

## Undergraduate Honors Projects – 2019-2020

### **Alexandra Boxberger**

The Effect of Maternal Borderline Personality Disorder Symptoms on Child Externalizing Problems, as Mediated by Parenting Stress and Maternal Warmth

**Advisors:** Jacqueline R. O'Brien, MS and Maureen Zalewski, PhD

Borderline personality disorder (BPD) is a psychological disorder characterized by impulsivity, negative affect, and emotional and interpersonal dysregulation, both of which can directly impact the experience of being a parent. The purpose of this study was to further understand the pathway through which elevated symptoms of maternal BPD are associated with higher levels of externalizing problems in their children. Specifically, we investigated whether maternal warmth and parenting stress mediated this relationship to transfer risk of mental health difficulties. The participants in this study included 68 mothers and their 3-4 year old children (M= 48, SD= 7.6 months). Maternal BPD symptoms, parenting stress, and child externalizing problems were assessed through maternal report, while maternal warmth was assessed using observational measures during a dyadic stressor task. Results support that elevated maternal BPD symptoms are associated with higher levels of child externalizing problems, as well as with higher levels of parenting stress. However, elevated maternal BPD symptoms were not associated with lower levels of maternal warmth. Additionally, higher levels of parenting stress did not explain the association between maternal BPD symptoms and child externalizing problems. These findings suggest that maternal BPD symptoms confer risk of mental health difficulties in children, and that interventions targeting maternal BPD symptoms may be more effective in mitigating this risk than parenting interventions designed to improve warmth.

### **Clare Brinkman**

Perspective Taking Taken to the Streets: Themes Found in Naturalistic Accounts

**Advisor:** Sara Hodges, PhD

The current body of psychology literature on perspective taking is largely made up of studies which instruct participants to take the perspective of another person. In order to better understand the circumstances under which unprompted perspective taking occurs, an online study (n = 238) was conducted to explore naturalistic accounts of everyday perspective taking. In this study, university student research participants were asked to write about a time, preferably in recent days, when they took the perspective of another person. Narratives were coded using a reliable coding scheme developed to capture the prevalence of and variation in the following elements: whose perspective was taken; what triggered the perspective taking; strategies mentioned (if any) for perspective taking; interpersonal or other outcomes of

perspective taking; and use of perspective-taking metaphors (e.g., use of visual or place metaphors). Results will help shed light on when people think they engage in perspective taking, and may address whether these contexts are related to prosocial and interpersonal understanding outcomes associated with perspective taking.

### **Matthew Dawson**

Identifying Neurons Necessary for Social Behavior

**Advisor:** Philip Washbourne, PhD

Humans have a long history of working in social groups with a plethora of research supporting the benefits of positive human interaction. While these behaviors may seem intuitive, they can be argued as the most intricate behaviors displayed by animals. To generate a situationally relevant response to social others, an animal must be able to track dynamic systems. Given the inherent complexity of social behaviors, it is expected that this system can be perturbed by a multitude of neurological disorders. Using animal models, we can begin to construct the neuronal circuitry necessary for social behaviors. This circuitry can be used to understand social behavior deficits and may reveal possible interventions for disorders. Zebrafish, *Danio rerio*, perform stereotyped social behaviors, such as shoaling, which can be used to explore neuronal changes associated with deficits in performing the behavior. Through chemo-genetic ablations, we were able to cause cell death to select neurons due to variations in gene expression. Chemically treated fish were put into a virtual social assay that untreated zebrafish respond to. Zebrafish exhibiting decreased social response would indicate that the ablated neurons are necessary for social behavior. Our results indicate a population of neurons in the forebrain that are necessary for correct social behavior. This insight will help us construct the circuitry underlying social interactions.

