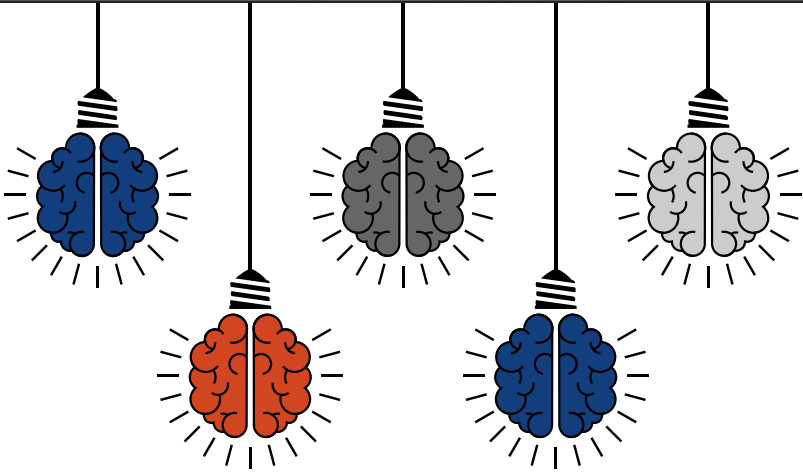


# ABRP | 2017

**New Insights into Affective and  
Behavioral Regulatory Processes**



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**SATURDAY, APRIL 15<sup>TH</sup> 2017**  
**RUTGERS UNIVERSITY**

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**RUTGERS**  
School of Arts and Sciences

## PROGRAM SCHEDULE

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8:30am – 9:15am	<b>Registration</b> Coffee and breakfast will be served <i>Livingston Student Center 201</i>
9:15am – 10:00am	<b>Morning Keynote Speaker:</b> <b>Elizabeth Phelps, New York University</b> <i>Mechanisms of threat control in humans</i> <i>Livingston Student Center 202</i>
10:00am – 11:30am	<b>Symposium 1: Self-Control and Rational Decision-Making</b> E.J. Masicampo, Melissa Ferguson, Mark Muraven, Nathaniel Daw, Luis Rivera
11:30am – 11:45am	<b>Coffee Break</b>
11:45am – 1:00pm	<b>Symposium 2: Regulatory Processes in the Brain</b> Jeff Spielberg, Francesco Versace, Janet Metcalfe, Chelsea Helion
1:00pm – 2:00pm	<b>Lunch (Provided)</b> <i>Livingston Student Center 201</i>
2:00pm – 2:45pm	<b>Afternoon Keynote Speaker:</b> <b>Vivian Zayas, Cornell University</b> <i>The social regulation of emotions</i> <i>Livingston Student Center 202</i>
2:45pm – 4:00pm	<b>Symposium 3: Regulating Emotional Responses and Interpersonal Behavior</b> Noga Cohen, Maxim Milyavsky, Kevin Ochsner, Jack Aiello
4:00pm – 4:15pm	<b>Coffee Break</b>
4:15pm – 5:30pm	<b>Symposium 4: Regulatory Control and Clinical Implications for Stress, Anxiety, and Depression</b> Bridget Callaghan, Lauren S. Hallion, Mauricio Delgado, Jutta Joormann
5:30pm – 6:15pm	<b>Data Blitz</b> Gayathri Pandey, Fiona Ge, Jocelyn Shu, Jeffrey D. Bowen, Anne Fritzsos, Peter J. Ehmann
6:15pm – 7:30pm	<b>Reception</b>

## KEYNOTE SPEAKERS

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### ELIZABETH PHELPS, NEW YORK UNIVERSITY

#### *Mechanisms of threat control in humans*

Animal models of associative threat learning provide a basis for understanding human fears and anxiety. Building on research from animal models, we explore a range of means maladaptive defensive responses can be diminished in humans. First, I will outline how extinction and emotion regulation, techniques adapted in cognitive behavioral therapy, can be used to control learned defensive responses via inhibitory signals from the ventromedial prefrontal cortex to the amygdala. One drawback of these techniques is that these responses are only inhibited and can return, with one factor being stress. I will then review research examining the lasting control of maladaptive defensive responses by targeting memory reconsolidation and present evidence suggesting that the behavioral interference of reconsolidation in humans diminishes involvement of the prefrontal cortex inhibitory circuitry, although there are limitations to its efficacy. Finally, I will describe two novel behavioral techniques that might result in a more lasting fear reduction, the first by providing control over stressor and the second by substituting a novel, neutral cue for the aversive unconditioned stimulus.

