

## **Undergraduate Honors Projects – 2016-2017**

### **Tanainan Chuanchaiyakul**

Preference Reversals in Donation

**Advisors:** Paul Slovic, PhD and Marcus Mayorga, MS

Generally, people make decisions based on available information. We tend to think that our decisions are originally from our own deliberation. However, these decisions can be influenced by choices presented to us. A previous study by Hsee (1998) suggests that these evaluations can be inconsistent when people are presented either with one choice or with many choices at once. We test whether this hypothesis applies in a donation scenario. Using an online survey, participants will see the picture of or the level of money of either one donation box (with low or high existing amounts of money) or two donation boxes (with low and high amounts of money in each). In the Single condition, they will choose an amount of money to donate to the box. In the Joint condition, they will choose both the box and the amount. We hypothesize that in the Single condition, people tend to donate more in the high money box. In contrast, for the Joint condition, more people will choose the low money box with a higher amount of money than people who donate to the high money box. Yet, when comparing two conditions, people will donate more in the Joint condition. This is because they have reversed their preferences in the presence of an alternative. This would also apply when they are provided only the amount of money in the box without the picture of the box(es). The findings will provide us with a better understanding of preference reversals that involve money and altruistic behavior. Ultimately, we may be able to apply this result to increase donation in the real-world practices.

### **Tanainan Chuanchaiyakul**

The Similarity Effect and Altruism

**Advisors:** Paul Slovic, PhD and Marcus Mayorga, MS

Many models try to explain people's decisions in multi-alternative scenarios but these models have not yet tested for the effect of interpersonal relationship that might affect people's choices. For example, Tversky (1972) introduced the Similarity Hypothesis: people tend to choose a dissimilar item over two similar items in the same set. To expand this finding and have a better understanding of what the impact of interpersonal relationships might have, we use an online survey of the Giving and the Taking conditions with a set of two similar items and one dissimilar item. In the Giving condition, subjects will choose to give away one M&Ms® jar from the set, with the only distinction being the colors of the M&Ms®. Further, recipient types are various (i.e. lover, acquaintance, unknown, child in need) to test for effects of interpersonal relationship with altruism regarding the type of recipient. The hypothesis for this Giving condition is that regardless of the recipient types, people still choose to give away the similar item to the recipient and keep the dissimilar item to the self. In the Taking condition, subjects will choose to keep a toothpaste; however, the only available clue is the quantity of each choice. We hypothesize in this Taking condition that people will use this clue and choose the dissimilar one. The findings will expand the knowledge of this effect by examining the interaction between similarity and altruism, and the interaction between similarity and categorical information (that is, color and quantity).

### **Natalie Crawford**

Influence of Act-Based Birthing Classes on Parenting Stress and Depressive Symptoms

**Advisors:** Jennifer Ablow, PhD and April Lightcap, MS

The present study will examine the relationship between participation in the prenatal Acceptance and Commitment Therapy (ACT)-based birthing classes titled Birth Your Way, and future parenting stress. This thesis asks the

question does participation in ACT-based birthing classes, Birth Your Way, effect maternal (1) parenting stress and (2) depressive symptoms at 1 month postpartum. Participants (41 low-income mothers) were randomly assigned to either the treatment (those who received the Birth Your Way class) or control (those who did not receive the Birth Your Way class) conditions. Maternal reports of stress/anxiety as well as depression were collected prenatally and 1-month postpartum. Additionally, levels of maternal experiential avoidance were collected prenatally and 1-month postpartum. A regression analysis found that when controlling for demographic and labor/delivery risk factors, participation in Birth Your Way did has a marginally significant effect on parenting stress or depressive symptoms 1-month postpartum. Post-hoc analysis found that when controlling for demographic and labor/delivery risk factors, the effect that participation in the birth class had on maternal levels of experiential avoidance is marginally significance. This thesis discusses the limitations of a behavior intervention such as Birth Your Way, the reasons why an insignificant result may have been found, as well as further directions for Birth Your Way based on the results of the study. The results of the current work have important implications for future prenatal interventions and the role that ACT-based interventions can play in improving maternal and child health.

