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Theoretical approaches to psychopathology: common cause approach vs. network approach

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ABSTRACT

The common causes (CC) approach is popular in psychopathology research, but nowadays, some experts consider this approach unfit to explain mental disorders. On the other hand, as a new approach, the network approach (NA) claims can provide a better explanation for understanding mental disorders. This study aims to determine the differences between NA and CC approach in psychopathology research. This research is a scoping review study using twelve articles. We searched for articles September-December 2020 in the Scopus and Science Direct databases. The results of the analysis of these articles show a fundamental difference between the two perspectives. The difference lies in the perspective of mental disorders, how to measure symptoms of mental disorders, treatment of mental disorders, and views on comorbidities. Each approach has advantages, although some articles support that NA is the better approach to studying mental disorders. To decide which approach is appropriate for psychopathology research, researchers should adapt it to the research objectives. Perspectives on psychopathology will determine how to answer the research questions and analyze the data.

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1. INTRODUCTION

The study of psychopathology and the symptoms that cause mental disorders has long been the focus of research on mental disorders. The study collects several symptoms that describe a disorder and analyzes latent variables that cause mental disorders, known as the common causes (CC) approach. The CC approach is an approach that explains mental disorders based on a medical disease model. This approach describes mental disorders as latent variables arising from a disturbance-as a source of symptoms or mental disorders. However, the research development over the last ten years has found that this approach is unfit to explain mental disorders' psychopathology [1]–[5]. According to this approach, mental disorders occur due to an underlying CC, and symptoms arise because these symptoms have a definite underlying cause [1]–[3]. The CC approach views mental disorders as the cause of symptoms in someone with a mental disorder [6]. Therefore, psychopathological studies using the CC approach aim to identify mental disorders' psychological and biological essence and the CC that cause symptoms.

Psychopathological research began to shift and offer a new approach: network analysis (NA) or Approach. According to the network approach, mental disorders are a complex dynamical system of disorder symptoms [1], [7], [8]. The NA approach explains that there is a possibility of an exchange between the symptoms of a mental disorder [4], [9]. The relationship between symptoms described in the NA approach is

also known as a systems perspective [7]. The NA approach is relatively new in psychopathological studies. In the network's approach, the underlying entity of the disorder or disease is the cause of the symptoms that reflect its presence. Disorders are distinct from their symptoms, and the symptoms of the disorders are not functionally related if conditioned on a common latent cause. The network approach in psychopathology sees symptoms as a network of functionally interrelated elements. An episode of a mental disorder activates the causal network because symptoms are causally interconnected, not independent of one another [2]. The empirical research on psychopathology using the NA began in 2010, two years after its introduction. NA considers that explaining mental disorders through a CC approach is incompatible with the pathogenesis of mental disorders because mental disorders are a series of causal relationships between symptoms [1], [7].

This approach provides a different argument from the well-known and long-used CC approach to explaining mental disorders. Some articles using NA to analyze their data claimed that this approach could better and more precisely explain mental disorder phenomena. However, the difference between these two approaches is controversial among experts and appears in several scientific articles. Each expert uses the approach they think is more appropriate to show which approach is better for explaining mental disorders. The difference in judgments about these two approaches makes it essential to conduct a literature study to review their differences. The literature study will answer whether the NA approach can solve problems in studying the psychopathology of a mental disorder. In this regard, this article aims to identify the differences between the CC approach and the NA approach in research on the psychopathology of mental disorders and to discover the advantages of the NA approach.

2. METHOD

The method in this study was systematic scoping review (ScR), which was carried out based on the preferred reporting items for systematic review and meta-analyses check sheet (PRISMA-ScR) [10] for scoping review and complied with the JBI evidence synthesis manual (The Joanna Briggs Institute) [11]. Scoping reviews are carried out to systematically identify and map the breadth of topics, fields, concepts, or issues. This method can clarify important concepts/definitions in the literature and identify the main characteristics or factors associated with a concept, including methodological research. Using the JBI manual can help researchers i) describe the purpose of conducting a scoping review, ii) measure research conducted on related topics, iii) identify important factors related to the concept under study, iv) as a preliminary study to conduct a systematic review and v) identify and analyzing knowledge gaps [12]. The stages of scoping review in this study were i) identifying research questions, ii) identifying relevant research to be included in the review, iii) selecting articles, iv) mapping data, and v) compiling, summarizing, and reporting results [11].

