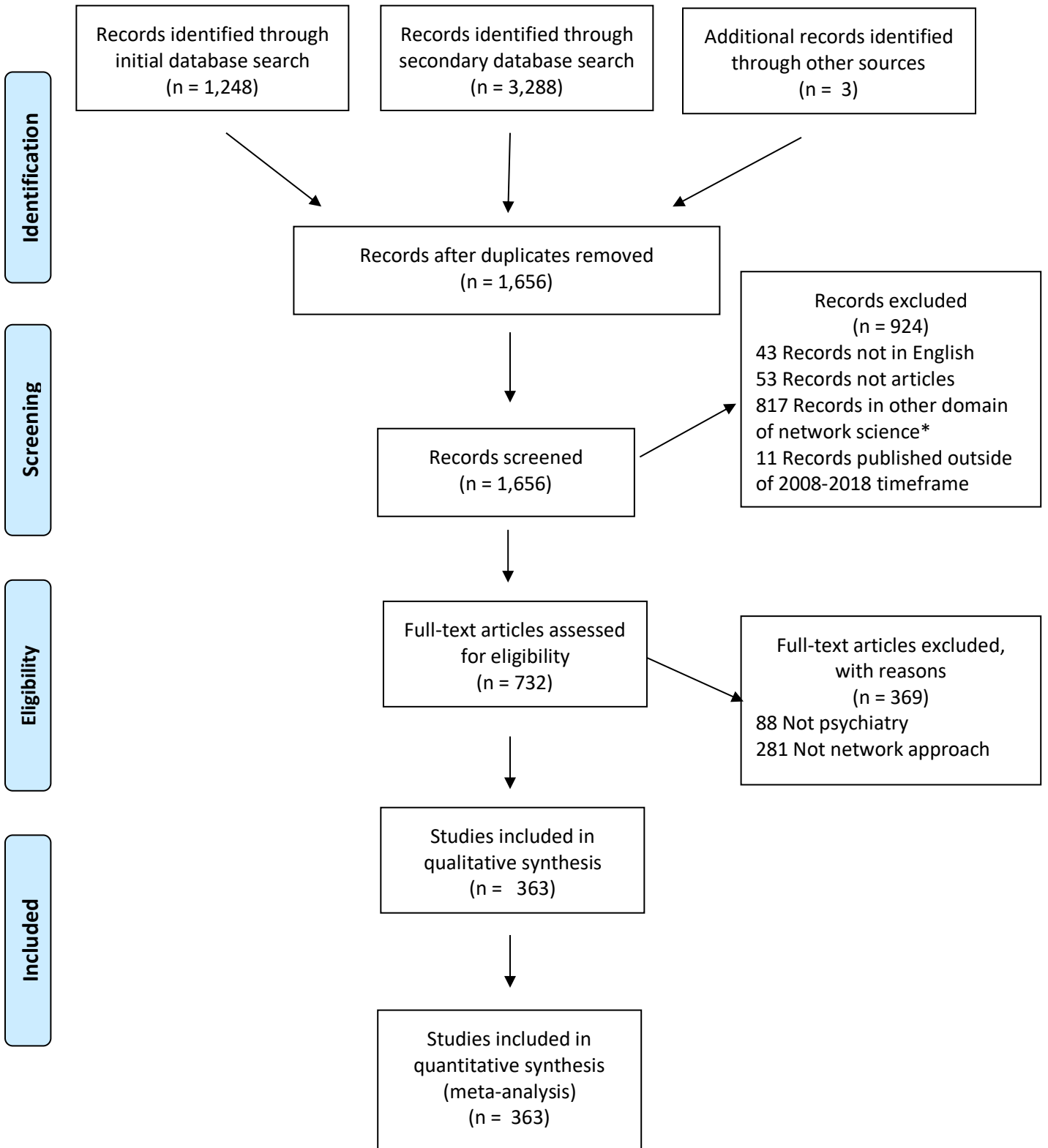


## PRISMA DIAGRAM



\*This screener item was used only for records identified during the secondary search (see below for detail).

## LITERATURE SEARCH STRATEGY

To identify articles in the network approach literature, we initially identified all articles citing one of three seminal publications explicating the network approach (see Citation Record Search #1-3, below). We reasoned that, by citing this seminal work, authors were identifying their article as potentially being part of the network approach literature. This search identified 571 unique records, 521 of which were reviewed for eligibility. The 274 articles deemed eligible provided the basis for our initial submission of this article. Based on reviewer feedback, we determined that this strategy may have omitted articles we would consider to be part of the network approach literature and revised our literature search to address this limitation.