### VIVIAN ZAYAS, CORNELL UNIVERSITY

#### *The social regulation of emotions*

The regulation of negative emotion is commonly viewed as a solo endeavor, generally requiring effortful cognitive resources. Here, I discuss how close others offer various routes to emotion regulation, any of which may occur in a fairly spontaneous and effortless manner, and even when the close other is not physically present. These spontaneous affective benefits facilitate recovery following a stressor as well as preemptively buffer the impact of an upcoming one. The social regulation of emotion has implications for individuals who may have difficulty executing effortful self-regulatory strategies, for situations in which effortful strategies may be dampened or may even backfire, and for diminishing negative outcomes (e.g., poor physical health) associated with the dysregulation of emotions.

# SYMPOSIUM 1: SELF-CONTROL AND RATIONAL DECISION-MAKING

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## **E.J. MASICAMPO, WAKE FOREST UNIVERSITY**

**Co-authors: Kathleen D. Vohs, Shaun Nichols**

### *Visual self-perspectives and self-control*

People's view of themselves and the world is largely first-person and egocentric, which means to consider the world from the perspective of the self. Remarkably, people can shift to another viewpoint, one where the self is viewed from the outside as an actor moving among other actors, materials, and events in the world. Prior work mainly has taken the approach of asking which perspective (first- or third-person) is better. The current work posits that both are key to accomplishing the essential task of goal achievement, and that first- versus third-person perspectives can aid different processes within goal strivings. Specifically, we hypothesize that the two perspectives differentially promote goal attainment at different stages of goal striving. Two stages are often delineated, deliberation versus implementation. In deliberation, people weigh the pros and cons of various options and decide which goals and behaviors to pursue. In implementation, people plan how, when, and where they will act on the goals they have chosen. We predicted and found that the third-person perspective promoted self-control success during the deliberation stage of self-control, using a paradigm that pitted eating for pleasure against eating healthily (Study 1). We also predicted and found that the first-person perspective promoted self-control success during the later implementation stage (Study 2), using a procedure in which participants planned ahead for a controlled categorization task. Thus, self-control success is best attained not by a single perspective of the self, but rather by holding different perspectives of the self at different stages of self-control.

## **MELISSA FERGUSON, CORNELL UNIVERSITY**

### *How do we say no to temptations?*

How do people manage to overcome a temptation and make a choice consistent with their long-term goals? A substantial amount of research and theory have identified the situations and the types of people that predict successful choices. Much less research has examined the kinds of processes that underlie how such choices are made in real-time. Over a series of studies, we used mouse-tracking to examine how people make self-control relevant or irrelevant decisions. In the self-control relevant decisions, participants chose between a short-term temptation versus a long-term goal option. We tested these choices in the two domains of healthy eating (e.g., cookie versus salad) and temporal discounting (a larger amount later versus smaller amount sooner). We also measured or manipulated self-control ability. Across the studies, we found that when participants chose the long-term goal option, those with greater self-control ability showed less curvature toward the unchosen temptation option. The amount of curvature toward the temptation also predicted real behavioral choices. Critically, we analyzed the nature of the hand movements and found evidence for smooth rather than abrupt movements, arguing for a dynamical account of successful self-control rather than a purely inhibition account. These findings have implications for self-control theory and our understanding of how successful choices unfold over time.

## **MARK MURAVEN, UNIVERSITY AT ALBANY--SUNY**

### *The causes of ego-depletion: An integrative approach*

A persistent question is why people's self-control performance suffers after exerting self-control. Despite extensive research in support of this ego-depletion effect, the underlying process remains unclear. Several competing models have been put forth that suggest it is either psychological (e.g., expectancies and lay theories about how self-control works) or physiological (e.g., glucose storage in the brain). This talk briefly describes some recent research on these theories and tries to clarify some misconceptions that seem to plague the literature. Finally, I take an integrative approach and describe how both psychology and physiology may affect self-control and how they work together to explain the ego-depletion effect.

## **NATHANIEL DAW, PRINCETON UNIVERSITY**

### *Deciding how to decide*

Deciding how to behave requires complex calculations, such that it may often be rational to use shortcuts and approximations that produce slightly worse outcomes, on average, while saving time. This perspective has helped to re-frame questions of automaticity and deliberation in terms of rational tradeoffs between costs and benefits of deliberation. I consider the extent to which this approach can be extended to provide a similarly rational account of a broader set of related phenomena, such as self-control, cognitive control, and compulsion.

