurements. Additionally, although the six most central items identified represent all four symptom clusters and both diagnostic systems, the network analysis may generally be biased toward the NACM symptom cluster as it has more items and likely high intracluster items correlations compared with especially the avoidance symptom cluster with only two items. Furthermore, although there is no current evidence for order effect in the ITQ, potential biases in the results from dropping the identical overlapping items from the ITQ rather than the PCL-5 cannot be ruled out. Second, although PTSD symptoms were assessed within the past month, the two included samples are heterogenous regarding the index trauma as well as time elapsed since the index trauma, which may have biased the results. Although the A stressor criterion was assessed similarly across the diagnostic systems in the present study, it is important to note that the stressor A criterion is differently defined in the diagnostic criteria. Third, the use of cross-sectional data bars us from inferring the potential direction of influence of the individual items in the network, which is necessary (although not sufficient) to start considering the potential role of symptoms in terms of interventions (Greene et al., 2018). A related caveat is that between-subjects models such as the one used in the present study do not necessarily generalize to within-subjects information (Adolf & Fried, 2019). In other words, even if central symptoms

were causal triggers of other symptoms in the network, "one size fits all" interventions targeting the six most central symptoms identified in the present study may not work for (some, many, and most) individual trauma victims. Fourth, to reduce the risk of Berkson's bias we used the full samples of trauma exposed participants and assessed centrality in participants with and without an estimated PTSD diagnose (De Ron et al., 2019). However, to assess PTSD, we only included cases with a known index trauma clearly meeting the A criterion. Berkson's bias usually induces many strong negative relations among nodes, which we do not observe, but results should still be interpreted with caution. Fifth, regarding the military sample in particular, the results of the EI difference tests suggested that while the items with the highest EI estimates were significantly more central than at least half of the other symptoms, many of the strongest items did not statistically differ from one another in terms of EI. Interpretations regarding the ranked importance of these items is not appropriate and should not be interpreted as being different from each other. However, they are more central than most other items in the network. Finally, the present study did not include an assessment of complex symptoms of PTSD (i.e., complex and dissociative PTSD), which is an important avenue for future research to get a more comprehensive coverage and comparison of the two diagnostic systems.

Conclusion

The present study is the first to investigate central PTSD symptoms in a network consisting of both ICD-11 and *DSM–5* PTSD symptoms assessed using validated measurements across two distinct samples. The results indicate that most symptoms were positively related, and the six most central PTSD symptoms were a combination of *DSM–5* and ICD-11 symptoms with five identical symptoms and one unique symptom identified across the two samples. The implications of the results, particularly whether we can reconcile the two diagnostic descriptions of PTSD, depend on how we view the relationship between the label "PTSD" and its diagnostic criteria (i.e., indexical or constitutive). In advocating for the indexical view, we have argued that the two diagnostic systems can be reconciled in the sense that they reflect shared as well as different aspects of PTSD in contrast to the constitutive perspective that assumes that they represent essentially different disorders. Regardless of this interpretation, the results indicate that we need to be cautious when researching PTSD and working with individuals presenting with posttraumatic symptomatology.

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