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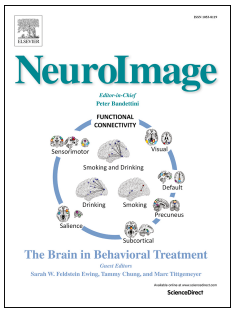

A common framework for the problem of deriving estimates of dynamic functional brain connectivity

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A common framework for the problem of deriving estimates of dynamic functional brain connectivity.

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Highlights

- Different approaches to compute dynamic functional brain connectivity have been proposed, each with their own assumptions.
- We present a theoretical framework that encompasses a large majority of proposed methods.
- Our common framework facilitates comparisons between different methods by highlighting their underlying assumptions.

Abstract

The research field of dynamic functional connectivity explores the temporal properties of brain connectivity. To date, many methods have been proposed, which are based on quite different assumptions. In order to understand in which way the results from different techniques can be compared to each other, it is useful to be able to formulate them within a common theoretical framework. In this study, we describe such a framework that is suitable for many of the dynamic functional connectivity methods that have been proposed. Our overall intention was to derive a theoretical framework that was constructed such that a wide variety of dynamic functional connectivity techniques could be expressed and evaluated within the same framework. At the same time, care was given to the fact that key features of each technique could be easily illustrated within the framework and thus highlighting critical assumptions that are made. We aimed to create a common framework which should serve to assist comparisons between different analytical methods for dynamic functional brain connectivity and promote an understanding of their methodological advantages as well as potential drawbacks.