POSTER SESSION III

A Bayesian Joint Model for Risk-Taking and Momentary Mood Reveals the Importance of Subjective, Non-Linear Utility Curves

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Background: Mood is one of the most common terms used in psychiatry, yet poorly defined. Here we propose a novel computational approach that links mood and reaction time to underlying cognitive processes using data from a monetary task that was conducted under closed-loop mood manipulation.
Methods: We conducted a task that consists of a sequence of interactive rounds in which participants decide whether to gamble or to take a "safe amount", whilst also rating their mood.

Using a Bayesian approach, we combine either a recency or primacy- weighted model for mood (https://www.biorxiv.org/content/10.1101/815944v1) with non-linear utility functions (to account for subjective risk preferences), and reaction times in the form of a drift-diffusion model.
Results: We have results fitted to 40 subjects which compare 4 different model variants: recency-linear (recency weighted with linear utility), primacy-linear, recency-nonlinear, and primacy-nonlinear. Models are evaluated by perf-subject fit using the Bayesian posterior information criterion (BPIC). Primacy-nonlinear was the best model in 31/40 subjects and Recency-nonlinear was best in the remaining 9/40 subjects. Using paired t-tests to account for subject variability, Primacy-nonlinear has a lower mean BPIC than Primacy-linear ($p < 1e-5$) and a lower mean BPIC than Recency-nonlinear ($p < 1e-5$).
Conclusions: We demonstrate the feasibility of jointly modeling mood and reaction time. We show that models with nonlinear utility curves are superior to simple linear utility curves. Likewise, models with primacy weighting for mood outperform models with recency weighting. This bolsters the validity of mood ratings as reflecting a process sensitive to both subjective valuation and experience timing.
Supported By: NIH Intramural
Keywords: Computational Modeling, Mood, Reward, Bayesian Modeling

A Computational Network Perspective on Pediatric Anxiety

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Background: Psychiatric taxonomy segregates pediatric anxiety symptoms into distinct diagnostic subtypes. However, typical mixed symptom presentation poses significant challenges. Pediatric anxiety may alternatively manifest within a multivariate network of inter-connected symptom domains. We utilize network analytic approaches to evaluate this possibility.
Methods: 4,964 youths (ages 5-17 years; healthy, non-selected, high-risk, clinically-anxious), from seven international sites, completed the Screen for Child Anxiety Related Emotional Disorders, which dimensionally assesses severity along DSM diagnostic categories: generalized-anxiety (GAD), separation-anxiety (SEP), social-anxiety (SOC), and panic (PAN) disorders; additionally, school-avoidance symptoms (SCH). Based on scores on these five domains, computational network analytic tools quantified the anxiety symptom network structure, and its moderation by diagnostic status (patients vs. healthy-controls), age (3-year longitudinal assessments), and sex. Differences were inferred from invariance tests.
Results: The anxiety network featured a highly inter-connected structure; all symptom domains correlated positively to varying degrees; strongest edges were GAD-PAN ($r=.39$) and GAD-SOC ($r=.31$). Patients and healthy youth differed in symptom severity in all domains, $ps<.001$, but demonstrated comparable network structure ($p=.14$). Network structure differed by sex ($p=.038$); females showed stronger GAD-SCH association ($p=.005$). Longitudinal data indicated structural changes during childhood ($p=.019$); GAD-PAN weakened ($p<.001$). Across analyses, GAD and PAN symptoms consistently showed high centrality.
Conclusions: Pediatric anxiety manifests along multiple, inter-connected domains, accounting for typical mixed symptom presentation. Using a large, heterogeneous sample, we quantify the nature of these inter-domain associations, as well as specific moderation effects by sex and age. Finding could inform clinical conceptualizations of pediatric anxiety, and, consequently, diagnosis, treatment, and research.
Supported By: NIMH IRP (ZIAMH002781-15)
Keywords: Anxiety, Developmental Psychopathology, Symptom Dimensions, Sex Differences, Network Analysis

A Conservative Gene Module Related to Hippocampus Neurogenesis and Schizophrenia

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