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BASIC RESEARCH ARTICLE

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# Dissociation in focus: replicating and extending network analytic insights based on the dissociative experiences scale

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**ABSTRACT**

**Background:** Factor-analytic studies of the Dissociative Experiences Scale (DES) have reported between one- and seven-factor solutions, leaving its dimensional architecture unresolved. This inconsistency compromises the interpretability of scores and limits the scale's utility for screening and treatment planning. To ensure diagnostic relevance and capture dissociation across mental disorders, we focused on a clinical cohort. Emerging evidence from network-analytic approaches suggests a stable three-factor structure, though replication is limited.
**Objective:** We employed Exploratory Graph Analysis (EGA), a network-psychometric method, to replicate and refine the DES structure in a large UK clinical cohort.
**Method:** Participants were 1,260 treatment-seeking adults drawn from personality disorder and NHS IAPT services (73.8% female; $M = 32.3$ years). Data were collected between 2013 and December 2024. A Gaussian graphical model based on Spearman correlations was estimated using EGA with 1,000 parametric bootstraps. Item- and dimension-stability indices guided iterative pruning. Dimensional solutions were compared to prior models using the Adjusted Rand Index (ARI).
**Results:** Seven items with stability indices below .75 were excluded, resulting in a 21-item, three-factor solution reflecting *amnesia*, *derealisation/depersonalisation*, and *absorption*. Each factor emerged in at least 93% of bootstrap samples, with the full configuration replicated in 96.1%, indicating high structural robustness. Cluster correspondence was perfect with the original DES model (ARI = 1.00) and moderate to substantial with two recent network-based studies (ARI = 0.51; 0.80).
**Conclusions:** EGA recovered the original three-factor configuration of the DES across diverse diagnostic groups, suggesting that *amnesia*, *derealisation/depersonalisation*, and *absorption* represent stable core dimensions of dissociation. Further longitudinal and multi-instrument studies are needed to evaluate temporal invariance and expand construct coverage beyond the DES.

## La disociación en foco: replicación y ampliación de los conocimientos analíticos de redes basados en la escala de experiencias disociativas

**Antecedentes:** Los estudios de análisis factorial de la Escala de Experiencias Disociativas (DES) han arrojado soluciones entre uno y siete factores, lo que deja sin resolver su arquitectura dimensional. Esta inconsistencia compromete la interpretabilidad de las puntuaciones y limita la utilidad de la escala para la detección y la planificación del tratamiento. Para garantizar la relevancia diagnóstica y captar la disociación en los trastornos mentales, nos centramos en una cohorte clínica. Las pruebas emergentes de los enfoques analíticos de redes sugieren una estructura estable de tres factores, aunque la replicación es limitada.
**Objetivo:** Empleamos el análisis gráfico exploratorio (EGA por sus siglas en ingles), un método psicométrico de red, para replicar y refinar la estructura DES en una gran cohorte clínica del Reino Unido.
**Método:** Los participantes fueron 1.260 adultos que buscaban tratamiento, seleccionados de los servicios de trastornos de la personalidad y NHS IAPT (73.8 % mujeres; $M = 32.3$ años). Los datos se recopilaron entre 2013 y diciembre de 2024. Se estimó un modelo gráfico gaussiano basado en correlaciones de Spearman utilizando EGA con 1.000 bootstraps paramétricos. Los índices de estabilidad de los ítems y las dimensiones guiaron la poda iterativa. Las soluciones dimensionales se compararon con modelos anteriores utilizando el índice Rand ajustado (ARI en su sigla en inglés).
**Resultados:** Se excluyeron siete ítems con índices de estabilidad inferiores a .75, lo que dio como resultado una solución de 21 ítems y tres factores que reflejaban amnesia,

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**PALABRAS CLAVE**
Disociación; Escala de Experiencias Disociativas (DES); Análisis Gráfico Exploratorio (EGA); psicometría de redes; estructura dimensional; desapego; compartimentación

**HIGHLIGHTS**

- A robust three-factor structure of the Dissociative Experiences Scale (DES) was identified in a large UK clinical sample using Exploratory Graph Analysis: amnesia, derealisation/depersonalisation, and absorption.
- The identified structure showed excellent replicability and closely aligned with the original model by Carlson et al. (1991) despite methodological and sample differences across studies.
- This study demonstrates the utility of network psychometrics for refining the assessment of dissociation.

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desrealización/despersonalización y ensimismamiento. Cada factor apareció en al menos el 93% de las muestras de bootstrap, y la configuración completa se replicó en el 96.1%, lo que indica una alta solidez estructural. La correspondencia de los clústeres fue perfecta con el modelo DES original (ARI = 1.00) y de moderada a sustancial con dos estudios recientes basados en redes (ARI = 0.51; 0.80).
**Conclusiones:** El EGA recuperó la configuración original de tres factores del DES en diversos grupos diagnósticos, lo que sugiere que la amnesia, la desrealización/despersonalización y el ensimismamiento representan dimensiones centrales estables de la disociación. Se necesitan más estudios longitudinales y con múltiples instrumentos para evaluar la invariancia temporal y ampliar la cobertura del constructo más allá del DES.