### **Bryce Dirks**

The Effectiveness of a Value Based Text Message Intervention on Unhealthy Food Craving and Consumption

**Advisors:** Nicole Giuliani, PhD and Elliot Berkman, PhD

The most recent report from the National Center for Health Statistics estimates that, among adults in the United States over the age of 20, 32.7% are overweight, 37.9% are obese, and 7.7% are extremely obese. Separately, research has shown that a rise in BMI is associated with an increase in health risks, including certain types of cancers (e.g., colorectal-cancer, breast cancer, renal cell). In contrast to many existing interventions, which focus on effortful down-regulation of food craving to reduce unhealthy food intake, this study tests the effectiveness of a personal values-based intervention. Middle-aged obese and overweight participants (N=105) were randomly assigned to receive healthy eating text messages that align with their core values or generic healthy eating text messages derived from public health campaigns (e.g., by the American Heart Association). We hypothesized that participants who received the core value text messages (vs. generic text messages) would show a decrease in craving and consumption of unhealthy foods. Craving and consumption measures were collected using standard self-report questionnaire measures (Block FFQ and FCI) and analysis is undergoing using repeated measures ANOVAs. Anticipated results will indicate a significant decrease in the craving and consumption of unhealthy foods in the value based text messages condition than the generic text messages condition. The implications of these results on healthy eating and obesity will be discussed.

### **Sydney Gilbert**

The Double-Drift Illusion Affects Both the Perception of Where the Target *Is* and the Memory of Where It *Was*

**Advisor:** Paul Dassonville, PhD

To successfully hit a curveball, how does your conscious perception of the curving ball effect where your bat actually swings? From evading car accidents to using basic hand-eye coordination, we often rely on our perceptions of the world to help guide our actions. Successfully perceiving and interacting with a moving object requires the brain to encode how the object's edges (global motion) and the object's internal texture (local motion) are moving through space. In order to quickly process moving objects, the brain typically assumes that these motions are in agreement. However, this assumption is a simple shortcut that does not always reflect the true physical world, often leading to a visual illusion. Previous research has shown that the perceived trajectory of an object with contrasting global and local motion is a combination of the two motion directions.

The purpose of this thesis was therefore to investigate the relative influence of the local and global motions over time and how the memory of the stimulus' previous locations are affected by the perceived trajectory. We assessed the change in the observer's memory of the trajectory's starting location by asking the observer to compare the onset

location with a probe that could be presented before or after motion onset (-250, 0, 250, 500 or 1000ms). Participants maintained fixation in the center of the screen while an object containing leftward, rightward, or no internal motion traveled upward for 500ms in the periphery. The global motion of the stimulus was adjusted for each observer so that the perceived double-drift trajectory appeared purely vertical. For probes presented 250ms before motion onset, the local motion induced a small but significant distortion of the perceived starting location. This bias grew significantly with later probe presentations, reaching a plateau for delays of 250ms or longer. Given that a delay period enhances the effect of the illusion, these results suggest that at least a portion of the distortion in the perceived trajectory of a double-drift stimulus is caused by a bias in the memory of its earlier locations, which are pushed in a direction opposite the local motion.

