

The Role of Physiological Noise in Resting State Functional Connectivity Magnetic Resonance Imaging.

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At the University of Wisconsin-Madison

01/09/2017

Resting state functional connectivity MRI (rs-fcMRI) is an outstanding tool to explore brain function. A short and straightforward imaging session can inform about the state of many networks - and their interactions - in the healthy and disrupted mind. In terms of methodology, sources of correlated noise such as motion, respiratory and cardiac artifacts collectively present one of the most challenging aspect to overcome in resting state imaging. In particular, the complexity by which cardiac and respiratory signals manifest themselves as physiological noise in the functional imaging data has continuously fueled intensive research for many years. In this dissertation we firstly explore the mechanisms of physiological noise and noise correction methods proposed by the scientific community and our research group. Subsequently, we investigate how physiological noise corrections affect functional connectivity estimates in term of relativity and validity. Our hope is that these advances in resting state techniques can diligently and effectively assist in the exciting discoveries about human mind that are yet to come.