

Title: Using Neural Synchrony to Predict Social and Non-Social Decision-Making Under Uncertainty

Expected Contributions: While research on ambiguous non-social uncertainty has been exhaustive, we know comparatively little about how individuals make decisions in response to ambiguous social sources. This is a meaningful research gap, given the extent to which social uncertainty is tied to negative psychological reactions and outcomes. ¹⁻⁴. My dissertation work explores neural and behavioral differences in uncertainty assessments of social and non-social uncertainty using a naturalistic fMRI paradigm. Using an adult population, I will apply dynamic ISC analyses ⁵ to characterize common neural signatures of domain-specific certainty judgments among functionally defined cortical parcels ⁶ and to examine the degree to which activity in each cortical parcel informs behavioral assessments of uncertainty. My stimulus models important features of social ambiguity (e.g., incremental learning, informational filtering), which are relatively absent from other existing approaches, which tend to focus on the final product of a certainty judgment (e.g., selecting low- or high- risk slot machines).

I believe that there are several innovative features of this proposal which will provide both theoretical and practical value to academic research. We use a single dynamic, feature-rich video stimulus (length: ~45 mins) to examine how participants gather information and build personal hypotheses about uncertain social events (i.e., whether or not a character committed a crime). Our proposed naturalistic approach optimizes ecological validity and allows us to gain a better understanding for how people assess social factors like trustworthiness. As such, this not only generates a baseline of comparison by which to contrast both clinical and non-clinical reactions to uncertainty, but also provides a means of examining uncertainty related behaviors in daily life.

Our findings may be relevant to elucidating cognition association with judging culpability in legal proceedings or less formal moral decision-making (e.g., the “court of public opinion”).

While prior research has used passive viewing paradigms to examine intersubject synchrony, our task incorporates continuous behavioral assessment of situational certainty. This behavioral measure is time-locked with neural activity, which will yield a direct association between neural and behavioral activation. As such, this is the first study that we are aware of that attempts to use synchrony in continuously-sampled neural activity to predict synchrony in continuously-sample behavioral judgments or decisions. The methodology that we develop to answer our question may help establish precedent for examining direct associations between multivariate patterns of neural activity and observable, downstream behaviors. Our application of an advanced computational method (ISC) has not previously been applied to explorations of uncertainty-related cognition and offers improved neural resolution to a complex social topic.

Lastly, our design also directly compares the neural and behavioral correlates of social uncertainty (i.e., evaluating a character’s guilt) with non-social uncertainty (i.e., evaluating the continuous luminance of the movie frame) (*see 2.1. Task Design*), which extends the relevance and offers an baseline of interdomain comparison against which to contextualize or contrast our results.

References

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