



Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 2

Commons West, Easel 32

1:00 PM to 2:30 PM

”How Much Does this Cost?” Decision-Making Processes Driving Infants’ Reaching Behavior

Tessala W Warheit Niemi, Senior, Biochemistry, Neurobiology

Merideth Kirry, Senior, Psychology, Individualized Studies

Mentor: Jessica Sommerville, Psychology

Mentor: Kelsey Lucca

Adults use many forms of information when deciding how to act in any situation. We are investigating the types of information infants use when determining how to act in a novel reaching task. We are looking at costs (how far they must reach; Study 1) and the social value of the object they are acting toward (Study 2). In Study 1 (ongoing), we tested 6-month-olds ($n=25$) and 9-month-olds ($n=14$). Infants completed a warm-up task to measure their maximum reach. During test trials, they were presented toys at 3 different distances: one inch away (Easy condition), one inch past maximum reach (Hard condition), and 27 inches away (Impossible condition; Figure 1). Infants reached more in the easy (93.2%) than the hard (72.6%, $\beta=-1.90$, $p<0.0001$) and impossible conditions (19.3%; $\beta=-5.45$, $p<0.0001$; Figure 2A). Infants also reached more in the hard than the impossible condition ($\beta=-3.5$, $p<0.0001$; Figure 2A). A within-subjects one-way ANOVA revealed a main effect of condition on infants’ latency to reach $F(2,73)=127$, $p<0.0001$. The average latency increased from easy (2.61 \pm 2.05seconds), through hard (4.93 \pm 3.21seconds), to impossible (9.29 \pm 1.13seconds; Figure 2B). This indicates that infants are less likely to reach for objects when costs are high. In Study 2 an actor will manipulate one toy to be exciting (“I love this toy!”) and one toy to be boring (“Eh”), 3 times, 10 seconds each. We hypothesize that if infants use social value in their decision-making process, they will persist more when reaching for the exciting toy, particularly in the hard condition when reaching is costly. Even though infants engage in less complex decisions than adults, we are able to see evidence of decision-making processes in infants’ actions, supporting the idea that humans’ ability to perform these processes may emerge during early infancy.

POSTER SESSION 2

Commons West, Easel 33

1:00 PM to 2:30 PM

“Can I Count On You?” Infants’ Expectations of Prosocial Behavior Across Contexts

Aarti Devadatta Bodas, Senior, Psychology

Mary Gates Scholar, UW Honors Program

Mentor: Jessica Sommerville, Psychology

Mentor: Kelsey Lucca

Understanding prosocial behavior, the concern for the welfare of others, is critical to navigating the social world. Here, we investigated the nature of infants’ understanding of prosociality by asking whether they expect those who are fair (i.e. those who distribute resources equally) to also be trustworthy (i.e. respect someone else’s property). We showed 32 22-month-olds videos of two actors, one who distributes goods fairly (3:3) and another who distributes goods unfairly (5:1). Using eye-tracking, we captured infants’ active and passive expectations about the trustworthiness of these actors when both were warned by a third character, a toy-owner: “Don’t touch my toy”. When she left the room and came back to find the toy missing, she asked “Where is my toy?”. We predicted that more infants would give anticipatory looks towards the unfair actor than towards the fair actor, suggesting that infants expected the unfair actor to have stolen the toy (i.e., active expectations). Next, infants either saw the fair actor steal the toy ($n=16$) or the unfair actor steal the toy ($n=16$). Here, we predicted infants would look longer at display when the fair actor stole the toy, a signal that this event violated their expectations (i.e. passive expectations). Additionally, we were interested in how social-environmental factors may influence infants’ expectations. Thus, we also investigated the influence of siblings on infants’ expectations. Findings revealed that infants with siblings looked anticipatorily at the unfair actor while infants without siblings looked anticipatorily at the fair actor. Additionally, infants who saw the unfair actor steal the toy looked longer at the display. This may be explained by infants looking longer at the actor whose behavior they found most interesting. Together, these findings provide insight into infants’ understanding of various sociomoral traits and how this understanding may be influenced by social-environmental factors.