## 1. Background

Dissociation refers to a 'disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour' (American Psychiatric Association [APA], 2013, p. 291). Although dissociation features in major diagnostic systems (i.e. DSM-5, ICD-11), its conceptual and empirical boundaries remain contested. As Nijenhuis (2022) argues, the term functions as a homonym encompassing multiple, qualitatively distinct phenomena that may not share common underlying mechanisms. This breadth increases sensitivity by capturing a wide range of psychological experiences but decreases specificity, complicating scientific operationalisation, limiting clinical application, and fuelling conceptual ambiguity.

his ambiguity is mirrored in the proliferation of psychometric instruments used to assess dissociation, most of which assume multidimensionality. The number and nature of identified factors vary not only between instruments but also within the same scale across studies. For instance, factor-analytic research on the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) over the past three decades has produced inconsistent results, ranging from a single factor to seven dimensions. Commonly reported dimensions include *amnesia*, *depersonalisation/derealisation*, *absorption/imaginative involvement*, *identity alteration*, *passive influence*, and related compartmentalisation features (e.g. Carlson et al., 1991; Stockdale et al., 2002; Mazzotti et al., 2016; Saggino et al., 2020). These discrepancies have been attributed to differences in item distributions, sample characteristics, analytical methods, and, crucially, the conceptual limitations of dissociation itself (Nijenhuis, 2022).

Network psychometrics offer an alternative approach to refining psychological constructs empirically. This perspective models constructs as systems of interacting variables rather than as indicators of latent causes (Borsboom & Cramer, 2013). One technique within this framework is Exploratory Graph Analysis (EGA), a fully data-driven method that integrates network estimation and clustering algorithms to identify dimensional structures in multivariate data (Golino & Epskamp, 2017). Compared to traditional factor analysis, EGA has demonstrated superior performance in recovering dimensional structures, particularly when variables are strongly interrelated – as is often the case in dissociative symptomatology (Cardeña, 1994; Loewenstein, 2018; Lynn et al., 2019; Golino et al., 2020; Forkmann et al., 2018). The method generates a visual network of item associations and their clustering into dimensions. Bootstrap resampling can further evaluate the stability and generalisability of these structures (Christensen & Golino, 2021).

To date, only two studies have applied network-analytic approaches to the DES (Schimmenti & Sar 2019; Wülfing & Spitzer, 2024). Wülfing and Spitzer (2024) were the first to implement EGA in a clinical inpatient sample ($N = 668$), identifying a three-factor solution comprising *absorption*, *derealisation/depersonalisation*, and *segregated processes*. Their findings supported the bipartite model of dissociation by revealing a detachment-related factor that included derealisation, depersonalisation, and elements of dissociative amnesia. This structure closely mirrored both the original factor model of Carlson et al. (1991) and the network-derived clusters reported by Schimmenti and Şar (2019). However, the additional dimensions – *absorption* and *segregated processes* – were less clearly delineated and may represent facets of compartmentalisation. The moderate sample size and diagnostic skew toward affective disorders in that German study limit the generalisability of these findings.

The present study seeks to replicate and extend these findings in a large UK clinical sample ($N = 1,260$). We focused on a clinical cohort to capture dissociative phenomena across a range of mental disorders and enhance diagnostic relevance. Using the same methodological approach, we applied EGA to examine the dimensional structure of the DES and assessed structural consistency using bootstrap procedures. To contextualise our results, we compared them with previously published models, including those by Carlson et al. (1991), Schimmenti and Şar (2019), and Wülfing and Spitzer (2024). Our aim was to test the robustness of the previously identified structure and contribute to clarifying the empirical architecture of dissociation.

## 2. Methods

### 2.1. Participants and data collection

Participants were recruited from clinical services in Greater London as part of two ongoing research projects initiated in 2013. Data collection is ongoing, and the present analyses draw on all data available as of December 2024. Inclusion criteria were: (a) age between 16 and 80 years and (b) fluency in English. Exclusion criteria comprised: (a) a diagnosis of schizophrenia or a recent psychotic episode, (b) learning disability, and (c) neurological disorder.

A total of 1,455 individuals were screened. Of these, 569 were referred from specialist personality disorder services, including individuals with suspected or confirmed diagnoses of borderline personality disorder (BPD) or antisocial personality disorder (ASPD). This subsample was included to capture participants with higher levels of personality pathology and clinical risk, thereby reflecting a broader range of clinical presentations and severity. Additional inclusion criteria for this group included: (a) current placement on a therapy waiting list or (b) participation in a psychoeducational group. Diagnoses were established using the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, 2014) and the Personality Assessment Inventory – Borderline Features Scale (PAI-BOR; Morey, 1991).

The remaining 820 participants were recruited via National Health Service (NHS) Improving Access to Psychological Therapies (IAPT; now NHS Talking Therapies) services and were eligible if they (a) reported clinically significant depressive symptoms and (b) qualified for low- or high-intensity face-to-face therapy within IAPT. No structured diagnostic interviews were conducted in this subsample.

