

Network Science Approaches to the Study of Addiction

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Abstract: An increasing volume of data is available to support the study of substance abuse and addiction. Yet while data contains information, it is far from constituting understanding. Accompanying the increasingly rich phenotyping of addiction is the critical challenge of distilling biological, behavioral, and social processes – and their underlying rules and mechanisms – that will inform effective interventions. Network science provides a set of theories, conceptual paradigms, mathematical frameworks, and computational tools that are beginning to show marked promise in meeting this challenge. In this talk I will discuss the foundations of network science and describe the types of investigations to which it is particularly well suited. I will then provide examples of the use of network science in the study of brain networks constructed from neuroimaging data, symptom networks constructed from self-report, and behavior networks constructed from laboratory tasks. I will conclude with a brief discussion of current frontiers in the further development and application of network science to the study of addiction.

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