Our revised (“secondary”) literature search consisted of three steps. *First*, we performed a keyword search in PubMed, Web of Science, and PsycINFO using any combination of a keyword denoting the network approach (e.g., causal system; see Search Terms, Group 1) and a keyword denoting a focus on psychopathology (e.g., post-traumatic stress disorder; see Search Terms, Group 2). A full list of keywords can be found in the **Search Terms** section below. The specific conditions listed in Group 2 are those assessed by either the Structured Clinical Interview for DSM-5 Enhanced Research Version (SCID-5-RV), the Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD), or the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS), excepting those mental disorders induced by substances/medications or those due to another medical condition. Where possible, results were restricted to peer-reviewed, English language articles published between 2008-2018. *Second*, we used PubMed, Web of Science, and PsycINFO to identify articles that cited one of five seminal articles in the network approach literature (see list below). These articles were identified by the first author (DJR) as articles that presented either the first or an especially comprehensive description of a key aspect of the network approach and thus may be cited by researchers working in this area. *Third*, we examined all articles discussed in any paper that identified itself as a review of or commentary on studies conducted in this literature. A complete list of all records reviewed in our literature search can be found at <https://osf.io/dr3wc/>. The results of this literature search are presented in the PRISMA diagram on the preceding page.

### Articles Included in Citation Record Search

1. Borsboom, D. (2008). Psychometric perspectives on diagnostic systems. *Journal of Clinical Psychology*, 64(9), 1089-1108. <https://doi.org/10.1002/jclp.20503>
2. Cramer, A.O., Waldorp, L.J., van der Maas, H.L., & Borsboom, D. (2010). Comorbidity: a network perspective. *Behavioral and Brain Sciences*, 33(2-3), 137-150. <https://doi.org/10.1017/S0140525X09991567>
3. Borsboom, D. & Cramer, A.O. (2013). Network analysis: an integrative approach to the structure of psychopathology. *Annual Review of Clinical Psychology*, 9, 91-121. <https://doi.org/10.1146/annurev-clinpsy-050212-185608>
4. Kendler, K.S., Zachar, P., & Craver, C. (2011). What kinds of things are psychiatric disorders? *Psychological Medicine*, 41(6), 1143-1150. <https://doi.org/10.1017/S0033291710001844>
5. Bringmann, L.F., Vissers, N., Wichers, M., Geschwind, N., Kuppens, P., Peeters, F., Borsboom, D., & Tuerlinckx, F. (2013). A Network Approach to Psychopathology: New Insights into Clinical Longitudinal Data. *PLOS ONE*, 8(4), <https://doi.org/10.1371/journal.pone.0060188>

## SEARCH TERMS

### **Group 1: *Terms denoting the network perspective***

- Network Approach
- Network Analysis
- Network Perspective
- Causal System
- Symptom Network

### **Group 2: *Terms denoting a focus on psychopathology***

- Psychopathology
- Psychiatric Disorder
- Mental Disorder
- Major Depressive Episode
- Manic Episode
- Hypomanic Episode
- Cyclothymic Disorder
- Persistent Depressive Disorder
- Dysthymia
- Premenstrual Dysphoric Disorder
- Psychotic Disorder
- Psychosis
- Delusions
- Hallucinations
- Disorganized Speech
- Disorganized Behavior
- Catatonic Behavior
- Catatonia
- Negative Symptoms
- Schizophrenia
- Schizophreniform Disorder
- Schizoaffective Disorder
- Delusional Disorder
- Brief Psychotic Disorder
- Mood Disorder
- Bipolar Disorder
- Depression
- Substance Use Disorder
- Substance Use
- Alcohol Use Disorder
- Tobacco Use Disorder
- Cannabis Use Disorder
- Inhalant Use Disorder
- Other Hallucinogen Use Disorder
- Opioid Use Disorder
- Phencyclidine Use Disorder
- Sedative/Hypnotic/Anxiolytic Use Disorder
- Stimulant Use Disorder
- Anxiety
- Anxiety Disorder
- Panic Disorder
- Agoraphobia
- Social Anxiety Disorder
- Specific Phobia
- Generalized Anxiety Disorder
- Separation Anxiety Disorder
- Obsessive-Compulsive Disorder
- Hoarding Disorder
- Body Dysmorphic Disorder
- Trichotillomania
- Excoriation Disorder
- Sleep-Wake Disorder
- Sleep Disorder
- Insomnia
- Hypersomnolence
- Personality Disorder
- Avoidant Personality Disorder
- Dependent Personality Disorder
- Obsessive-Compulsive Personality Disorder
- Paranoid Personality Disorder
- Schizotypal Personality Disorder
- Schizoid Personality Disorder