Both studies used a cross-sectional design. Participants referred from specialist personality disorder services attended two in-person sessions at University College London, completing behavioural tasks, self-report questionnaires, and structured interviews. IAPT participants completed a remote version of the study, which included the same self-report measures and one behavioural task. All participants provided written informed consent and were compensated £10 per hour, with optional performance-based incentives. Ethical approval was granted by the Wales Research Ethics Committee (REC: 12/WA/0283) and the London Queen Square REC (REC: 16/LO/0077).

### 2.2. Measure

The Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986; Carlson & Putnam, 1993) is a 28-item self-report measure assessing the frequency of dissociative experiences. Respondents indicate the percentage of time they experience each item using 10% increments on an 11-point Likert-type scale ranging from 0% to 100%. The total score is computed as the average across all 28 items, with higher scores reflecting more frequent dissociative experiences. The DES has demonstrated adequate internal consistency, good test–retest reliability, and strong convergent validity (Van Ijzendoorn & Schuengel, 1996). In the present sample, the scale showed excellent psychometric properties (McDonald's $\omega = .96$).

### 2.3. Statistical procedures

All analyses were conducted using R version 4.2.3 (R Core Team, 2023). To ensure transparency and reproducibility, the full R script is available online (https://osf.io/crva7/). Exploratory Graph Analysis (EGA) was implemented using the *EGAnet* package (version 1.2.3; Golino et al., 2022). In the first step, a Gaussian Graphical Model (GGM) was estimated via the graphical LASSO procedure (Epskamp et al., 2018). Given significant non-normality, as indicated by the Shapiro–Wilk test ($p < .01$), Spearman correlations were used. The resulting network comprised nodes (items) and edges (partial correlations), representing conditional dependencies among items while controlling for all others in the network.

Community detection was carried out using the Louvain algorithm (Blondel et al., 2008), which identifies clusters of nodes with higher within-cluster connectivity relative to between-cluster connections. To evaluate structural stability and account for sampling variability, bootstrap EGA (*bootEGA*; Christensen & Golino, 2021) was applied using 1,000 parametric bootstrap samples. This procedure yields a distribution of replicate network structures, from which the following metrics were derived: (1) the median number of dimensions with associated confidence intervals and replication proportions, (2) the median network structure based on median edge weights across bootstraps, and (3) structural consistency – defined as the proportion of bootstrap samples in which each dimension from the original EGA was exactly reproduced (i.e. identical item composition).

Item stability was also assessed to determine how often each item was assigned to its original dimension versus alternative groupings. Stability coefficients range from 0 (no stability) to 1 (perfect stability), with values below 0.75 indicating insufficient stability (i.e. replication in fewer than 75% of bootstrap samples; Christensen & Golino, 2021). Unstable items were candidates for removal. Network loadings were computed to evaluate the contribution of each item to its respective dimension. These loadings, calculated as the sum of all edge weights connected to a node within its cluster, are conceptually analogous to factor loadings but typically smaller due to the use of partial correlations.

To assess the consistency of the observed dimensional structure with prior findings, the Adjusted Rand Index (ARI) was computed. The ARI quantifies the similarity between two classifications while correcting for chance, ranging from −1 (complete disagreement) to 1 (perfect agreement), with 0 indicating chance-level correspondence. ARI values were used to compare the dimensional solution obtained in the present study with those reported by Carlson et al. (1991), Schimmenti & Sar (2019), and Wülfing and Spitzer (2024). Items excluded from a solution or not assigned to any cluster were omitted from comparisons. Given that all compared solutions comprised three clusters of similar size (typically 5 to 7 items per cluster), the ARI was deemed appropriate, as it is minimally affected by cluster size imbalance under these conditions (Warrens & van der Hoef, 2022).

## 3. Results

Of the 1,455 individuals initially screened, 195 (13.4%) were excluded due to missing DES data, yielding a final sample of 1,260 participants (73.8% female, $N = 930$), aged 18 to 80 years ($M = 32.26$, $SD = 10.59$). A total of 556 participants were recruited via specialist personality disorder (PD) services. This subgroup included 507 individuals diagnosed with borderline personality disorder (BPD; 79.5% female, $N = 403$), aged 18 to 64 years ($M = 30.85$, $SD = 9.71$), and 49 individuals with antisocial personality disorder (ASPD; 6.1% female, $N = 3$), aged 19 to 65 years ($M = 37.06$, $SD = 12.83$). The remaining 704 participants were recruited from IAPT services (74.4% female, $N = 524$), all of whom met criteria for clinically significant depressive symptoms. Their ages ranged from 18 to 80 years ($M = 32.93$, $SD = 10.87$).

Figure 1 presents the dimensional solution from the initial EGA network (left) and the median network structure based on 1,000 bootstrap iterations (right), both indicating a four-factor structure. However, this four-dimensional configuration appeared in only 62.8% of bootstrap samples, reflecting poor structural consistency. The median number of dimensions was four (95% CI [2.82, 5.18]).