## **Maxwell Good**

Effect of Identity Manipulation on Aggressive Behavior

**Advisor:** Elliot Berkman, PhD

The identity-value model (IVM) of self-regulation proposes that self-regulation is the result of a value-based calculation between a variety of goal inputs, and that identity relevant choices are more likely to be enacted given their high subjective value (Berkman et al., 2015). The current project tests this model by investigating the link between identity and aggression, a behavior that has been demonstrated to result from self-control failure (DeWall et al., 2005). Participants (N=128) were randomly assigned to recall either a small (easy recall) or large (difficult recall) number of autobiographical instances of aggressive behaviors, leading participants to believe they either did or did not have an aggressive disposition (Schwarz et al., 1991), and measured aggressive inclinations on a subsequent aggression task. We predicted that participants who had to report more instances of aggressive behavior would experience greater difficulty in recalling these examples, implying they could not be typical or frequent. Thus, subjects in the difficult recall condition will conclude they are less aggressive compared to participants in the easy recall condition. Preliminary results indicate that ease of recall had no effect on aggressive behavior, as scores on the aggression task were not dependent on whether participants recalled a small or large number of aggressive behaviors. These results run contrary to the IVM's main prediction, suggesting that the relationship between identity and successful self-control may not be robust, though further testing using different methodology will be needed to confirm this.

## **Tonya Hansberry**

The Sequela of Maternal Trauma: Attachment Relationships and the Development of Empathy in the Next Generation

**Advisors:** Jennifer Ablow, PhD and Jeff Measelle, PhD

Surprisingly few studies have examined how child empathy develops within the context of the primary attachment relationship, or how maternal trauma and contextual factors contribute to individual differences in infant's empathy. This study originated with two central aims: (1) determine whether infant displays of empathy differ according to their quality of attachment; and (2) explore the extent to which maternal trauma and contextual factors contribute to these differences. Thus, this study sought to advance our understanding of how maternal characteristics are related to 17-month-old's empathy within the attachment context, and to identify mechanism(s) by which the capacity for empathy is transmitted across generations. As predicted, considering child characteristics such as temperament and contextual factors such as family socioeconomic status (SES), restricted maternal empathic responsiveness resulting from a history of trauma further was associated with empathic dysregulation in infants. Infants who were securely attached were significantly more empathically reactive to their mother's distress in comparison to insecure infants, in particular, infants classified as disorganized. Further, a regression model predicting empathy revealed a significant effect of effortful control (EC) on infant's global empathy score such that infants with higher EC expressed significantly higher levels of empathy. Family SES was non-significantly related to empathy and none of

the interactions with attachment were significant. These results suggest that multiple conditions of risk negatively impact infant empathy development; however, characteristics of the baby such as their ability to regulate attention and emotion—EC—may protect them against the negative effects of familial processes.

## **Ailin Jin**

Understanding Cross-modal Spatial Processing during Visual and Tactile Tasks Using fMRI

**Advisors:** Alexander J. Bies, PhD and Margaret E. Sereno, PhD

Real-world spatial navigation is a relatively complex process that recruits multisensory modalities to integrate spatial information over time and space (Wolbers, & Hegarty, 2010). Previous studies have revealed cross-modal plasticity of cortices in congenitally blind and sighted people during tactile navigation (Gagnon et al., 2012; Kuper, Chebat, Madsen, Paulson, & Ptito, 2010), but little is known about the neural basis underlying tactile navigation, especially without previous learning. To understand cross-modal spatial processing in normal humans, this study examined the brain areas activated by spatial tasks with visual images and tactile substitutions in sighted participants (N=8) using functional magnetic resonance imaging (fMRI). In experimental conditions, the tasks required different spatial abilities – a map rotation task tested mental rotation ability, and path and orientation tasks tested spatial orientation ability. In corresponding controls, participants performed shape judgment tasks on the same or similar stimuli instead. Brain activation patterns were similar among the three types of tasks. In the visual experiment, experimental tasks were associated with higher levels of activation in the precuneus, superior parietal lobule, postcentral gyrus and frontal gyrus, whereas activation in occipital, parahippocampal, and insular cortices was not significantly different between experimental and control conditions. In the tactile experiment, we observed similar superior parietal lobule, precentral, postcentral and frontal gyri activation in all tasks. Our results indicate engagement of navigation-related areas (including parietal, precuneus and parahippocampal cortex) during completion of a variety of visual-spatial tasks, and recruitment of a subset of these regions, including regions important for egocentric spatial processing, during tactile spatial tasks. Remarkably, shared activation in intraparietal and precuneus cortex during visual and tactile spatial tasks demonstrates cross-modal spatial processing between haptic and visual modalities during these navigation-related tasks.