### **Lilly Elston**

Child Gender as a Moderator Between Maternal Difficulties with Impulse Control and Preschoolers' Externalizing Behavior Problems in a High-Risk Population

**Advisors:** Ana C. Hernandez, MS and Maureen Zalewski, PhD

Children of mothers who have difficulties with emotion regulation have been shown to exhibit higher levels of behavior problems, which is a risk factor for future psychopathology. This study examined whether child gender moderated the association between maternal difficulties with impulse control and preschooler externalizing behavior problems using a sample of 68 dyads that oversampled mothers with elevated levels of emotion dysregulation and their 3- to 4-year-old children (46% girls). We hypothesized that higher levels of maternal difficulties with impulse control would be associated with higher levels of child externalizing behaviors. Further, we

hypothesized that the association between maternal impulse control and child externalizing problems would be significantly stronger for boys compared to girls.. Maternal impulse control difficulties were assessed via self-report on the Impulse subscale of the Difficulties in Emotion Regulation Scale (DERS) and child externalizing behaviors were assessed via maternal report on the Child Behavior Checklist (CBCL). The results show that as maternal difficulties with impulse control increased, child behavior problems also increased. As expected, we found that the association between maternal impulse control problems and children's externalizing problems was pronounced for boys. Early recognition of externalizing behavior problems of children of mothers with elevated difficulties with impulse control may have clinical implications for prevention and intervention for child psychopathology.

### **Theemeshni Govender**

Interactive Effects of Social Support and Self-Complexity on Depressive Symptoms in Adolescent Girls

**Advisors:** Marjolein Barendse, PhD and Jennifer Pfeifer, PhD

Development of the self-concept is a fundamental aspect of adolescence. However, it is unknown how variation in self-concept development interacts with other risk factors, such as lack of social support to predict depressive symptoms during adolescence. To address this, we used data from an ongoing longitudinal project, TAG (Transitions in Adolescent Girls) to examine the effects of perceived support from friends and family and self-complexity on depressive symptoms in a sample of adolescent girls (N = 174) aged 10 to 13. Exploratory analyses were used to examine whether positive and negative self-complexity have differential effects on depressive symptoms and the effect ethnicity/race as well as socioeconomic status may have on these interactions. We expected a larger decrease in family support (and to a lesser extent friend support) and a large change in self-complexity between waves 1 and 2 to predict a greater increase in depressive symptoms. We additionally predicted significant interactions would be observed, such that decreasing social support (especially from family but also from friends) would predict increased risk for depressive symptoms, most strongly when combined with a large change in self-complexity. Results suggest that only change in perceived family support predicts depressive symptoms. Changes in perceived friend support and self-complexity, as well as the resulting interactions did not significantly predict depressive symptoms. Lastly, race/ethnicity and SES did not impact any of the relationships examined. Exploring these frameworks can provide a better understanding of risk and protective factors for specifically adolescent girls and contribute to better serving them.

## **Ania Grudzien**

### Color Memory Differentiation as an Adaptive Remedy for Highly Similar Object Memories

**Advisors:** Yufei Zhao, MS and Brice Kuhl, PhD

Potential for memory confusion occurs when memory relates to highly similar objects encountered within the same context. Memory differentiation, an adaptive mechanism by which the brain distinguishes memories that share a high degree of representational overlap, emerges as a potential brain remedy. Differentiation can be understood as the ability to manipulate highly similar memories by exaggerating the differences between them in order to keep them distinct in mind. In this experiment, we examined differentiation of color memory in a visual spatial context. We employed a behavioral memory experiment, with computer generated colored object stimuli, operationalized as a color and location memory task. 40 students from the University of Oregon Human Subjects Pool were asked to memorize the spatial locations of colored object pairs. The colored objects were partitioned into two groups, a paired group (identical objects, highly similar in color), analogous to memories with a high degree of representational overlap, and a control group (different objects, highly similar in color), analogous to unique memories. A two-way ANOVA comparing color differentiation for object group and object location yielded a marginally significant effect of object group, such that subjects exhibited a greater degree of differentiation for highly similar paired objects. In addition, we found a significant, negative linear relationship between errors in location memory and degree of color differentiation. The results lend support to previous research suggesting a high degree of representational overlap leads to memory differentiation in order to prevent errors and confusion in human memory.