## **LUIS M. RIVERA, RUTGERS UNIVERSITY, NEWARK**

### *Stigmatized ethnic-racial identity moderates the role of executive functioning in food preferences*

Hispanic-Americans and African-Americans suffer disproportionately from high obesity rates relative to their White-American counterparts. This disparity spells particularly bad news for ethnic-racial stigmatized groups because obesity is a risk factor for a variety of chronic health conditions such as diabetes and hypertension. Following psychological theories of health disparities, one explanation for the disproportionate obesity rates among individuals from stigmatized groups is their experience with bias and its associated stress. We posit that experiences with bias-based stress should have a detrimental effect on the cognitive resources necessary to engage in diets that promote good health. Consistent with these ideas, the present study recruited Hispanic-American and African-American adult participants to test the hypothesis that those who strongly identify with their stigmatized ethnic-racial group, and thus frequently experience bias-based stress, will exhibit evidence of the relation between poor executive functioning and poor diets. Participants completed measures of subjective ethnic-racial identification, executive functioning on a Stroop interference task, and preferences for unhealthy (e.g., banana) and healthy (e.g., ice cream) food. In support of the hypothesis, only among strongly identified participants, poor Stroop Task performance was associated with preferences for unhealthy over healthy foods. Moreover, these results did not vary between Hispanic-American and African-American participants. This research suggests that poor self-regulation among strongly identified individuals from groups that are the target of ethnic-racial bias and its associated stress may be a determinant of poor diets, which is a risk factor for obesity. Altogether, this research has implications for understanding physical health disparities in the United States.

## SYMPOSIUM 2: REGULATORY PROCESSES IN THE BRAIN

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### JEFFREY SPIELBERG, UNIVERSITY OF DELAWARE

#### *Brain network reconfiguration supporting inhibitory control in affective and non-affective contexts*

Background: The ability to inhibit distracting stimuli from interfering with goal-directed behavior is crucial for success in most spheres of life. Despite an abundance of studies examining regional brain activation, knowledge of how brain networks reconfigure to support inhibitory control remains quite limited. Methods: To address this gap, we applied graph theory to fMRI data collected while a large sample of adults performed tasks recruiting inhibitory control. Given that affective context may influence the particular networks engaged, both color- and emotion-word Stroop tasks were examined. In contrast to traditional methods, graph theory methods allowed us to examine emergent properties of brain networks (e.g., resilience to disruption). Results: Higher demand for inhibitory control in the color-word Stroop was associated with restructuring of the global brain network into a configuration that was more optimized for specialized processing (as indexed by the Transitivity network property), more efficient at communicating the output of such processing across the network (Global Efficiency), and more resilient to potential interruption (Assortativity). Increases in Transitivity and Global Efficiency were also observed in response to emotionally arousing stimuli in the emotion-word Stroop. Conclusions: We identified several emergent brain network properties that shifted in response to demand for inhibitory control. Several areas of consistency were observed across affective and non-affective contexts, suggesting at least partial similarity in network reconfiguration. Given the crucial role of inhibitory control in goal-directed behavior, present findings provide insights into how such control may break down across a variety of neurological and psychiatric pathology.

### FRANCESCO VERSACE, UNIVERSITY OF OKLAHOMA

Co-authors: David W Frank, Elise M. Stevens, Menton M. Deweese, Susan M. Schembre

#### *A new meaning to “food porn”: Brain responses to food-related and erotic images predict eating behavior*

Background: While some individuals can resist the lure of temptation, many others, even when sated, find appetizing food irresistible. Identifying the neuropsychological mechanisms underlying overeating will contribute to the development of more effective dietary intervention. Preclinical findings indicate that rats prone to attributing incentive salience to discrete food-related cues (called “sign-trackers”) are more vulnerable to cue-induced compulsive behaviors than rats not prone to do so (called “goal-trackers”). Here, we tested the extent to which the same neuropsychological trait underlies human cue-induced eating. Method: In 49 participants, we measured the amplitude of the late positive potential (LPP, a component of the event-related potentials that measures motivational relevance) evoked by neutral, pleasant (erotic and romantic), unpleasant (mutilations, violence, and disgust), and food-related images that either preceded (Food+) or not (Food-) the delivery of chocolate candies. To classify participants based on their brain reactivity profiles, we applied cluster analysis on their LPP responses. We

also measured the number of candies each participant ate during the task. Results: 40% of participants had larger LPPs to Food+ images than to erotic images (sign-trackers), while the rest of the sample had the opposite brain reactivity profile (goal-trackers). Sign-trackers ate more than twice as many candies as goal-trackers (21 vs. 8;  $p < .05$ ). Conclusion: These findings indicate that individual differences in the tendency to attribute incentive salience to food-related stimuli increase vulnerability to cue-induced eating. The good correspondence between our results and those from pre-clinical models will accelerate the development of new personalized interventions to prevent overeating.