Analysis of item stability revealed that seven items failed to meet the recommended stability threshold of 0.75 (see Figure S1 in the Supplement), suggesting they were inconsistently assigned across bootstrap replications. For instance, item 24 (*'Not sure whether one has done something or only thought about it'*) was assigned to factor 2 in the original EGA but replicated in that cluster in only 40% of bootstraps. In contrast, it was assigned to factor 3 in 32% and factor 5 in 26% of the samples. Network loadings further indicated multidimensionality, with item 24 loading 0.202 on factor 2 and 0.144 on factor 3 (see Table S1). The seven unstable items (DES-01, DES-02, DES-03, DES-04, DES-09, DES-21, DES-24) were concentrated in two factors, with three in factor 1 and four in factor 2. Further inspection showed that all excluded items were infrequently endorsed, with a mean zero-response rate of 32.9%. Several items also exhibited strong skewness (e.g. DES4 skew = 2.75; DES3 skew = 1.46) or elevated kurtosis (DES24 kurtosis = 8.96).

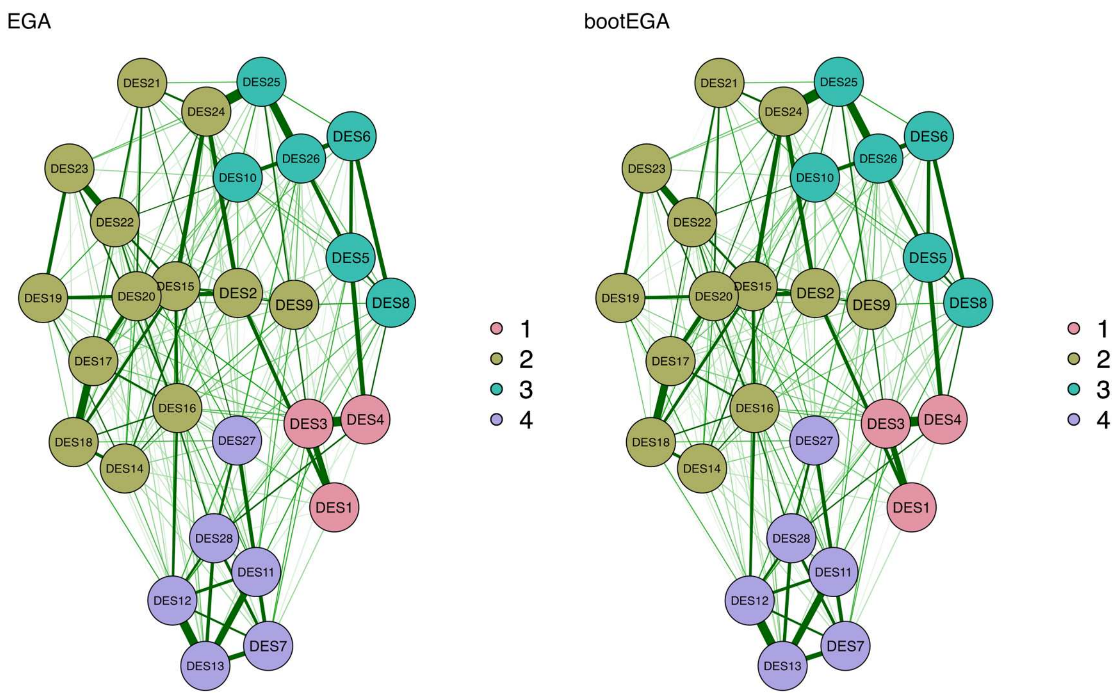


**Figure 1.** Dimensionality structure of the original EGA (left) and original BootEGA (right). Figures are plotted in average design. Thicker edges represent stronger associations. EGA: Exploratory Graph Analysis.

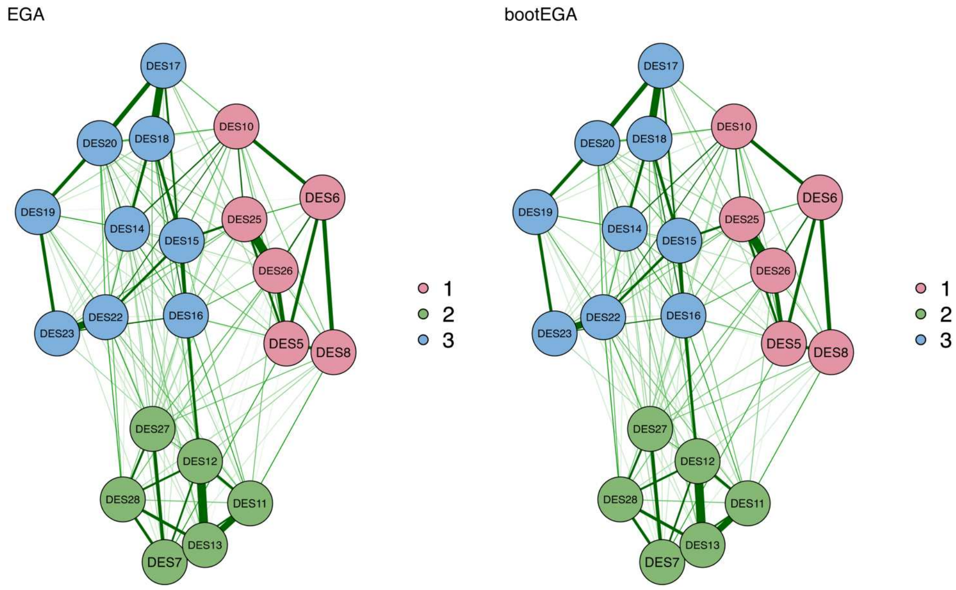


**Figure 2.** Dimensionality structure of the final EGA (left) and final BootEGA (right). EGA: Exploratory Graph Analysis.

