Network theory

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Systems-based thinking in psychology and the mental health sciences

The theoretical framework through which the nature and origins of mental health disorders are conceptualized plays a pivotal role in guiding research questions and attempts to refine our understanding of psychiatric illnesses.

One approach to mapping out the aetiology of mental disorders has involved the adaptation of the common cause model, which is used to understand many medical illnesses. This dominant view proposes that the symptoms of an illness arise from a shared pathogenic pathway (such as a virus) that causes the presence of the symptoms. This implies that the symptoms of the disorder are independent of (do not influence) each other, with the existence of each attributed to their common cause. COVID-19 showcases the utility of this model in medicine: symptoms such as fever, cough, and loss of smell arise owing to the presence of the SARS-CoV-2 virus rather than from any causal relationship between the symptoms themselves.

Despite its successes in the field of medicine, the common cause approach and its accompanying pursuit of root entities as the driving forces of disorders has been less fruitful in understanding mental disorders. Thus, scholars have challenged the validity of this approach to psychopathology.

In 2017, Amsterdam-based researcher Denny Borsboom presented a competing approach — the network theory of mental disorders. Borsboom highlighted how symptoms can arise independently in the absence of an underlying disorder. Symptoms might be triggered by external events, such as the experience of recurrent sleep problems after the opening of a noisy venue in one's neighbourhood. As some symptoms co-occur more naturally than others, this pattern enables certain symptoms to catalyse the activation of other symptoms, laying the foundation for a sequence of causal dynamic interactions among symptoms over time. For instance, sleep problems induce fatigue, which can lead to anhedonia and sustainment of low energy over time, further inducing a new set of related symptoms. In certain individuals with symptoms that are sufficiently connected, this dynamic interplay among symptoms can remain even after the triggering event has diminished. In this way, symptoms can reinforce and sustain each other over time, ultimately emerging into a mental health disorder.

In this view, because of individual differences in whether and to what extent symptoms influence the onset of other symptoms, the same adverse event can put certain individuals at greater risk for the genesis and maintenance of detrimental patterns of interplay among symptoms that emerge into a mental disorder. Other individuals might display more resilient patterns to the perturbations and stressors stemming from the external environment with respect to their symptom dynamics, making them less vulnerable to psychiatric illness.

The network theory of mental disorders has been influential in studying and conceptualizing mental health disorders. The legacy of the network approach championed by Borsboom and the Amsterdam school of thinkers also extends beyond symptom interactions and mental disorders, accelerating a systems-based perspective across other subdisciplines of psychology.

With its tools to harness the idea that mental disorders are emergent properties of a multifactorial and dynamically interacting set of biopsychosocial processes, the network approach has played a critical role in solidifying the foundation of a systems-based approach to modelling psychological phenomena.

Key paths open for researchers following the tenets of these systems-based approaches. Phenomena such as vaccine hesitancy and depression are postulated to arise through emergence, and researchers can use systems-based approaches to investigate the factors and dynamic interactions that contribute to the onset of and changes in the expression of these phenomena. Furthermore, the approach lends itself to studying how individual differences might influence the dynamics among factors and how different couplings of factors and feedback loops influence thoughts, emotions and behaviours.

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Appropriate forethought is needed when using these approaches, including the need to incorporate critical factors that have been postulated to be related to the emergence of mental health disorders and other psychological phenomena. With these considerations, network-based and systems-based approaches present a promising and valuable tool with which to refine the field's understanding of how psychological phenomena emerge and are maintained over time.

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Competing interests

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