## **Lisa Guerricabeitia**

### Associations Among Trait Anxiety, Behavioral Inhibition and Total Energy Intake in Preadolescent Children

**Advisors:** Claire Guidinger, MS and Nichole Kelly, PhD

Overeating, or eating in excess of the body's caloric need, is associated with long-term weight gain and the onset of obesity. Extant research links negative affect, and specifically anxiety, to increases in overeating and disordered eating more generally. Difficulties with behavioral inhibition, a facet of executive functioning, are also associated with poorer eating habits in children. Whether these variables interact with one another to influence energy intake is unknown. In a sample of 76 children (8-10 years old) living in rural Oregon, this study will examine whether trait anxiety is associated with children's total energy intake and whether this association is moderated by child behavioral inhibition. Energy intake (total kcal) will be calculated from nutritional information following a standardized, buffet-style lunch. Behavioral

inhibition and trait anxiety will be assessed using the Stop Signal Task paradigm and self-reported questionnaire (STAIC), respectively. Based on current theories of emotional eating, we hypothesize that higher levels of anxiety will be associated with increased caloric intake. Based on extant findings that link decreased behavioral inhibition to overeating, we hypothesize that decreases in behavioral inhibition will strengthen this relationship.

## **Shifa Hamid**

Interpersonal Perceptions of Political Ideology

**Advisors:** Bradley Hughes, MS and Sanjay Srivastava, PhD

Conservative versus liberal opinion is becoming increasingly inserted in our daily interactions. The partisanship in political ideology is dividing the United States, based on what we assume other people think, which then informs who we choose to surround ourselves with. With the relevance this holds as political knowledge is becoming more accessible, it is important to be aware of our impressions in judging other people's political identities. This work seeks to understand how perceptions of political ideology are formed between strangers. The relationships investigated are: the extent perceivers agree about who is conservative or liberal, how accurate perceptions are of who is conservative or liberal, and how stereotypes are used to make these perceptions. These hypotheses were tested with groups of 4 to 6 students (N=216) participating in a self-report survey, a Leaderless Group Discussion task, and a survey rating the personalities of the other members in the group. Preregistered analyses will look at questions regarding varying degrees of affiliation between group members, in future work.

## **Rachel Jackson**

Augmented Reality Feedback and Effects on Measures of Stress, Mood, and Memory Encoding

**Advisors:** Lea Frank, MS and Dasa Zeithamova-Demircan, PhD

Research with Virtual Reality has shown that a brief meditation experience is effective in reducing feelings of stress and anxiety (Keller, Bunnell, Kim & Rothbaum 2017). When combined with interactive biometric feedback (for example: one's heart rate) these same interventions have a stronger effect on both subjective feeling states as well as physiological changes associated with a relaxation response (Jester, Rozek, & McKelley 2019). While it has been previously shown that reductions in stress can facilitate improved performance on cognitive tasks (Wu & Yan 2019), no research to date has specifically examined the ability of a brief Augmented Reality based meditation experience to boost cognitive performance. Our aim was to investigate if an AR-based meditation experience can stimulate a temporary boost in

cognition by way of lowering stress, and to examine any additional effects of an addition of biometric feedback.

### **Olivia Kim**

Sleep, Depression, and Motivation in Young Women

**Advisor:** Melynda Casement, PhD

Insufficient sleep is prevalent amongst young adults and has a range of consequences for health and wellbeing, including depression. There is some evidence to suggest that the motivation to pursue reward may be a promising factor in the established relationship between sleep and depression. This study aims to explore 'rewarding wanting' or motivation as a possible mechanism in this relationship. Twenty-two women ( $M=20.16$ ,  $SD=1.27$ ) who regularly had less than 8 hours of sleep per night, higher than average daytime sleepiness, and moderate to high depressive symptoms participated in the study. For one week, participants kept a consistent sleep schedule of their typical sleep duration. For the second week, participants were randomly assigned to maintain their typical sleep opportunity (TSO) or extend their sleep opportunity (ESO) by 90 minutes. The results show that higher levels of sleep duration predicted decreases in depressive symptoms after controlling for depressive symptoms at baseline, motivation for reward did not predict depressive symptoms after controlling for depressive symptoms at baseline, and there was no effect of sleep duration on motivation for reward. Findings from the exploratory analysis indicate that higher reward magnitudes and lower reward probabilities may be detrimental for depressive symptoms, while low reward magnitudes may be helpful. These findings provide support on targeting sleep extension and motivation for reward in interventions and treatments in depression for young adult women.