- Histrionic Personality Disorder
- Narcissistic Personality Disorder
- Borderline Personality Disorder
- Antisocial Personality Disorder
- Disruptive Mood Dysregulation Disorder
- Selective Mutism
- Enuresis

- Encopresis
- Oppositional Defiant Disorder
- Conduct Disorder
- Tic Disorder
- Autism Spectrum Disorder
- Autism

## SCREENING & ELIGIBILITY ASSESSMENT

After identifying potentially relevant articles via our literature search, we systematically screened articles and assessed them for eligibility. Below, we outline our screening and eligibility criteria for determining whether an article was part of the network approach literature. Please note that the boundary between what should and should not be regarded as part of the network approach literature is inherently fuzzy and the best way to draw this boundary may differ depending on the aims of the researcher. For the purposes of this review, we broadly considered an article to be part of this literature if it (a) addressed phenomena that fall in the domain of psychiatric research and (b) incorporated the perspective of the network approach to psychopathology (i.e., the notion that causal relations among symptoms contribute to their tendency to cohere as syndromes). The complete screening and eligibility codes for each record can be found at <https://osf.io/dr3wc/>.

### Screening Questions:

1. Is it a journal article?
2. Is the article written in English?
3. \*Is the article readily identified as focusing on an area of network science outside the realm of network approach to psychopathology networks (e.g., neurobiological networks, social networks, gene transcription networks)?
  - a. Note: This screening item was applied only during the secondary database search (see **Literature Search Strategy** for further detail).
  - b. Note: Methodological papers were not excluded at this stage unless there was clear reason to conclude that they are not applicable in the network approach
4. Was the article published between 2008 and 2018?

### Literature Categorization:

To facilitate our review of eligibility, we first identified articles as being either theoretical, methodological, or empirical. We would like to stress that the boundaries between theoretical, methodological, and empirical contributions in this literature are again inherently fuzzy. Empirical articles frequently include novel methods, methodological critiques, or extended theoretical discussions. Conversely, theoretical articles frequently illustrate points and methodological articles frequently evaluate their methods using empirical data. Our labeling of articles should thus be interpreted only as a loose designation intended to capture the article's primary contribution to the literature in order to facilitate the determination of whether it fit within the domain of the network approach to psychopathology and our subsequent review of the full literature. Our guidelines for making these categorizations are presented below.

**Theoretical:** Theoretical articles will be those principally focused on theoretical or meta-theoretical issues (outside the domain of psychometric theory), including evaluation of an existing theory or the application of theory to a specific substantive topic in the absence of empirical analysis.

### Distinguishing Features:

- ***Theoretical vs. Methodological.*** The primary focus of a theoretical article is on the psychiatric object itself (e.g., how to conceptualize psychopathology or the implications of the network conceptual framework for understanding a specific disorder) whereas the primary focus in a methodological article will be the method for studying the psychiatric object (e.g., the development or discussion of analyses used to assess relationships among symptoms).
- ***Theoretical vs. Empirical.*** In theoretical articles, empirical analyses are performed principally to illustrate the theoretical ideas being introduced or discussed. That is, the focus of the analysis is not one of substantive inquiry (e.g., assessing which symptoms are most central to a given symptom network), but of illustration (e.g., showing what a symptom network looks like). Conversely, in an empirical article, the primary focus of the article is substantive investigation of the specific psychiatric object. The distinction of the article's focus should be made based on the authors' stated aims for the paper and on the focus of the discussion and conclusions of the paper. In cases where the focus of the article is unable to be distinguished, the article should be considered an empirical article.

#### **Example(s):**

- An introduction or review of network theory or some hypothesis within the broader framework of network theory.
- A critique or criticism of network theory.
- A discussion of the implications of network theory for understanding a specific disorder in the absence of empirical analyses.

**Methodological:** Methodological articles will be those principally focused on methods for measurement or data analysis, including the proposal of new methods, evaluation of existing methods, method tutorials, and discussions of psychometric theory.

#### **Distinguishing Features:**

- ***Methodological vs. Theoretical.*** The primary focus of a theoretical article will be on the psychiatric object itself (e.g., how to conceptualize psychopathology or the implications of the network conceptual framework for understanding a specific disorder) whereas the primary focus in a methodological article will be the method for studying the psychiatric object (e.g., the development or discussion of analyses used to assess relationships among symptoms).
- ***Methodological vs. Empirical.*** The primary focus of any empirical analyses in a methodological article will be on illustrating or evaluating the method in question (e.g., an illustration of a method for estimating the relationship among symptoms or a comparison of two distinct methods for estimating node centrality). In contrast, the primary focus of an empirical article will be on the object of the empirical analysis (e.g., the symptom network being investigated). In other words, the method will be the means of carrying out the investigation rather than the focus of the investigation.