- Stage 1: Identifying the research question
  The first step is to generate the important question to answer in this scoping review. This research question will guide our decision on the inclusion and exclusion criteria and the keywords to search the articles. We also make sure that the next step supports answering the research question.
- Stage 2: Identifying relevant studies

a. Inclusion and exclusion criteria

We include the article from 2010 until 2020, with a study focused on NA and CC approaches. We exclude articles outside that year range and articles with nonrelevant topics for the exclusion criteria. All article is in the English language.

b. Search methods

The search process uses two databases (Scopus and Science Direct) to find the related articles. The article search focused on the journal paper that discusses the NA and/or CC approaches. We used keywords with Boolean System to maximize the coverage of scientific articles. The keywords used in searching the databases are (common causes) OR (medical model) AND (network analysis) OR (network approach) AND (psychopathology) AND (mental disorder). In addition, we applied filters to get more accurate search results and minimize extraneous articles that did not meet the criteria. There are 145 articles found using keywords. After removing duplicates (11 articles) and reviewing article references, 134 articles remained. Furthermore, we selected the article from the title and abstract and found 33 relevant articles. After reading the full text, 24 articles were included for eligibility evaluation-finally, 11 articles for synthesis.

- Stage 3: Study selection based on inclusion and exclusion criteria

The research strategy and the article screening process in this study are referenced by the PRISMA-ScR guidance by Tricco *et al*. [10], explained in Figure 1. First, we removed duplicates after collecting all articles identified from the search. Then, we excluded articles by the exclusion criteria and coded them for the reason of exclusion-this process using Rayyan QCRI at https://rayyan.qcri.org.

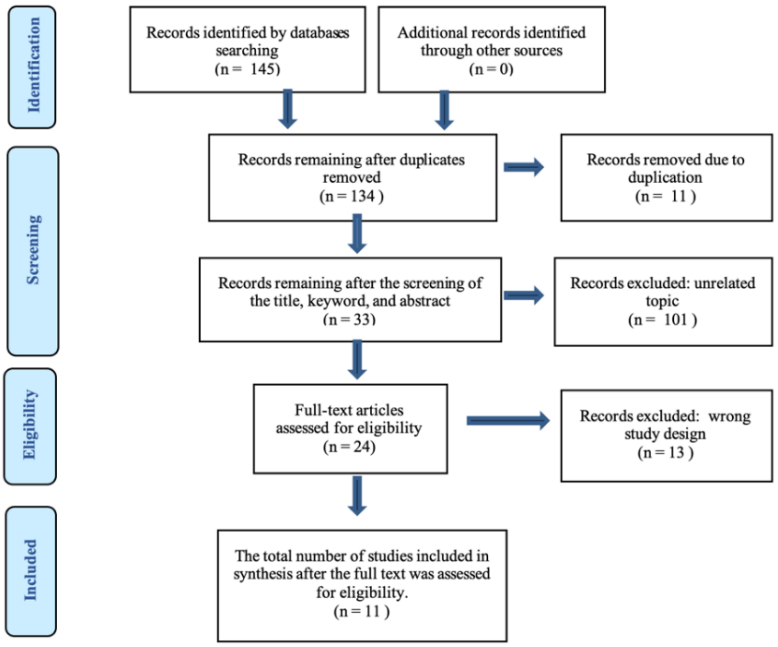

Figure 1. PRISMA-ScR flow diagram

- Stage 4: Charting the data

We are using Microsoft Excel to map data from these eleven studies. The categories used in the table are i) the identity of the article, which includes the author, year of publication, and title, and ii) the main findings. Only relevant information for this review is included in Table 1 (see Appendix) [1], [2], [5]–[7], [13]–[18].

- Stage 5: Collating, summarizing, and reporting the results

We analyze relevant data from each article based on the content we found and write the findings in the table according to the established category. We used some categories to find pertinent themes in each article, summarize them, and explain them further in the discussion. The categories are i) perspective on mental disorder, ii) perspective on symptoms, iii) comorbidity, and iv) measurement methods.

3. RESULTS AND DISCUSSION

3.1. Common causes approach vs. network approach

Table 3 presents a comparison of two distinct methods for understanding mental disorders. These methods diverge in their explanations of how mental disorders develop. The NA approach views mental disorders as a set of symptoms interacting [6]. The CC approach posits that mental disorders arise when symptoms manifest together [2]. Both methods concur that the symptoms originate from a hidden variable, which is the mental disorder itself [9], [16], [19]. However, the NA approach suggests that the symptoms emerge from the mental disorder, while the CC approach contends that symptoms trigger the disorder [14].

Moreover, the two approaches differ in how they measure mental disorders. The NA approach postulates that symptoms do not necessarily have to be independently determined to cause a mental disorder and that there might be a correlation between symptoms. Conversely, the CC approach measures symptoms in the same manner as mental disorders. It employs the total score obtained from the measurement outcomes as a symptom that reflects the individual's attitudes toward the hidden variables [1].