## **Ha Eun Kim**

Cortical Thickness: An Introduction and Comprehensive Review of the Current Literature

**Advisors:** Don Tucker, PhD and Ariel Wightman, BS

Cortical thickness of the cerebral cortex provides valuable information about normal and abnormal brain anatomy. For the past 30 years, lots of research and studies have revealed the association of cortical thickness and various neurodevelopmental disorders as well as regional differences in normal brain function. Thus, it is crucial to understand and summarize what has been discovered so far. The aim of this review was to examine all available published cortical thickness research on Google Scholars and to provide a comprehensive summary of current studies. The literature search encompassed all relevant cortical thickness studies published until January 2017 on Google Scholars. The articles were found through using the key term cortical thickness. With 134 papers initially found, duplicates were removed and several papers were individually found and included to provide more specific information in this paper, which eventually lead to total of 119 papers. The papers were inspected twice and were categorized into five different groups according to the paper's relevant topics in terms of cortical thickness as follows. I, brief summary of the different cortical thickness extraction mechanisms; II, studies in healthy normal participants; III, studies in neurodevelopmental disorders; IV, studies in neuropathological disorders and V, studies in all other disorders. Summaries of research on more specific disorders were addressed in each subcategory. These outcomes indicate the importance of cortical thickness research and need for further analysis in the future.

## **Kara Martin**

### Maternal Emotional Dysregulation and Parenting Behaviors

**Advisors:** Leslie Roos, MS and Phil Fisher, PhD

Positive parenting behavior is essential to predicting numerous positive child outcomes such as school success, appropriate child behavior, and mental health. We have investigated pathways through which maternal emotional dysregulation, assessed via DERs (Difficulties in Emotion Regulation Scale), impacts the familial relationship between mother and child. Observing parenting behaviors and maternal responsiveness to children's distress by the PICCOLO (Parenting Interactions with Children: Checklist of Observations Linked to Outcomes) scale allows direct intervention for the poor parenting behaviors. Previous research suggests that maternal emotional dysregulation in particular can have negative impacts including reduced emotional support for the child or an increase in child's physical aggression (Skowron, Kozlowski, & Pincus, 2010; Tzoumakis, Lussier, & Corrado, 2015; Hughes & Gullone, 2010). However, the mechanisms through which emotional dysregulation impact parenting behaviors are less understood. Maternal parenting stress (assessed via the Parental Stress Index (PSI)) may serve as a key mediator in the maternal emotional dysregulation and parent-child relationship due to difficulties of managing distress and effective parenting, such as providing emotional support or appropriate discipline practices in the presence of one's own mental health symptoms or emotion dysregulation. This research can further the knowledge of parental mental health and parenting techniques by using video coding (PICCOLO) of mother-child interaction in tandem with caregiver reports of parenting practices, such as responsiveness to child distress. It is expected that mothers with a difficulty in regulating their own emotions will be affected in their ability to engage in positive parenting practices (e.g. responsiveness, teaching, affection, encouragement). Focusing on maternal emotion dysregulation may provide valuable information for interventions that seek to disrupt intergenerational transmission of emotional dysregulation and negative caregiving experiences.

## **Chelsea Queen**

### The Effects of an Educational Intervention on the Willingness to Fund Mental Health Prison Programs for Mentally Ill Offenders