Following the removal of these seven unstable items, all analyses were repeated. This resulted in the elimination of factor 1, which had contained DES-01, DES-03, and DES-04. The revised EGA revealed a stable three-factor structure, with all remaining items retaining their original dimensional assignments (see left side of Figure 2). This structure was consistently replicated in the bootEGA (see right side of Figure 2).

The three-factor solution demonstrated excellent structural consistency across bootstrap replications, with overall replication in 96.1% of samples. Individual replication rates were 94.6% for factor 1, 99.0% for factor 2, and 93.2% for factor 3 (see Figure S2). The first dimension, consisting of DES-05, DES-06, DES-08, DES-10, DES-25, and DES-26, reflects amnestic experiences and is best characterised as *amnesia*. The second dimension, comprising DES-07, DES-11 to DES-13, DES-27, and DES-28, captures *derealisation/depersonalisation*. The third, composed of DES-14 to DES-20, DES-22, and DES-23, represents *absorption* or imaginative involvement.

For clarity and comparison, Table 1 provides an overview of the dimensional allocation of all 28 DES items across the original study by Carlson et al. (1991), the network analysis by Schimmenti and Şar (2019), and the EGA-based model by Wülfing & Spitzer (2024).

### *3.1. Structural consistency across studies*

We evaluated our final EGA solution against three previously published structures (Carlson et al., 1991; Schimmenti et al., 2019; Wülfing & Spitzer, 2024). Comparison with the original structure proposed by Carlson et al. (1991) yielded an Adjusted Rand Index (ARI) of 1.00 based on 20 overlapping items, indicating perfect agreement in cluster assignments. All shared items were allocated to the same dimensions, underscoring strong conceptual alignment between the models.

Comparison with Schimmenti & Sar (2019) was based on 12 overlapping items and resulted in an ARI of 0.505, reflecting moderate agreement. The highest correspondence was observed for items related to *absorption* (referred to as *trance* in that study) and *derealisation/depersonalisation* (labelled *experiential disconnectedness*), while discrepancies were most notable for items classified as *amnesia* in our model.

Finally, comparison with the EGA structure from a German clinical sample (Wülfing & Spitzer, 2024), which included 11 overlapping items, yielded an ARI of 0.80, indicating substantial agreement. Alignment was particularly strong for *absorption* and *derealisation/depersonalisation*, whereas divergence involved *amnesia* items, which were either excluded or assigned to *segregated processes* in the Wülfing & Spitzer solution.

## 4. Discussion

This study applied EGA to a large UK clinical sample to re-examine the dimensional structure of the DES. Following the removal of seven low-stability items, we identified a highly replicable three-factor structure capturing *amnesia*, *derealisation/depersonalisation*, and *absorption*. Bootstrap replications exceeded 93% for each factor, with the complete configuration reproduced in over 96% of resamples, indicating excellent structural robustness.

Agreement with the canonical three-factor model by Carlson et al. (1991) was near-perfect (ARI = 1.00), while concordance with more recent network-

**Table 1.** List of all DES items, descriptions, and allocations to the subscales and EGA dimensions in different studies.