### **Clare McCann**

Examining Self-Perceived Scholastic Competence, Mindfulness and School Transitions in Adolescent Girls

**Advisors:** Theresa Cheng, MS; Samantha Chavez, MS; Jennifer Pfeifer, PhD; and Kate Mills, PhD

The dropout rate after the first year of high school is 25% in the United States, meaning 1.2 million freshmen do not make it to graduation every year (U.S. Department of Education's National Center, 2019). Understanding factors that impact scholastic motivation is essential to combat this attrition in educational attendance. Self-perception of scholastic competence is one likely factor, as previous studies have found that negative self-perception is related to less academic achievement and increased emotional problems. Further, experiences such as the transition into middle school and high school have been proposed as points of change in self-perceived scholastic competence, and mindfulness has been proposed as a potential protective

factor. This pre-registered analysis used existing data to examine three hypotheses: 1. Self perceived scholastic competence will increase with age across early adolescence 2. Higher prior levels of mindfulness will relate to higher levels of self-perceived scholastic competence 3. Transitioning into middle school or high school will relate to self-perceived scholastic competence. A sample of 174 adolescent girls spanning the ages of 10 to 16 years contributed up to three time points of data. We used a multilevel modeling approach, with time points nested within individuals. Our results found no relationship between age and change in self-perceived scholastic competence across early adolescence, and transitions into middle school and high school did not relate to increased or decreased self-perceived scholastic competence. However, prior levels of self-reported mindfulness was positively related to self-perceived scholastic competence. From these findings, we suggest that mindfulness could be used as an intervention to increase self-perceived scholastic competence in girls in early adolescence.

## **Angela O'Neil**

### Representational Models of Personality in Social Brain Networks

**Advisor:** Robert Chavez, PhD

There is broad consensus that regions of the default mode network, including the medial prefrontal cortex (MPFC) and temporal parietal junction (TPJ), and the posterior cingulate cortex (PCC) are implicated in social cognition. Previous research has also investigated how factors such as similarity and trait-knowledge influence the representation of self and others within these regions. However, few studies to date have directly compared models between self and other representations to test which Big-Five personality similarity model best explains the social cognitive processes within tight-knit groups. In this current study, we investigated three models of Big-Five personality similarity in four regions of the brain. We tested whether subject's ratings of others' personality (intrapersonal), the similarity between a subject's self and others' personality (self-anchor), or between others' self-reported personality (interpersonal) predicted neural similarity patterns of others in the default network regions during a round-robin fMRI trait judgement task. Using multilevel modeling representational similarity analysis approach, we found that the intrapersonal model significantly predicted neural representations of others in the rTPJ ( $p = 0.027$ ), such that greater similarity in the rTPJ reflected greater similarity in trait judgments. However, the self-anchor, interpersonal, or intrapersonal models were not significant predictors of others' representations in the dMPFC, vMPFC, or PCC ( $p > 0.05$ ) in this sample. Thus, although one significant finding was shown, these results suggest that Big-Five personality may not drive neural similarity patterns of others during a trait judgement task, whereby other metrics may be more effective than Big-Five personality to capture individual differences when thinking of people in our social network.

## **Joshua Pearman**

What Types of Status Matter? Consensus, Accuracy, and Personality Antecedents of a Two-Component Model of Status

**Advisors:** Bradley T. Hughes, MS and Sanjay Srivastava, PhD

In social hierarchies, people are organized based on their relative status compared to others. A person's status is determined by the judgments of others and has two components: respect/admiration and social influence. The focus of this work was to understand the relationship and effects of these components in interpersonal perceptions. We tested three hypotheses: 1) The components of status, respect/admiration and social influence, will be associated such that individuals who are perceived as having greater respect/admiration will also have higher levels of social influence; 2) Others will agree about who has status in a group (consensus), and will also agree about their own relative status in the group (self-other agreement); 3) Personality traits will predict who attains status. To test these hypotheses, we had groups of  $n = 4 - 6$  ( $N = 218$ ) complete a leaderless group decision making task and then provide ratings about the status and personality of each of the other members of the group and make decisions about who they would prefer to work with on future tasks. The preregistered analysis will use a Social Relations Model approach to account for dependencies in the data and linear regression models to test the hypotheses. We will present the results from this analysis and discuss implications of a two-component approach to status for future work.