POSTER SESSION 2

Commons West, Easel 31

1:00 PM to 2:30 PM

You CAN Sit with Us: Do Moral and Non-Moral Norms Translate across Group Boundaries?

Anna Elisabeth Baumann, Recent Graduate, Anthropology: Human Evolutionary Biology

Mentor: Jessica Sommerville, Psychology

Mentor: Rachel Horton, Psychology

Mentor: Kelsey Lucca

Morality has significant social importance as it influences the way we interact with others. We know that adults and children (aged 3-11) expect all groups to follow moral norms such as fairness, but only in-group members to follow non-moral norms like certain food preferences (Lieberman, 2017). It remains unknown if this applies to infants. Studying infants' moral sensitivities will shed light on the origins of morality, and it will give us insights on its socialization. We are investigating infants' expectations about in-group and out-group members performing actions that are consistent/inconsistent with moral norms (i.e., distributing resources fairly/unfairly) and actions that are consistent/inconsistent with non-moral norms (i.e., using an object according to its established function or unconventionally). In Study 1, 24-month olds (N=32, testing ongoing) are first familiarized to a storyteller speaking English (in-group) or Spanish (out-group). Infants are then shown the storyteller doing a fair (equal) or an unfair (unequal) distribution of cookies to two third parties. We are measuring, via infants' visual attentiveness, whether they expect fair or unfair resource distributions. We predict that infants will show enhanced attentiveness to the unfair event, thereby suggesting what they saw violated their expectations. During piloting, infants in both conditions looked longer at the unfair distribution (English-Unfair: M=32.44 seconds (SE=9.09), Fair: M=28.8 seconds, (SE=15.4), Spanish-Unfair: M=27.8 (SE=15.2), Fair: M=17.3 (SE=5.39), providing preliminary support for our hypothesis. We are also testing how non-moral norms translate across group boundaries. After the same familiarization events as before, the test trial shows an unconventional action (ie. brushing your hair with a fork) pitted against a convention one (ie. eating with a fork). We predict that non-moral norms will be group-specific because they should be seen as culturally dependent and not encompassing. In sum, these findings will provide important new insights into the origins of morality.

POSTER SESSION 4

Commons West, Easel 37

4:00 PM to 6:00 PM

Classification of Behavioral and Neural Variation in Individuals with Autism Spectrum Disorder

Josephine Ella Millard, Senior, Biology (General)

Mentor: Frederick Shic, Pediatrics

Mentor: Adham Atyabi

Mentor: Kelsey Dommer, CHBD, SCRI

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition associated with deficits in social interaction and the presence of restricted patterns of behavior. ASD is clinically and phenotypically heterogeneous. The most recent update to the diagnostic definitions for mental disorders (DSM-5) provides additional flexibility for capturing the diverse array of phenotypes shown by diagnosed individuals. Despite categorized behavioral symptoms across core and comorbid dimensions of ASD, the neural mechanisms are unknown. Studies have shown atypical neuroanatomy and functional connectivity of the brains of individuals with ASD, suggesting a neural etiology. Here, we focus our attention on the superior temporal sulcus (STS), a region of the brain demonstrated to play a role in processing communication, social information, and theory of mind. Our research question evaluates whether neural activity in STS is affected by behavioral phenotype in children with ASD. We speculate that neural activity between individuals with ASD varies significantly more than typically developing (TD) children, who show more clustered, similar outcomes. Functional near infrared spectroscopy (fNIRS) distinguishes concentrations of oxygenated (HbO) and deoxygenated (HbR) hemoglobin in regions of cortical vasculature, signifying neurovascular coupling. This study uses HbO and HbR measured as subjects watch the events of a social scene on a monitor and analyzes ASD individuals' deviance from average TD activity. Eye-tracking, clinical assessments, and parent questionnaires are considered to extrapolate possible correlations between ASD individuals' variation in neural outcome and the behavioral phenotype expressed. We expect that individuals showing higher degree of neural variance from TD activity will show more severe autism behavioral phenotype. It is possible that in the search for neural mechanisms of ASD, considering behavioral factors signifying atypical variance could reveal significant differences. This exploratory analysis aims to examine the wide range of possible influential factors on neural heterogeneity within the social brain of individuals with ASD.