| Item | Description | Dimensions across studies | | | |
|---|---|---|---|---|---|
| | | Carlson et al., (1991) | Schimmenti et al. (2019) | Final Wülfing & Spitzer 2024 | Our final EGA |
| 01 | Driving a car and realizing one does not remember what happened during the trip | Ind | Excluded | Segregated processes | Excluded |
| 02 | Missing part of a conversation | Absorption | Excluded | Segregated processes | Excluded |
| 03 | Finding oneself in a place but unaware how one got there | Amnesia | Exp-Dis | Excluded | Excluded |
| 04 | Finding oneself dressed in clothes one can't remember putting on | Amnesia | Exp-Dis | Excluded | Excluded |
| 05 | Finding unfamiliar things among one's belongings | Amnesia | Excluded | Excluded | Amnesia 1 |
| 06 | Being approached by people one doesn't know who call one by a different name | Amnesia | Excluded | Excluded | Amnesia 1 |
| 07 | Seeing oneself as if looking at another person | Dereal/Depers | Excluded | Dereal/Depers | Dereal/Depers 2 |
| 08 | Not recognizing friends or family members | Amnesia | Excluded | Excluded | Amnesia 1 |
| 09 | Not remembering important events in one's life | Ind | Excluded | Segregated processes | Excluded |
| 10 | Being accused of lying when one is telling the truth | Amnesia | Trance | Absorption | Amnesia 1 |
| 11 | Not recognizing one's reflection in a mirror | Dereal/Depers | Exp-Dis | Dereal/Depers | Dereal/Depers 2 |
| 12 | Other people and objects do not seem real | Dereal/Depers | Exp-Dis | Dereal/Depers | Dereal/Depers 2 |
| 13 | Feeling as though one's body is not one's own | Dereal/Depers | Exp-Dis | Dereal/Depers | Dereal/Depers 2 |
| 14 | Remembering past so vividly one seems to be reliving it | Absorption | excluded | Absorption | Absorption 3 |
| 15 | Not sure if remembered event happened or was a dream | Absorption | Trance | Excluded | Absorption 3 |
| 16 | Being in a familiar place but finding it unfamiliar | Absorption | Trance | Excluded | Absorption 3 |
| 17 | Absorption in television programme or movie | Absorption | Trance | Absorption | Absorption 3 |
| 18 | So involved in fantasy that it seems real | Absorption | Trance | Excluded | Absorption 3 |
| 19 | Able to ignore pain | Ind | excluded | Absorption | Absorption 3 |
| 20 | Staring into space | Absorption | Trance | excluded | Absorption 3 |
| 21 | Talking out loud to oneself when alone | Ind | Excluded | Segregated processes | excluded |
| 22 | Feeling as though one were two different people | Absorption | Exp-Dis | Excluded | Absorption 3 |
| 23 | Usually difficult things can be done with ease and spontaneity | Absorption | Excluded | Absorption | Absorption 3 |
| 24 | Not sure whether one has done something or only thought about it | Ind | Seg-Be | Segregated processes | Excluded |
| 25 | Finding evidence of having done things one can't remember doing | Amnesia | Seg-Be | Segregated processes | Amnesia 1 |
| 26 | Finding notes or drawings that one must have done but doesn't remember doing | Amnesia | Excluded | Excluded | Amnesia 1 |
| 27 | Hearing voices inside one's head | Dereal/Depers | Excluded | Excluded | Dereal/Depers 2 |
| 28 | Looking at the world through a fog | Dereal/Depers | Exp-Dis | Dereal/Depers | Dereal/Depers 2 |

Notes: EGA: Exploratory Graph Analysis; Exp-Dis: Experiential Disconnectedness; Seg-Be: Segregated Behaviors; Dereal/Depers: Derealization/Depersonalization; Ind: Independent

based models ranged from moderate to substantial (Schimmenti et al., 2019; Wülfing & Spitzer, 2024).

These findings strengthen confidence that the DES captures three stable dimensions rather than artefacts of sampling or methodology. Despite differences in geography, diagnostic composition, and analytic technique, convergence across studies suggests that the tripartite structure of the DES is more resilient than the diversity of factor solutions previously reported (e.g. Stockdale et al., 2002; Mazzotti et al., 2016; Saggino et al., 2020). Our results also offer a synthesis in the long-standing debate over one- versus multi-factor interpretations of the DES. While three distinct clusters were clearly identified, moderate to strong inter-cluster connections suggest substantial shared variance – potentially attributable to common antecedents such as trauma exposure or imaginative involvement (Lynn et al., 2019). This pattern may account for the emergence of a general factor in some large-scale factor-analytic studies, without negating the clinical value of dimensional distinctions. Beyond these antecedents, the strength of inter-cluster edges may also reflect a broader dissociative disposition or shared cognitive–affective mechanisms operating across dimensions. For instance, recent meta-analytic findings indicate that dissociation is moderately to strongly associated with emotion dysregulation ($r = .39$ overall), including suppression, avoidance, and rumination, across both detachment and compartmentalisation (Bruno et al., 2025). Although less pronounced, the robust associations between detachment, compartmentalisation, and alexithymia suggest that diverse dissociative phenomena may partly originate from difficulties in perceiving and evaluating emotions (Bruno et al., 2025). In sum, these findings point to disruptions in metacognitive monitoring and self-referential emotional processing – aspects of effective mentalizing capacity – as plausible transdiagnostic mechanisms contributing to the observed covariance between dissociative dimensions. Unravelling such shared processes may help refine theoretical models and support the development of more integrated assessment frameworks.

Moreover, the study highlights the utility of network psychometrics for refining psychological instruments. By integrating item-level stability indices with bootstrap replication, we were able to identify and exclude items that contributed little to the structural consistency of the model. Upon further examination, these excluded items showed marked distributional irregularities, including low endorsement frequencies, pronounced skewness, and elevated kurtosis. Such properties are known to undermine the reliability of item associations and reduce the effectiveness of community detection in network models, providing additional methodological justification for their removal. Relatedly, the moderate alignment with Schimmenti et al. (2019) is not unexpected, potentially reflecting differences in network modelling, language, and sample context. In our previous study (Wülfing & Spitzer, 2024), we examined a German clinical sample using EGA, emphasising item stability and replicability. In contrast, Schimmenti et al. analysed an Italian community sample using a spring-glass model and selected items based on node strength prior to clustering. This resulted in the exclusion of a total of 12 items, of which only two were also excluded in our model. Bringmann et al. (2019) cautioned that centrality metrics, including node strength, may be unstable and may not necessarily reflect theoretical or clinical relevance, unless they are derived from well-understood and validated network structures. This limitation is particularly pertinent in the context of dissociative phenomena, given that the conceptual and empirical foundations remain diverse.