Additionally, the methods contrast in their accounts of comorbidities. The NA approach proposes that comorbidities arise directly from the symptoms of several mental disorders. Conversely, the CC approach characterizes comorbidity as a two-way association between multiple latent variables [9]. For instance, obsessive-compulsive disorder may cause depression, or depression may cause obsessive-compulsive disorder.

Table 2. Differences between the CC approach and the network approach

Psychopathological aspects	CC approach	Network approach
Perspectives on mental disorders	Perspectives on mental disorders are caused by latent variables, depending on the presence or absence of specific symptoms, covariations, and duration. Mental disorders are the basis of symptoms that appear together due to a CC [2]. Mental disorders cause their respective symptoms [6].	Mental disorders are a complex dynamic system of symptoms and signs of a disorder [1]. Mental disorders are a network of symptoms that interact directly with each other [6], [15].
Symptom	Small latent variables, like mental disorders symptoms, can easily account for clinical symptoms. A prime example is panic disorder, a latent variable that manifests observable symptom [16], [19]. Additionally, mental disorders, in general, can also give rise to symptoms [9].	A causal relationship interconnects symptom. Symptoms can appear due to disturbances, and interactions between symptoms can cause certain disorders [5]
Measurement	From a psychometric perspective, a symptom measure represents a measure of disorder, and the total scores of all the symptoms measured reflect an individual's attitude toward these latent variables [1].	The independence assumption attached to latent variables is no longer needed. It is no longer necessary to ensure that each symptom independently causes a particular mental disorder; instead, there may be a relationship between symptoms [1].
Comorbidity	The issue of comorbidity is multifaceted and involves various latent variables that may not be immediately apparent [13]	Comorbidity arises from a direct relationship between symptoms of various disorders [9], [13].

The CC perspective sees mental disorders emerge as symptoms that appear together due to an existing mental disorder, and this means that the mental disorder causes the symptoms to appear. Apart from the psychopathological perspective, another difference lies in how these two approaches explain the symptoms of mental disorders. According to CC, symptoms are explained through a small set of latent variables, meaning that mental disorders are latent variables that cause observable symptom [16], [19]. Figure 2 shows how mental disorders cause their symptoms.

On the other hand, NA sees symptoms as interconnected by a causal relationship. Symptoms can appear due to disturbances, and interactions between symptoms can cause certain disorders [14]. The relationship between symptoms is essential in understanding the disorder's etiology. NA can answer issues in psychopathological studies because it conceptualizes mental disorders as interactions between complex symptom interactions and mental disorder systems that can change from time to time, and changes in one symptom have an impact on other symptoms and the characteristics of the disorder [4], [6], [7], [20]. NA can explain psychopathology by visualizing and analyzing the complex interdependence patterns between symptoms. Also, it can predict the development of disorders [21] as shown in Figure 3.

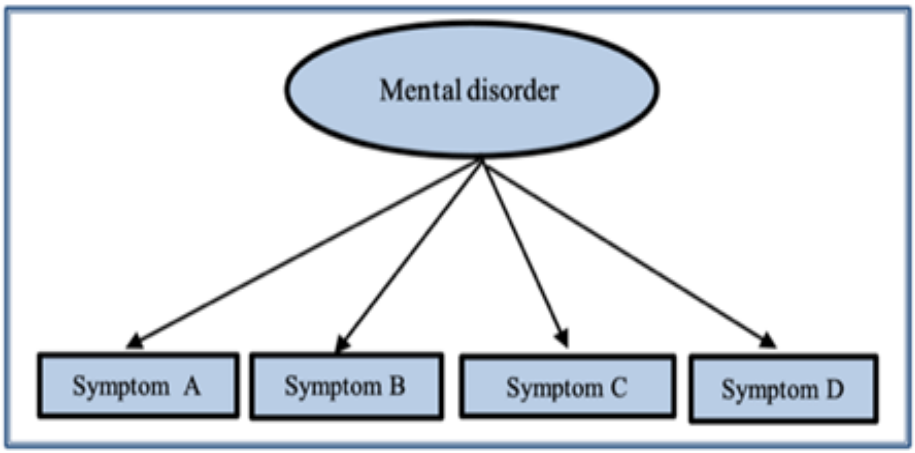

Figure 2. CC model/medical disease model (adapted from guyon [16])

NA does not only measure the manifestation of the underlying attributes [22]. From a statistical point of view, the assumption of independence attached to latent variables is no longer necessary. It is no longer necessary to establish that each symptom independently causes a specific mental disorder; instead,

there may be a relationship between symptoms. There is also a need for psychometrics or measurements to use this approach in studying mental disorders [1]. Symptoms are active in identifying a disorder rather than just being a passive psychometric variable [16]. This model proposes that symptom correlation arises from direct causal interactions between symptoms. The main idea of this model is that symptoms are the main thing/subject of a disorder, not just describing a disorder [23].