## **Meghan Ramirez**

Effects of Sound on Heart Rate Variability: A Meta-Analysis

**Advisor:** Christina Karns, PhD

Exposure to sounds such as rain or wind through trees is known to evoke feelings of relaxation while sounds such as alarms or screams may cause heightened arousal, but the neurophysiological mechanisms involved in this process have not been heavily researched. An overarching aim of this analysis is to understand the promise and potential limitations of simultaneous neural and cardiovascular physiological recordings to elucidate the mechanisms of environmental influences of stress and emotions. Specifically, it aims to determine the extent to which sounds modulate the autonomic stress response and ongoing neural oscillations.



## **Matthew Reifsnyder**

The Intergenerational Transmission of Oxidative Stress

**Advisors:** Sarah Horn, MS and Phillip Fisher, PhD

Oxidative stress acts as a recently uncovered physiological force that contributes towards negative physical and mental health outcomes varying from increased susceptibility of contracting diseases to a variety of psychological disorders. While oxidative stress has been discovered to occur in relation to lifestyle determinants such as low socioeconomic status, increased body mass index (BMI), and exposure to tobacco smoke, there is little knowledge towards the influence that oxidative stress plays towards a child's health. In order to address this gap in knowledge, urinary isoprostane (IsoP) samples were assessed from 48 of 105 mother-child dyads and compared to lifestyle determinants including annual income, maternal smoking status, and BMI of each dyad. A paired samples t-test, as well as a univariate general linear model was conducted co-varying for age, BMI, maternal smoking behavior, and annual income. Results indicate that while there were no significant predictors for maternal nor child IsoP levels, potential associations were discovered between maternal smoking status and increased IsoP levels for both mother and child. Additionally, mean child IsoP values were found to be significantly higher than their mother counterparts, offering insight towards the age of onset for oxidative stress. Further studies are needed to clarify the potential associations reflected in this study by selectively sampling mothers who actively use tobacco products, as well as gathering larger and more diverse sample populations.

## **Audrey Sherman**

Investigating Age and Expertise in Children's Processing and Execution of Complex Activity Sequences, A Proposal

**Advisor:** Dare Baldwin, PhD

This paper proposes a study to examine the role of children's age and expertise in their ability to efficiently process, and competently execute, complex new activities. We will harness the dwell-time paradigm, a method introduced by Hard, Recchia, and Tversky (2011) to track participants' attention during the unfolding of dynamically streaming events. In particular, children between 5 and 8 years of age will advance at their own pace through two activity sequences: one depicting a familiar method of shoe-lace tying they are learning to execute, and the other depicting a novel method of shoe-lace tying. As well, children will attempt to tie shoe laces via both the familiar and the novel method. Lastly, children will participate in a range of tasks assessing their general motor and executive function skills, and their caregiver will also provide survey responses regarding those same skills. Of interest is the extent to which relationships emerge across these tasks and skills, and the extent to which children's age, versus their expertise at shoe-lace tying, predict these relationships. Findings from this research

will help to validate the dwell-time method as a measure of event processing in children. Moreover, our findings will provide altogether new information about developments in event processing and motor skill, as well as informing theoretical accounts of mechanisms that underlie event processing and learning more generally.

## **Avery Turner**

How Does Sleep Develop?

**Advisor:** Don Tucker, PhD

Electroencephalographic (EEG) recordings of infant sleep reveal a unique pattern called Trace Alternant (TA) which consists of large bursts of electrical activity across channels followed by relative silent periods. We predicted that this activity would appear on the scalp as a negative discharge in the frontal electrodes because adult deep sleep features slow oscillations which appear on the scalp as negative frontal discharges. We used EEG recordings from five infants with gestational ages ranging from 33 weeks to 36 weeks to locate segments of TA activity and mark the bursts of activity within them. We found that these bursts actually followed the opposite pattern on the scalp as the adult slow oscillations, with the frontal channels showing a positive discharge with corresponding negativity in the posterior channels. This may imply that TA activity in infants serves a different function than slow wave sleep in adults and that the transition from TA activity to slow wave sleep is an important feature of brain development early in life.