**Advisors:** Robert Mauro, PhD and Robert Rocklin, JD

Social and political stigmas follow criminality and mental illness within the general population. For mentally ill criminals, these two characteristics are combined causing the effects of the stigmas to be heightened. Previous research has shown that the general negative stigma towards mental illness has negative effects on the allocation of funding for mental health programs (Skitka and Tetlock, 1993; Corrigan, Watson, & Gracia, 2004). The lack of funding for mental health programs is exacerbated in prisons. Mentally ill inmates frequently do not receive the treatment that they need. Failing to treat mental illness in the prison systems exacerbates the disorders, creating additional problems post-release within the community. In the present study, participants were asked to complete a questionnaire that assesses varying characteristics about themselves (i.e. demographics, political affiliations, thoughts on current government spending, etc.). Through random selection, approximately half of the participants were asked to read a fact sheet about the benefits that funding has on mentally ill prisoners in correctional mental health facilities. Each participant was then asked to allocate hypothetical funds to different mental health populations. If lack of knowledge about the societal costs and benefits of mental health treatment for criminal populations was a major factor in limiting individuals' willingness to fund treatment for this population, then those participants who received the educational intervention should demonstrate a greater willingness to fund mental health prison programs relative to alternative mental health programs. The data collection is still underway and the results are pending.

## **Helen Rawlins**

### The Role of Recall in Self-Enhancing Social Comparisons of Academic Performance

**Advisors:** Colton Christian, MS and Sara Hodges, PhD

Comparing oneself to others is a regular part of human existence. Yet, when making these comparisons, people are notoriously biased, reporting that they are better than others on an array of positive dimensions. One explanation that has been provided for self-enhancement on positive dimensions is recall (Chambers & Windschitl, 2004). When asked to compare themselves to others, people may be more likely to recall positive information about the self than for another person. This difference in recall may lead to self-enhancement. The present study seeks to explore self-enhancing social comparisons in relation to feedback and recall in classroom settings by examining how accurately students predict their own grade and the class average before taking an exam, and how well they incorporate feedback into their comparative judgments (i.e. their relative standing) when recalling their own performance after the exam. Participants were more accurate at predicting and recalling the class average than their own scores, and consistently predicted their own performance to be above average, though this difference was only significant for males. Contrary to our predictions, the degree to which participants self-enhanced in recalling their exam score did not significantly correlate with their overall comparative judgments. We also explored whether sex, future persistence in the field, or theories of intelligence were related to the accuracy of recalling or predicting test scores.

### **Tesufuai Sameshima**

The Modulation of Perceptual Weights Facilitated by the Expectations of Forthcoming Evidence

**Advisors:** Ulrich Mayr, PhD and Atsushi Kikumoto, MS

The process of decision making consists of the integration of multiple sensory inputs leading to a perceptually congruent output. However decisions may not always accurately reflect the information presented due to various noise being incorporated as evidence to form a decision. Some of this noise can be influenced by expectations, modulating imminent decisions and precipitate biases. An example of this can be observed when stimuli that are viewed more recently bias our perception of it occurring more frequently (Summerfield & Lange, 2014). The present study inquires into the effects of expectations in modulating decisions in the presence of inconsistent evidence and how this impacts the perceptual weight of the presented evidence. Participants were instructed to view a Stream of randomly oriented Gabor patterns followed by a binary decision to categorize the summation of the stream as cardinal or diagonal. The stream was preceded by a neutral, diagonal, or cardinal cue with the latter two indicating a 70% probability the summation of the stream to be congruent with the cue. A logistic regression analysis of the Gabor patterns and the corresponding decisions revealed an underweighting of the evidence when the cueing is incompatible. The analysis also reveals a dampening of this underweighting as evidence accumulates, which may reflect an update of prior expectations.

### **Sierra Stewart**

Effects of Cognitive Frames and Emotion on Personal Risk Perception

**Advisor:** Robert Mauro, PhD

Substantial research has explored why individuals take risks in their everyday lives. For example, previous research has investigated the “Framing Effect.” Individuals tend to avoid taking risks when decisions are framed in terms of gains, but tend to take risks when the same decision is framed in terms of losses. Affect has an impact on the framing effect. Positive affect is associated with greater risk taking when a decision is framed in terms of a loss, but positive affect is not associated with greater risk taking when the decision is framed in terms of a gain (Cheung 2011). Although substantial research has examined how individuals make decisions, there is little research that focuses on how specific emotions impact risk-taking decisions.