### JANET METCALFE, COLUMBIA UNIVERSITY

#### *Curiosity and the tip-of-the-tongue state*

Theories of study time allocation suggest that people are most engaged with and want to devote their time to materials that are not completely mastered but also are not so difficult as to be impossible. Their curiosity is thought to be triggered by items that are ‘almost known,’ or are in what is sometimes called the Region of Proximal Learning. Answers that are on the tip-of-the-tongue (TOT)—not immediately recallable but nevertheless evoking a feeling of imminent recall—seem, intuitively, to be materials that have this characteristic. We, therefore, hypothesized that people would be particularly curious to see the answers to questions which were on the tips of their tongues. Accordingly, we investigated whether people chose to see answers more when they were in a TOT state as compared than when they did not know the answer but were not in this metacognitive state. We also investigated whether there was a difference in their Event Related Potential (ERP) responses when the answers to TOT versus non-TOT questions were given. The difference was distinctive. We looked at whether the externally presented answers given as feedback when the person was in versus not in a TOT state were differentially remembered. Finally, we examined the relation between the distinctive TOT-related ERP pattern and later memory. We will conclude that the TOT state is a special metacognitive state, sometimes characterized as a ‘mild torment,’ that is associated with the need to know.

### CHELSEA HELION, COLUMBIA UNIVERSITY

Co-authors: Jennifer Silvers, Alisa Powers, Michael Dreyfuss, Katherine Insel, Jochen Weber, Walter Mischel, BJ Casey, Kevin Ochsner

#### *Regulating responses to negative social stimuli across development*

Emotion regulation takes many forms—whether it’s suppressing unwanted feelings, reevaluating a negative situation, or inhibiting an emotional response, individuals have myriad options in their regulatory toolbox. What remains unknown is the extent to which different forms of emotion regulation rely on distinct or overlapping processes. This question is perhaps most salient in the context of development, a time period where individuals acquire different regulatory skills. In this research, we explore the relationship between two forms of emotion regulation—impulse control and cognitive reappraisal—across a wide developmental age range. Behavioral and neuroimaging data were collected from participants who completed two regulatory tasks: 1) a task wherein individuals must exercise impulse control in order to inhibit responses to negative affective stimuli (Affective Go/No-Go), and 2) a task where individuals must reframe a negative situation into one that is less bad (Reappraisal). We found that participants

who were better at impulse control were also better at down-regulating negative emotions using reappraisal. Both forms of regulation involved brain regions involved in cognitive control, including prefrontal and parietal control regions. We found age-related differences in dorsal anterior cingulate recruitment (dACC)—younger participants showed increased dACC activity during both forms of regulation, which was associated with worse performance in both tasks. In addition, we found evidence for medial-to-lateral shift in amygdala-prefrontal connectivity based on the type of regulation being implemented. Taken together, this suggests that both forms of regulation rely on both distinct and overlapping cognitive processes, which develop together throughout childhood and adolescence.

## **SYMPOSIUM 3: REGULATING EMOTIONAL RESPONSES AND INTERPERSONAL BEHAVIOR**

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### **NOGA COHEN, COLUMBIA UNIVERSITY**

#### *Enhancing emotion regulation through cognitive control training*

We all encounter situations in our lives in which our emotions override our ability to think clearly, to make the right decision, and to act according to our goals. The ability to regulate our emotions predicts our mental and physical well-being and deficits in this ability may lead to mood disorders and various other psychopathologies. In a recent series of studies, I showed that training participants to employ control over irrelevant information reduced the effect of aversive pictures on behavior and resulted in a lower amygdala activation to these pictures, compared to a control training. This training also increased the connectivity between the amygdala and the right inferior frontal gyrus, a region known to be associated with the ability to inhibit unwanted behaviors. In another study, I showed that training individuals to ignore irrelevant information before the appearance of unpleasant pictures led to a reduction in rumination, a maladaptive coping strategy that is considered a prominent risk factor to depression. In a third study, I showed that a similar training procedure increases the propensity to use reappraisal and the effectiveness of instructed reappraisal. These findings suggest that the ability to ignore irrelevant information plays a causal role in both adaptive and maladaptive emotional behavior. Furthermore, these findings are the first to show that training individuals to ignore irrelevant neutral (i.e., non-emotional) information can shape emotional reactions and strengthen the neural connections between brain regions involved in emotion regulation.