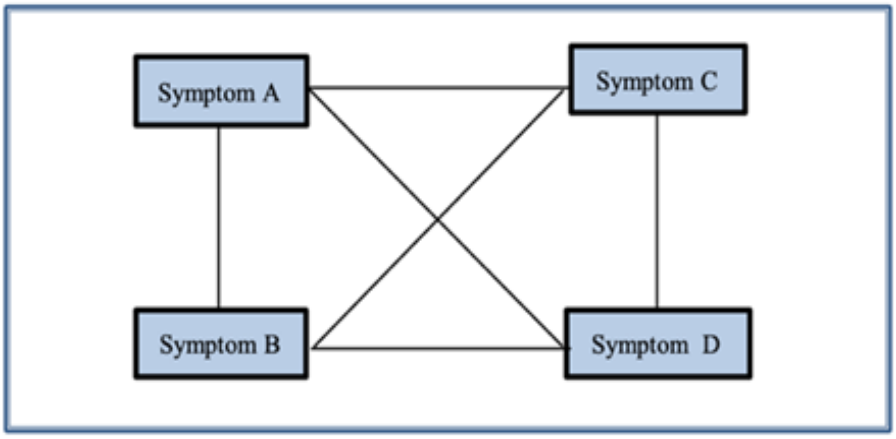

Figure 3. Network model (adapted from guyon [16])

3.2. The advantages of network analysis

This approach leads to a comprehensive psychopathology model, including a general explanatory model for mental disorders and new definitions of related concepts such as mental health, resilience, vulnerability, and liability [6], [15]. In addition, network theory has direct implications for how diagnosis and treatment are understood and suggests a clear agenda for future research in psychiatry and related disciplines [15]. The NA approach can identify psychopathological aspects, such as the centrality of symptoms in each disorder and the reciprocal dynamics between symptoms [19]. NA can finally understand and explain psychopathological phenomena differently than mental disorders and offers a framework for psychopathology at various levels of explanation, i.e., biological, psychological, and sociological, regarding a disorder [21], [24].

In addition, some strengths have acclaims when using NA to study psychopathology, which i) it can solve one of the significant nosological problems in psychiatry, which involves limited psychiatric symptoms and the resulting problem of comorbidity patterns [24], [25]; ii) explain the heterogeneity of mental disorders that are expressed differently between individuals; iii) adding better descriptive potential, explanation and prediction related to nosology compared to previous classification methods [24]; iv) provide robust and measurable data about the relationship between different psychopathological symptoms based on the assumption that a single symptom does not cause mental disorders but rather a combination of various symptoms that interact with each other in the complex network [17], [25]–[27]; and v) the shortest path in the network can provide information about general psychopathological symptoms that activate the main symptoms [28]. Furthermore, this approach has the added value of identifying clinically relevant symptoms compared to other approaches.

The assumptions in NA are consistent with the clinician's existing knowledge and psychopathological representations of mental disorders, focusing on concrete symptoms and their associations, not on latent disorders or syndromes. In addition, by visualizing and analyzing complex dependency patterns and the occurring processes of the disorder, NA can explain the causes of mental disorders [20]. Contreras *et al.* [17] suggested that NA can provide information to clinicians in two different ways, namely, knowing the main types of complaints that patients may have, prioritizing interventions on a symptom or syndrome, and allowing assessment of symptom dynamics over time to time. That statement is in line with what was stated by van Rooijen *et al.* [29]) that NA involves applying complex systems analysis to the study of psychopathology so that clinicians can anticipate the course of mental disorders in the future. This approach already uses in various mental disorders, such as depression [30]–[33], anxiety disorders [32], posttraumatic depression [3], [32]–[34], psychotic disorders [26], [29], [34]–[41], the general structure of psychiatric symptomatology [3], [17], [39], [42]–[45] self-diagnosis manual, [3], [46] quality of life [47] and personality traits [2], [46]. In addition, NA is also used in health science and mental health research [47], [48].