This study examines the effect of specific emotions (happiness, anger, fear and sadness) on risk taking decisions of the sort that individuals make in everyday life. Participants were asked to imagine being in four scenarios. These scenarios varied on whether the risk was physical or social and whether it was framed in terms of a loss or a gain. Furthermore, the participants were asked to imagine having a specific emotion while in the described situations. They are then asked to make a choice and record and rank possible consequences to their decision. It is hypothesized that: 1) Decisions that are framed in terms of a loss will result in higher rates of risk taking. 2) Decisions that are

framed in terms of a loss will result in higher rates of risk taking when they are paired with negative emotions (anger, fear, sadness) than when they are paired with positive emotions (happiness). 3) Decisions that are framed in terms of a gain will produce higher rates of risk taking when paired with positive emotions than when paired with negative emotions. Understanding the impact of affect on risk-taking is important for the development of interventions designed to address risk-taking in adolescents and young adults.

### **Dylan M.N. Vas**

The Effect of Motivation on Mind-wandering and Sustained Attention

**Advisors:** Matthew K. Robison, MS and Nash Unsworth, PhD

Cognitive psychology has recently developed a heightened interest in the common experience of mind-wandering (Callard et al., 2013). People mind-wander frequently, which is associated with decreased cognitive performance (e.g. Stawarczyk et al., 2011; Unsworth & McMillan, 2013; Seli et al., 2015). Previous work has shown that mind-wandering rates relate to cognitive abilities, such as working memory capacity, reading comprehension, and attention control. In addition, previous research has also found that contextual variables, like motivation, can influence mind-wandering and task performance. The present study seeks to expand on these findings by examining attention control via reaction time in the psychomotor vigilance task (PVT), probing for thought content (on task, task-related interference, external distractions, mind-wandering, mind-blanking), and requesting self-reported levels of motivation. Results showed that reports of being on task decreased over time, while mind-blanking and spontaneous mind-wandering rates increased. Higher motivation ratings were associated with faster reaction times, more on task reports, and lower rates of mind-wandering and mind-blanking. The results provide evidence that sustained attention worsens over time, and this was accompanied by thought content changes over time. Additionally, motivation was found to be a valid predictor of both task performance and fewer instances of off-task thought.

### **Chenle Xu**

What Did You Say She was Like? Features of Gossip Associated with Hearsay Accuracy and Consensus

**Advisors:** Cory Costello, MS and Sanjay Srivastava, PhD

When gossiping about a person, how does one's verbal responses affect the impression formed by the gossipers? The current project explores the impacts of nine types of verbal responses on the accuracy and consensus. We coded one-hundred and fourteen gossip conversations from a previous study for nine specific responses and eight global features of the conversations. After using profile correlation and focusing on the effect sizes, our results suggest that certain types of responses may be associated with accuracy and consensus. This project should help shed light on the conversational features associated with accuracy and consensus of impressions formed through gossip.

### **Alexandra Zakin**

Real World Object Naming from Infant Perspective

**Advisor:** Caitlin Fausey, PhD

Babies learn what words mean through experience – but what is the relevant experience? Here, we begin to answer this question by capturing infant-perspective experiences in their everyday lives at home. Infants ages 9 to 24 months (N = 7) wore a head-camera at home (M = 4.09 hours). We identified moments in which someone held an object in view and then transcribed the speech surrounding these moments (+/- 30 seconds). We hypothesized that the rate at which caregivers name objects-in view is not constant, but rather changes over this developmental period. Caregivers are especially likely to name visually large, centered, objects-in-view just as infants are learning to say

those names (e.g., 11-13 months). Caregiver sensitivity to naming moments that are optimal for learning would be consistent with a growing body of evidence that social partners helpfully tune how they interact with infants (Brand et al., 2002; Fernald, 1985; Roy et al., 2009). Developmentally changing synchrony between seen objects and heard names is likely to be a key feature of relevant input to early word learning. Our hypothesis was supported in that there was an increase in object in-hand naming over the first year of life, with a peak at 13 months. A drop in object in-hand naming at 26 months followed this peak.