The Brain-to-Society (BtS) Model of Choice:
The Power and Limit of Computational Reinforcement Learning in Accounting for Human Decision Making and Behavior

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Presentation Abstract

Decision and behaviour are the outcomes of both the human brain's ability for logic, complex reasoning, empathy, and creativity, as well as its more automatic responses to diverse internal and external signals operating on multiple scales. Many of these signals emerge directly from the real-world context set by social, commercial, cultural and political environments, themselves resulting from human decision-making and behaviour at personal, professional, organizational, and institutional levels. The BtS model of individual choice, in development for more than 10 years, examines human decision making and behaviour from a whole-brain perspective, across a rich diversity of dynamic real-world contexts, and taking a pragmatic, solution-oriented perspective. The BtS model of choice is anchored in reinforcement learning and its underlying computational processes, with extension in development for accommodating higher-order processes such exploitation, exploration and planning. After having introduced the BtS model, we will first offer a short briefing on computational sciences and technologies now embedded in much of modern brain, behaviour, and social sciences. We will then report on early agent-based model of temporal difference learning and demonstrate its limited ability to reproduce real-world behavior (eating) in changing contexts (food environment) in a child birth cohort. Neurobehavioral experiments will demonstrate patterns of exploration and exploitation that may account for such limitation and we will sketch next empirical and computational strategy.

About the Webinar Series

The **BRIDGE** webinar series is designed to prepare for the next generation of big data analytics, woven into transdisciplinary and intersectoral sciences, policy and innovation, and serving as catalyst for solutions at scale to better address the seemingly intractable problems that lie at the nexus of health and wealth production, distribution and consumption. A key to accelerate change lies in establishing bridges between sectoral big data, and between data and content. To foster real time learning, the **BRIDGE** webinar series brings together a new solution-oriented transdisciplinary translational paradigm for the four *M*s of big data sciences used on both sides of the health and economic divide (*M*achines, *M*ethods, *M*odels and *M*atter).

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