### **MAXIM MILYAVSKY, UNIVERSITY OF MARYLAND, COLLEGE PARK**

**Co-authors: David Webber, Jessica Renee Fernandez, Arie Kruglanski, James Gross, Rav Suri, and Amit Goldenberg**

#### *To reappraise or not to reappraise?: Emotion regulation choice from the perspective of the cognitive energetics theory*

Research shows that cognitive reappraisal is an effective emotion regulation (ER) strategy that lacks the drawbacks of other ER strategies (e.g., distraction, suppres-

sion). Yet, surprisingly, recent findings have shown that people rarely choose to use cognitive reappraisal while watching aversive images, and their reappraisal choices do not depend on the images' intensity (Suri, Whittaker & Gross, 2015). We use Cognitive Energetics Theory (CET) to explain this puzzling behavior. CET posits that the likelihood of launching any cognitive process is a function of two opposing forces: the driving force (i.e., motivation to launch the process) and the restraining force (i.e., task difficulty). We hypothesized that people chose to use the reappraisal strategy relatively rarely because of the difficulty of implementing it. Moreover, their decision to reappraise (or not) did not depend on the images' intensity because the latter was associated both with the driving and the restraining forces. In support of our hypotheses, we found that the more intense negative images were perceived as requiring more emotion regulation (Study 1), but also as more difficult to reappraise (Study 2). Furthermore, when we reduced the association between the images' intensity and the difficulty of reappraising by asking participants to merely predict others' (Study 3) or their own choices (Study 4), the images' intensity predicted the reappraisal choices better and made people reappraise more often than when participants had to actually implement their reappraisal choices. In Study 5, we showed the same effects for a relatively easy (vs. difficult) reappraisal strategy.

### **KEVIN OCHSNER, COLUMBIA UNIVERSITY**

#### *New perspectives on the social regulation of emotion*

In laboratory and neuroscience research, the study of emotion regulation has typically concerned the way that individuals alter their own emotions. Recently, however, there has been increasing appreciation that others may actively influence – and thereby regulate – our emotions. This talk will discuss four examples of the social regulation of emotion. The first involves self-regulating one's own emotions by simulating the way that others would respond to emotional events. The second examines, 'crowd sourced', reappraisal where an individual attempts to reframe affective dilemmas experienced by others and in turn may receive regulatory support from them. The third asks how knowledge of group norms for responding to emotional triggers - e.g., knowing that others find a given event upsetting or not such a big deal - can change the way you respond to these triggers. Implications for models of emotion regulation and translational applications are discussed.

### **JOHN AIELLO, RUTGERS UNIVERSITY, NEW BRUNSWICK**

#### *The regulation of interpersonal involvement: A model and a program of research*

Approach and avoidance forces are present in every interpersonal encounter. Individuals develop an equilibrium point for preferred levels of intimacy, which is a joint function of numerous immediacy behaviors (e.g., interpersonal distance, eye contact, amount of smiling, topic of conversation). If one of these components changes resulting in more or less intimacy than desired, a reciprocal change occurs in one or more of the other behaviors in order to restore the desired level of intimacy. When successful compensation is not possible, however, discomfort results. Even though compensatory behaviors can be used consciously and strategically, under most circumstances they are employed outside of the realm of consciousness. This process usually occurs quickly and automatically, although often incompletely. Changes in the overall intimacy level of a relationship however typically occur very gradually over time. My curvilinear comfort model posits that interpersonal involvement is a joint, negotiated process and that beyond a critical

discomfort level, compensatory adjustments can no longer be easily employed to reestablish a desired level of involvement. One or both members of the interaction will likely experience physiological arousal, anxiety, and discomfort. Consequently, approach forces cease to be aroused and avoidance forces predominate, resulting in an individual's subsequent withdrawal from the interaction. A series of studies will be presented to demonstrate support for this theory.

