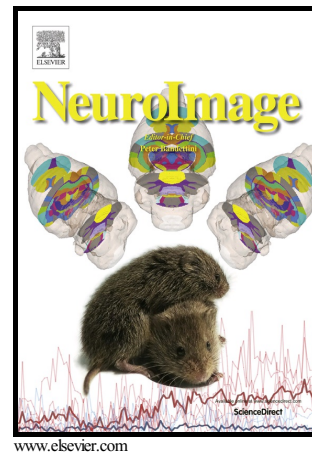


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and where we go from here

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A decade of decoding reward-related fMRI signals and where we go from here

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Abstract

Information about potential rewards in the environment is essential for guiding adaptive behavior, and understanding neural reward processes may provide insights into neuropsychiatric dysfunctions. Over the past 10 years, multivoxel pattern analysis (MVPA) techniques have been used to study brain areas encoding information about expected and experienced outcomes. These studies have identified reward signals throughout the brain, including the striatum, medial prefrontal cortex, orbitofrontal cortex, dorsolateral prefrontal cortex, and parietal cortex. This review article discusses some of the assumptions and models that are used to interpret results from these MVPA studies, and how they relate to findings from animal electrophysiology. The article reviews and summarizes some of the key findings from MVPA studies on reward. In particular, it first focuses on studies that, in addition to mapping out the brain areas that process rewards, have provided novel insights into the coding mechanisms of value and reward. Finally, it discusses examples of how multivariate imaging approaches are being used more recently to decode features of expected rewards that go beyond value, such as the identity of the expected outcome or the action required to obtain it. The study of such complex and multifaceted reward representations highlights the key advantage of using representational methods, which are uniquely able to reveal these signals and may narrow the gap between animal and human research. Applied in a clinical context, MVPA may advance our understanding of neuropsychiatric disorders and the development of novel treatment strategies.

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