4. CONCLUSION

This scoping review focuses on comparing the CC approach and the network approach and discovering the advantages of the network approach in studying psychopathology. The CC approach, and the network approach are proven to explain the psychopathology of mental disorders through different points of view. The CC approach uses the basis of medical science, which looks at a mental illness that causes symptoms so that psychopathology measurements are on the latent variable, namely the disorder itself. In contrast, the network approach explains that mental disorders arise because of symptoms that interact and mutually reinforce or influence one another. The network approach measures psychopathology through symptoms that appear or occur. This review also found that using the network approach provides better explanations regarding comorbidity, heterogeneity of mental disorders, predictions, and descriptions of mental disorders. Each approach has advantages, although some articles support that NA is the better approach to studying mental disorders. To decide which approach is appropriate for psychopathology research, researchers should adapt it to the research objectives. Perspectives on mental disorders will determine how the researcher answers the research objectives and how to analyze the data.

APPENDIX

Table 1. Table of findings

Key	Authors	Main findings
Rayyan-386093131	[13]	Comorbidity In the CC approach, comorbidity is a two-way relationship between several latent variables. In the network approach, comorbidities is the result of a direct relationship between symptoms of various disorders.
rayyan-386093129	[1]	The perspective of mental disorders Disease model approach CC Individuals afflicted with mental disorders may encounter a variety of interrelated symptoms that stem from the underlying cause of their condition. It is of utmost importance to comprehend these indicators as evidence of fundamental factors to acquire a complete comprehension and accurately evaluate the disorder. This methodology is rooted in psychometrics, which views symptoms as constituents of a larger whole. By scrutinizing the symptoms in this fashion, we can achieve a more thorough understanding of the disorder and formulate more effective treatment strategies. Network Approach In the realm of mental disorders, it is crucial to view symptoms as interrelated components within a broader framework rather than isolated manifestations of a disturbance. This approach, network modeling, enables a comprehensive comprehension of the disorder as a multifaceted network of interconnected symptoms. Acknowledging the interactions and mutual reinforcement of symptoms can enhance our ability to holistically assess and treat the disorder. Ultimately, this methodology offers a more efficacious approach to addressing and conceptualizing mental health issues.
Rayyan-386093236	[7]	The network approach conceptualizes phenomena as interacting, often mutually reinforcing, complex network elements.
Rayyan-386093108	[5]	The CC approach posits that symptoms indicate fundamental categories or dimensions, while NA regards symptoms as an intrinsic component of mental disorders. Following NA, disorders manifest due to the interactions between symptoms. Targeting central symptoms within disorder networks may yield expedited recovery. Conversely, the CC approach elucidates clinical symptoms via a limited number of latent variables. Panic disorder, for example, may be viewed as a latent variable that gives rise to observable symptoms.
Rayyan-386093126	[14]	In the CC approach, causal relationships interconnect the symptoms. In the network approach, symptoms can arise due to disturbances, and interactions between symptoms can lead to certain disturbances.
Rayyan-386093136	[2]	The CC approach posits that these disorders are caused by latent variables that are affected by specific symptoms, their duration, and their covariations. On the other hand, the network approach suggests that mental disorders simply group symptoms that tend to co-occur and appear together due to a CC.
Rayyan-386093141	[15]	NA: Understanding mental disorders can be challenging as they stem from a complex interplay of biological, psychological, and social factors. These factors significantly impact mental health, resilience, vulnerability, and liability. However, practical advice and real-world examples can aid in improving comprehension and treatment. Furthermore, the application of network theory can assist in diagnosing and treating mental disorders and guide future research in psychiatry and related fields.
Rayyan-386093192	[16]	Clinical symptoms can be traced back to a limited number of underlying factors, like how mental disorders account for observable symptoms. Panic disorder, for instance, can be seen as a latent variable that sets off several symptoms.
Rayyan-386093225	[6]	Network approach - The network approach offers a lucid account of how these symptoms interact to produce a detrimental cycle. While it is crucial to tackle each symptom separately, evaluating their influence on one another is equally imperative to disrupt this cycle successfully. - Conceptualizing disorders with this approach will provide the clinician with a comprehensive understanding of the psychopathology of mental disorders. CC model The symptoms of mental disorders occur together because they have the exact underlying cause.

Table 1. Table of findings (*Continue*)

Rayyan-386093120	[17]	NA is crucial in identifying critical aspects of psychopathology, but there is uncertainty about its practical use in clinical settings due to statistical analysis methods and psychometric validity limitations. Improving reliability and validity is necessary to enhance its practical application.
Rayyan-386093194	[18]	NA: Using empirical data to compare and refine mental health theories holds great potential. A comprehensive framework for constructing theories involves collecting empirical data, formalizing a theory, and subjecting it to testing against new data. Such an approach enhances precision and efficacy in comprehending and managing mental illnesses.

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