**Specific Aims**

Social situations often require forming judgments about others’ beliefs, actions, or intentions with limited information. This uncertainty is typically aversive for normative populations 1 and rises to clinical significance for individuals suffering from anxiety disorders, depression, and post-traumatic stress disorder 2–4. Extant research has identified neural regions that differentially respond to social and non-social sources of uncertainty 5,6, but the neural mechanisms underlying how social uncertainty resolves or augments over time are not well understood or differentiated. Social uncertainty is often generated iteratively in response to accumulating evidence in feature-rich and dynamic contexts 1,7. Extant studies of social uncertainty often employ highly-controlled experimental designs that measure certainty judgment outcomes in response to isolated stimuli across independent trials without direct human interactions (e.g., trust games). This offers unparalleled causal inference at the cost of ecological-validity. Understanding the unique neural representations and cognitions associated with social uncertainty sources may require study designs that mirror the contexts and features that generate uncertainty.

Many unique features of social uncertainty sources can be found within video stimuli (e.g., multimodal, feature-rich, dynamic) 8,9. Passive viewing of video stimuli has been used to model neural responses to context-dependent phenomena by examining intersubject neural synchrony via *Intersubject Correlations (ISC)*, or the predictive utility one individual’s time course of neural activity exhibits towards other individuals’ activation in corresponding voxels or regions 8–11. This data-driven approach demands few assumptions of a region’s function but can highlight neural circuitry commonly involved in social cognition 10, identify features neural circuitry respond to 8, and find differences in neural recruitment between groups (e.g., adults v. adolescents) and/or domains (e.g., social v. non-social) 8,11. However, examining neurally synchrony during passive viewing alone only allows us to *infer* subjective experiences or assessments. Social uncertainty judgments form idiosyncratically based upon a participant’s unique expectations, experiences, and knowledge 12, and thus direct simultaneous measurement of subjective experiences and assessments during fMRI is ideal but underutilized.

Social uncertainty is present throughout the typical life course and is clinically relevant during vulnerable developmental periods. Adolescence is a period of profound social development and pronounced attention towards social others 13,14. The presence of ambiguous social stressors during adolescence predicts long-term susceptibility to, and severity of, anxiety and depression 15. Early intolerance of uncertainty also predicts emotion dysregulation 16–18, suboptimal risk-taking 19, and peer-pressure susceptibility 20. However, adolescent responses to and assessments of ambiguity differ substantially from that of their adult counterparts 21,22 even after adjusting for differences in familiarity bias and novelty-seeking 23,24. Our understanding of adolescent responses to uncertainty are incomplete and the underlying mechanism driving differences between adults and adolescents is still undetermined. A study identifying the neural mechanisms in adults and adolescents which drive uncertainty evaluations of dynamic, feature-rich social stimuli would fill a crucial gap in the extant literature.

My proposed grant proposal uses video stimuli to collect neural and behavioral representations of uncertainty continuously and simultaneously. Using social and non-social tasks, I will employ intersubject correlations to identify the neural regions commonly involved in domain-specific certainty judgment formation, how neural intersubject synchrony informs synchrony of subjective behavioral indicators of uncertainty, and how these relationships differ as a consequence of adolescent-to-adult development. My specific aims are as follows:

***Aim 1. The Dissertation Research Project (F99 Phase) – To explore the formation of social and non-social uncertainty judgements among healthy, neurotypical adults.*** My proposed paradigm tasks adult (18+ yrs) participants with watching a novel video stimulus (e.g., a crime mystery) while continuously rating their certainty of a social (i.e., a character’s guilt or innocence) and non-social (i.e., frame luminance) outcome during fMRI. Using this approach, we can examine the extent to which individuals demonstrate synchronous neural activity across over 400 cortical parcellations 25 and the extent to which synchronous neural activity in each parcellation predicts synchronous behavioral activity in subject assessments of uncertainty. This paradigm has been successfully piloted and has yielded promising preliminary univariate results (*See* **Research Strategy A.2.2.**)

***Aim 2. The Postdoctoral Research Direction (K00 Phase) – To explore the formation of social and non-social uncertainty judgements across normative adolescent development.*** In my postdoctoral fellowship, I will expand upon my predoctoral work by using the paradigm described above to identify the neural mechanisms commonly underlying adolescent (13–18 yrs) certainty judgment formation and contrast the resultant activation pattern against our adult sample to identify developmental differences and similarities in certainty judgment formation. Exploratory sample-stimulus correlations 8 will be applied to identify age-related differences in response to stimulus features which will guide future hypothesis-driven research on age-related differences.

Taken together, this combination of training in computational neuroscience, developmental neuroimaging, and the developmental decision-making literature will facilitate my long-term goal of establishing my own lab dedicated to computational social affective developmental neuroscience research.