Before concluding, several methodological limitations should be noted. First, the cross-sectional design precludes inferences about causal processes or change over time, including within treatment. Second, although the sample was large, it lacked full heterogeneity, as participants were primarily treatment-seeking adults from Greater London with BPD, ASPD, or affective disorders. Third, the exclusive use of the DES may limit generalisability to dissociative phenomena not well captured by this instrument. Future work should incorporate broader assessment tools. Fourth, disruptions in metacognitive monitoring and self-referential processing, as indicated by our findings, may also increase susceptibility to symptom overreporting, as suggested by Merckelbach and colleagues (2017). This possibility underscores the need to integrate symptom validity indices or performance-based measures in future studies to differentiate genuine dissociative experiences from response biases or exaggerated reporting tendencies. In addition, future studies should explore the longitudinal and cross-cultural stability of the DES and replicate these findings in populations with complex emotional needs and, in particular, with (complex) post-traumatic stress disorder is warranted, given the high prevalence of dissociative phenomena in these clinical groups.

Using contemporary network methods in a large clinical sample, we recovered a robust three-factor structure of the DES consistent with the original tripartite model of dissociation. These findings reinforce *amnesia*, *derealisation/depersonalisation*, and *absorption* as core domains, support the practical utility of EGA, and offer a foundation for future research into the structure and dynamics of dissociation. Notably, the close alignment with the original model by Carlson et al. (1991), despite decades of contradictory factor-analytic findings, suggests that this structure may capture a particularly resilient latent organisation. This convergence across methodologies, samples, and time points positions the original tripartite model as a stable structural benchmark in dissociation research and underscores the value of integrating traditional and contemporary psychometric approaches. This structural clarification enhances the interpretability of DES scores and supports more consistent application of the scale in clinical assessment and research, thereby strengthening the empirical foundation for the study of dissociation.

## Author contributions

PW CS TN conceptualized the study and PW performed data analyses. PW drafted the first manuscript. TN coordinated data acquisition. All authors reviewed the manuscript critically and contributed to the manuscript.

## Disclosure statement

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## Data availability statement

The supplementary materials and R code have been made publicly available at the Open Science Framework and can be accessed at https://osf.io/crva7/. For ethical reasons, the data from this study are available only upon reasonable request from the last author.

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## References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.

Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dis-sociation scale. *Journal of Nervous and Mental Disease*, *174*(12), 727–735. https://doi.org/10.1097/00005053-198612000-00004

Blondel, V. D., Guillaume, J. L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment*, *2008*(10), P10008. https://doi.org/10.1088/1742-5468/2008/10/P10008

Borsboom, D., & Cramer, A. O. J. (2013). Network analysis: An integrative approach to the structure of psychopathology. *Annual Review of Clinical Psychology*, *9*(1), 91–121. https://doi.org/10.1146/annurev-clinpsy-050212-185608

Bringmann, L. F., Elmer, T., Epskamp, S., Krause, R. W., Schoch, D., Wichers, M., Wigman, J. T. W., & Snippe, E. (2019). What do centrality measures measure in psychological networks? *Journal of Abnormal Psychology*, *128*(8), 892–903. https://doi.org/10.1037/abn0000446

Bruno, S., Tacchino, C., Anconetani, G., & Velotti, P. (2025). Unravelling the associations between dissociation and emotion (dys)regulation: A multidimensional meta-analytic review. *Journal of Affective Disorders*, *380*, 808–824. https://doi.org/10.1016/j.jad.2025.03.158

Cardeña, E. (1994). The domain of dissociation. In S. J. Lynn & R. W. Rhue (Eds.), *Dis-sociation: Theoretical, clinical, and research perspectives* (pp. 15–31). Guilford Press.

Carlson, E. B., & Putnam, F. W. (1993). An update on the dissociative experience scale. *Dissociation*, *6*(1), 16–27.

Carlson, E. B., Putnam, F. W., Ross, C. A., Anderson, G., Clark, P., & Torem, M. (1991). Factor analysis of the dissociative experiences scale: A multicenter study. Em B. G. Braun & E. B. Carlson (Eds.), *Proceedings of the eighth international conference on multiple personality and dissociative states* (pp. 16). Rush.

