In this Issue

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A brief summary of the articles appearing in this issue of *Biological Psychiatry*.

Special Issue: Recent Advances Using Neuroeconomics to Investigate Psychopathology

In the introductory paper of the journal's special issue on neuroeconomics, **Sharp *et al.*** (pages 87–92) detail the need for improved treatments for psychiatric disorders as well as the need to develop a new classification system based on linking pathology in brain systems to behavioral disturbances. The authors suggest that neuroeconomic approaches may advance this agenda by promoting the close mapping of reward-related decision-making across multiple levels of investigation.

Kishida and Montague (pages 93–100) describe recent developments using mathematical models of valuation that implicate the neurotransmitter dopamine in learning and social exchange. The authors review the recent application of these imaging models and game theory approaches to develop quantitative and objective approaches to characterizing social interaction. Framing social behavior in this way may provide a natural framework for future computationally-driven developments in investigations of the underlying neurobiology of psychiatric disorders.

Chang *et al.* (pages 101–106) introduce a classification scheme for psychiatric symptoms based on the state of a dysfunctional neural circuit. The authors focus on variance-shifted and state-shifted functional deficits and discuss these from the perspective of neuroeconomics and related behavioral and neural investigations in animals, with an emphasis on commonly occurring symptoms in psychopathology.

Monterosso *et al.* (pages 107–112) review key findings in two areas of neuroeconomics, delay discounting and prediction error, applied to the study of addiction. The authors assert that neuroeconomic modeling refinement facilitates understanding of neural substrates that contribute to addiction. They also discuss neuroeconomics in the study of self-control and the challenges for this area of work.

Hartley and Phelps (pages 113–118) explore the role of anxiety in decision-making using a neuroeconomic approach. The authors discuss the overlap between the neural systems mediating fear and anxiety and those implicated in studies of economic decision-making. They then review a set of economic decision-making biases exhibited by anxious individuals and propose that the neural circuitry supporting fear learning and regulation may mediate the influence of anxiety upon choice.

Recent advances in functional neuroimaging, combined with multi-player exchange games drawn from behavioral economics, and computational/quantitative approaches more generally, provide a fitting paradigm within which to study interpersonal function and dysfunction in psychiatric conditions. In this review, **King-Casas and Chiu** (pages 119–125) outline the importance of interpersonal factors in psychiatric illness and discuss how neuroeconomics provides a tractable framework to examine the neurobiology of social dysfunction.

Neuroeconomics offers the possibility of a new approach to understanding why individuals with attention-deficit/hyperactivity disorder have difficulty making decisions. **Sonuga-Barke and Fairchild** (pages 126–133) propose a model linking three brain networks to specific decision-making impairments. They suggest that difficulties ordering preferences, setting goals and implementing plans are related to default mode network disruptions. They also link disrupted reward networks to problems in learning about the value of future outcomes. The authors also suggest that executive network dysfunction hinders the ability to make choices and compare potential outcomes.

Delgado and Dickerson (pages 134–141) examine the individual contributions of multiple learning and memory neural systems and their interactions to human decision-making in normal individuals and neuropsychiatric populations. The authors assert that neuroeconomic approaches may provide novel insights into several neuropsychiatric populations that suffer from damage to structures involved in learning and memory processes, such as the basal ganglia (e.g., trial and error learning) or the hippocampus (e.g., declarative learning), and have deficits in learning, memory, or decision-making.

Inhibition: Methylphenidate and Maternal Effects

Inhibitory function is improved by methylphenidate, but inhibitory signals may have a confounding attentional-capture effect. Using functional imaging in a double-blind, placebo-controlled study of healthy volunteers, **Pauls *et al.*** (pages 142–149) report that methylphenidate reduced activation within different regions of the right inferior frontal gyrus/insula to infrequent stimuli associated with inhibition and attentional-capture, suggesting that methylphenidate may improve inhibition by influencing underlying attentional mechanisms rather than by exerting a direct effect on inhibitory function.

Tang *et al.* (pages 150–156) demonstrate that behavioral inhibition to a novel environment, a risk factor for anxiety in humans, can be reduced via exposure of infant rats to small doses of novelty. This early intervention effect varied systematically from one family to another, with the maximal effect found among offspring with mothers showing a low-basal/high-evoked corticosterone response, indicating greater maternal self-stress regulation. Such findings point to the importance of considering the interaction of maternal and non-maternal factors in the development of anxiety disorders.

Positive Affect, Stress, and Reward Reactivity

Changes in positive affect are an important predictor of vulnerability to mood pathology. Using functional magnetic resonance imaging in young adult volunteers, **Nikolova *et al.*** (pages 157–163) show that reward-related reactivity of the ventral striatum (VS), a structure involved in reward processing and appetitive behaviors, interacts with recent life stress to predict current levels of positive affect. Individuals with low VS reactivity to reward exhibited decreased positive affect as a function of recent life stress. Interactive effects were not present among those with high VS reactivity, indicating a potentially protective role of reward-related responsiveness.

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