**Example(s):**

- Introduction and evaluation of a new method for assessing network structure.
- Critique of existing methodological strategies.
- Tutorial for using a new R package.

**Empirical:** Empirical articles will be those that analyzed data in the service of investigating a substantive phenomenon. Most articles that specifically include data collection and analysis will fall into this category, except those articles that use data with the specific aim of using this data to illustrate a theory or for the purposes of illustrating or evaluating a method.

**Distinguishing Features:**

- **Empirical vs. Theoretical.** In theoretical articles, empirical analyses are performed principally to illustrate the theoretical ideas being introduced or discussed. That is, the focus of the analysis is not one of substantive inquiry (e.g., assessing which symptoms are most central to a given symptom network), but of illustration (e.g., showing what a symptom network looks like). Conversely, in an empirical article, the primary focus of the article is substantive investigation of the specific psychiatric object under study. The distinction of the article's focus should be made based on the authors' stated aims for the paper and, to a lesser degree, and the focus of the discussion and conclusions of the paper. In cases where the focus of the article is unable to be distinguished, the article should be considered an empirical article.
- **Empirical vs. Methodological.** The primary focus of any empirical analyses in a methodological article will be on illustrating or evaluating the method in question (e.g., an illustration of a method for estimating the relationship among symptoms or a comparison of two distinct methods for estimating node centrality). In contrast, the primary focus of an empirical article will be on the object of the empirical analysis (e.g., the symptom network being investigated). In other words, the method will be the means of carrying out the investigation rather than the focus of the investigation.

**Example(s):**

- A network analysis of 500 individuals' PTSD symptoms, based on a clinician-administered measure of PTSD symptom severity.
- An intra-individual network analysis of positive and negative emotions over the course of two weeks.

## **Eligibility Evaluation:**

After categorizing articles as being primarily theoretical, methodological, or empirical, we reviewed whether the article met our core eligibility criteria: (1) is the article concerned with a topic in the domain of psychiatry? and (2) does it incorporate the network approach to psychopathology? The following guidelines were used to determine eligibility:

### **1. Is the article concerned with a topic in the domain of psychiatry?**

- a. *Theory Articles*: Does the article address a phenomenon that falls in the domain of psychiatric research?
  - i. Most commonly, this will include the broad topic of mental health, a specific mental disorder, or specific symptom or subset of symptoms. It may also include factors that are commonly studied in this domain because they affect (e.g., hopelessness) or are impacted by (e.g., quality of life) mental disorders.
- b. *Method Articles*: Do the authors identify the methodological work as being applicable in the domain of psychiatric research?
- c. *Empirical Articles*: Does the object under empirical investigation fall in the domain of psychiatric research?

### **2. Does the article incorporate the network approach to psychopathology?**

- a. *Theory Articles*: Does the article include a focus on the concept of mental disorders as networks/causal systems of interacting components?
  - i. Article must include a substantive discussion of this concept that goes beyond merely citing papers that posit such an approach or briefly referencing this approach as one that exists in the literature or is a promising direction for future consideration. A substantive discussion of this concept will generally include a thorough presentation of the subject (e.g., multiple paragraphs devoted to this idea; a figure depicting this approach) or a brief but novel contribution to the theory around this approach (i.e., one that goes beyond briefly restating prior ideas).
- b. *Method Articles*: Do the authors explicitly identify the work as being applicable to the study of psychiatric phenomenon as networks/causal systems?
  - i. *Note*: Because methodological articles may have minimal discussion of specific content areas of applicability, this criterion applies more liberally than for theoretical or methodological articles. Here, it is sufficient if the authors simply make at least a single explicit reference to the applicability



of these methods to the study of psychiatric phenomenon as networks interacting components.

- c. *Empirical Articles*: Do the authors explicitly identify the concept of psychiatric phenomena as interacting components as part of the rationale for their research?
  - i. Indicators of this criterion include the citation of seminal papers in this literature in the introduction or an explicit discussion of the concept of mental disorders as interacting components.
  - ii. *Note*: Conducting network analyses is neither necessary nor sufficient for empirical articles to meet this criterion.
  - iii. *Note*: As with theory articles, a citation of the network approach as a promising direction for future research is not itself sufficient for inclusion in our review of the literature.