

The network structure of ICD-11 complex post-traumatic stress disorder across different traumatic life events

The ICD-11 describes complex post-traumatic stress disorder (CPTSD) as consisting of six symptom clusters: re-experiencing of the trauma in the present, avoidance of traumatic reminders, sense of current threat, affective dysregulation, negative self-concept, and disturbed relationships¹.

The network approach estimates and quantifies symptom-specific associations, and symptoms that have many and/or strong associations are deemed highly central to a network. In theory, the most central symptoms should reflect the most significant aspects of a disorder and, potentially, the most important treatment targets. Considering that exposure to a traumatic life event is a defining feature of CPTSD, it is important to explore if CPTSD symptom expression varies depending upon the type of trauma.

We used network analysis to: a) examine the structural validity of CPTSD across six different index trauma experiences (unexpected death of a loved one, physical or sexual assault, life-threatening accident, life-threatening illness, natural disaster, childhood poly-traumatization), and b) explore differences in the overall importance (i.e., centrality) of specific symptom clusters across the six index trauma events.

Data were drawn from general population surveys in the US (N=1,839), the UK (N=1,051), Israel (N=1,003) and the Republic of Ireland (N=1,020). In every case, participants were recruited from existing online research panels that are representative of the general population of each country. In total, 4,913 adults participated across the four samples. Their mean age was 44.9±15.0 years (range 18-90 years), and 60.5% were female. Clinical data were also pooled from three cohorts of clients (N=588, mean age 39.6±12.2 years, 54% female) collected from the same national health service trauma centre in Scotland.

Traumatic exposure was measured using the Life Events Checklist for DSM-5² or the International Trauma Exposure Measure³. The Childhood Trauma Questionnaire⁴ was also used in the clinical samples to measure childhood trauma exposure. CPTSD symptoms were assessed using the International Trauma Questionnaire⁵.

Participants from the community samples were classified into six groups based on their index trauma: unexpected death of a loved one (28.4%, N=1,393), physical/sexual assault (19.3%, N=949), life-threatening accident (15.2%, N=745), life-threatening illness (8.3%, N=409), and natural disaster (6.2%, N=307). All participants from the clinical sample reported multiple traumatic life events in childhood and were thus classified in the group of childhood poly-traumatization.

Symptom networks were estimated separately in each trauma sub-sample using the R-package *Isingfit*, using the default hyperparameter value of 0.25. The resultant networks were visualized using the R package *qgraph*⁶. This package visualizes networks as nodes (points in space reflecting symptoms) and edges (lines connecting the nodes, indicating the presence, direction and strength of associations). The overall importance/influence of each symptom node was determined using the expected influence (EI) measure of centrality. EI is calculated by summing the edge weights of a given node, and thus provides an indication of a node's direct influence over all other nodes in the given network⁷. We tested for significant differences in EI across the trauma groups using non-parametric permutation tests⁸.

Networks, EI values and results from the permutation tests are available at <https://www.traumameasuresglobal.com/na2020>. The EI values were highly inconsistent across the different groups, suggesting that specific symptom clusters had a different relevance depending on the type of index trauma. This was supported by the permutation tests, with 31% of EI values differing significantly across the trauma groups ($\alpha=0.05$).

For those who had experienced accidents or assaults, avoidance was a particularly influential symptom cluster. Sense of current threat and disturbances in relationships were

influential nodes for those in the illness group. Avoidance and disturbances in relationships were high in EI for those who had experienced the unexpected death of a loved one. For those who had experienced a natural disaster, avoidance and negative self-concept were high in EI. Finally, negative self-concept was particularly central for the poly-traumatized sample.

The prominence of sense of threat in the illness group might be suggestive of fear of recurrence. The centrality of avoidance in accidents and assaults might suggest that people are less likely to put themselves in positions where these events can re-occur. Poly-traumatization, especially when occurring in childhood, can lead to a failure to develop age-appropriate competencies, which in turn can lead to a sense of self as defective, helpless, deficient and unlovable.

These results have important implications for the treatment of CPTSD using person-centred approaches. We previously argued⁹ that symptoms of CPTSD can be targeted and prioritized in therapy according to the severity or prominence of a given cluster, alongside the patient's readiness to tackle these symptoms. We now provide evidence that the expression and structure of CPTSD symptoms is associated with the index trauma event. It may be, therefore, beneficial to prioritize different symptom clusters, when planning treatment, depending on the index trauma.

Further research on exploring the salience of different symptoms clusters in CPTSD is important and may contribute to effective and efficient treatment planning.

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