Christensen, A. P., & Golino, H. (2021). Estimating the stability of psychological dimensions via bootstrap exploratory graph analysis: A Monte Carlo simulation and tutorial. *Psych*, *3*(3), 479–500. https://doi.org/10.3390/psych3030032

Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods*, *50*(1), 195–212. https://doi.org/10.3758/s13428-017-0862-1

First, M. B. (2014). Structured clinical interview for the DSM (SCID). In R. L. Cautin, & S. O. Lilienfeld (Eds.), *The Encyclopedia of Clinical Psychology* (pp. 1–6). Hoboken, NJ: John Wiley & Sons, Inc. https://doi.org/10.1002/9781118625392.wbecp351

Forkmann, T., Teismann, T., Stenzel, J. S., Glaesmer, H., & Beurs, D. (2018). Defeat and entrapment: More than meets the eye? Applying network analysis to estimate dimensions of highly correlated constructs. *BMC Medical Research Methodology*, *18*(1), 16. https://doi.org/10.1186/s12874-018-0470-5

Golino, H., Christensen, A., Moulder, R., Garriso, L., & Jamison, L. (2022). EGAnet: Exploratory graph analysis: A framework for estimating the number of dimensions in multivariate data using network psychometrics. R package version 1.2.3. https://CRAN.R-project.org/package=EGAnet.

Golino, H. F., & Epskamp, S. (2017). Exploratory graph analysis: A new approach for estimating the number of dimensions in psychological research. *PLoS One*, *12*(6), e0174035. https://doi.org/10.1371/journal.pone.0174035

Golino, H., Shi, D., Christensen, A. P., Garrido, L. E., Nieto, M. D., Sadana, R., Thiyagarajan, J. A., & Martinez-Molina, A. (2020). Investigating the performance of exploratory graph analysis and traditional techniques to identify the number of latent factors: A simulation and tutorial. *Psychological Methods*, *25*(3), 292–320. https://doi.org/10.1037/met0000255

Loewenstein, R. J. (2018). Dissociation debates: everything you know is wrong. *Dialogues in Clinical Neuroscience*, *20*(3), 229–242. https://doi.org/10.31887/DCNS.2018.20.3/rloewenstein

Lynn, S. J., Maxwell, R., Merckelbach, H., Lilienfeld, S. O., Kloet, D. V. H., & Miskovic, V. (2019). Dissociation and its disorders: Competing models, future directions, and a way forward. *Clinical Psychology Review*, *73*, 101755. https://doi.org/10.1016/j.cpr.2019.101755

Mazzotti, E., Farina, B., Imperatori, C., Mansutti, F., Prunetti, E., Speranza, A. M., & Barbaranelli, C. (2016). Is the dissociative experiences scale able to identify detachment and compartmentalization symptoms? Factor structure of the dissociative experiences scale in a large sample of psychiatric and nonpsychiatric subjects. *Neuropsychiatric Disease and Treatment*, *12*, 1295–1302. https://doi.org/10.2147/NDT.S105110

Merckelbach, H., Boskovic, I., Pesy, D., Dalsklev, M., & Lynn, S. J. (2017). Symptom overreporting and dissociative experiences: A qualitative review. *Consciousness and Cognition*, *49*, 132–144. https://doi.org/10.1016/j.concog.2017.01.007

Morey, L. C. (1991). *Personality assessment inventory*. Psychological Assessment Resources.

Nijenhuis, E. R. S. (2022). The need to constrain the concept of dissociation. *Journal of Trauma & Dissociation*, *23*(5), 578–580. https://doi.org/10.1080/15299732.2022.2079160

R Core Team. (2023). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing.

Saggino, A., Molinengo, G., Rogier, G., Garofalo, C., Loera, B., Tommasi, M., & Velotti, P. (2020). Improving the psychometric properties of the dissociative experiences scale (DES-II): A Rasch validation study. *BMC Psychiatry*, *20*(1), 8. https://doi.org/10.1186/s12888-019-2417-8

Schimmenti, A., & Şar, V. (2019). A correlation network analysis of dissociative experiences. *Journal of Trauma & Dissociation: The Official Journal of the International Society for the Study of Dissociation (ISSD)*, *20*(4), 402–419. https://doi.org/10.1080/15299732.2019.1572045

Stockdale, G. D., Gridley, B. E., Balogh, D. W., & Holtgraves, T. (2002). Confirmatory factor analysis of single- and multiple-factor competing models of the Dissociative Experiences Scale in a nonclinical sample. *Assessment*, *9*(1), 94–106. https://doi.org/10.1177/1073191102009001011

Van Ijzendoorn, M. H., & Schuengel, C. (1996). The measurement of dissociation in normal and clinical populations: Meta-analytic validation of the Dissociative Experiences Scale (DES). *Clinical Psychology Review*, *16*(5), 365–382. https://doi.org/10.1016/0272-7358(96)00006-2

Warrens, M. J., & Van Der Hoef, H. (2022). Understanding the adjusted rand index and other partition comparison indices based on counting object pairs. *Journal of Classification*, *39*(3), 487–509. https://doi.org/10.1007/s00357-022-09413-z

Wülfing, P., & Spitzer, C. (2024). A network analytic approach to dissociation: New insights from clinical data. *Journal of Trauma & Dissociation: The Official Journal of the International Society for the Study of Dissociation (ISSD)*, 1–14. Advance online publication. https://doi.org/10.1080/15299732.2024.2407799