## **SYMPOSIUM 4: REGULATORY CONTROL AND CLINICAL IMPLICATIONS FOR STRESS, ANXIETY, AND DEPRESSION**

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**BRIDGET CALLAGHAN, COLUMBIA UNIVERSITY**

**Co-authors: Andrea Fields, Nim Tottenham**

### ***Early adversity affects gut microbial community structure and cortical functional connectivity: Links to anxiety***

The prefrontal cortex is critical for emotion regulation. Regional connectivity with this circuit takes many years to develop and is affected by early environments. For example, early adversity alters prefrontal development and is a significant risk factor for the emergence of anxiety. Recent studies in rodents have suggested that gut microbial communities are also disrupted by early adverse events, and that such microbial populations play an important role in the maturation of the prefrontal cortex. So far, no human studies have examined how adversity affects the gut microbiome, or how such changes are linked to prefrontal cortex functioning and anxiety across development. This is an important gap in the literature, as non-invasive peripheral manipulations hold much promise for mental health treatment, especially in developing populations. To address that gap in the literature, we examined the effect of early adversity (institutional rearing) on the community composition of the gastrointestinal microbiome during middle childhood, and then linked those microbial changes to anxiety and prefrontal reactivity during an emotional faces task. Across taxonomic levels, bacterial richness estimates were lower in the previously deprived youths than in the typically developing sample and dominant bacteria differed between the two groups. We found that bacterial composition was positively related to medial prefrontal cortex (mPFC) reactivity, and functional connectivity during the emotional faces task, which was, in turn, related to anxiety. These data suggest that adversity-altered microbiota are important for both anxiety and brain development, highlighting the potential of peripheral interventions following adversity exposure.

**LAUREN S. HALLION, UNIVERSITY OF PITTSBURGH**

**Co-authors: Susan N. Kusmierski**

### ***Impaired internal-to-external attention shifting as a mechanism of uncontrollable worry***

Uncontrollable worry is the core feature of generalized anxiety disorder (GAD) and has been experimentally and prospectively linked to increased anxiety and depression in both clinical and healthy samples. The perception that worry is uncontrollable (i.e., hard to stop) is especially predictive of increased clinical severity. Currently, the cognitive mechanisms that underlie impaired disengagement from worry are poorly understood. Identifying these mechanisms is a critical step toward developing treatments that directly target those mechanisms to improve control over worry. We apply recent developments in the basic attention literature to test a novel potential mechanism of uncontrollable worry: impaired shifting between internally-directed and externally-directed attention. Undergraduate participants with varying levels of trait worry (N = 64) completed a novel paradigm that assessed the ability to shift from internally-directed attention (worry) to externally-directed attention (sustained attention to response task; SART) and a control condition involving shifting between two types of external attention (an auditory task and the SART). SART performance is a widely-used measure of sustained attention and was used as a behavioral index of ability to shift attention away from worry and external (auditory) attention, respectively. Higher trait worry predicted slower SART performance after shifting from worry versus external attention ( $r = -.33, p = .018$ ). Self-reported worry intrusions during the SART predicted more commission ( $r = .28, p = .048$ ) but not omission ( $r = .11, p = .469$ ) errors, indicating an additional role for impaired response inhibition. These findings support and extend theoretical models of cognitive control over worry.

**MAURICIO DELGADO, RUTGERS UNIVERSITY, NEW BRUNSWICK**

### ***Reminiscing about positive memories buffers acute stress responses***

Recalling happy memories elicits positive feelings and enhances one's wellbeing, suggesting a potential adaptive function in using this strategy for coping with everyday stress. In two studies (Behavioral = 134; fMRI = 43), we explored whether recalling autobiographical memories that have a positive content – i.e., remembering the good times – can dampen the hypothalamic-pituitary-adrenal (HPA) axis stress response, such as reducing cortisol levels. Healthy participants first underwent an acute stressor (i.e., socially evaluative cold pressor) or control task. Afterwards, they were asked to retrieve memories of only positive valence (e.g., Family Vacation) or only neutral valence (e.g., Packing for a trip) and then make subjective emotion ratings. To measure changes in stress responses, we collected salivary cortisol at baseline, peak (after recalling memories, +20 min), and recovery (+50 min). Across both studies, recalling positive, but not neutral, memories resulted in a dampened cortisol rise and reduced negative affect, resembling the nonstressed control groups. Further, individuals with greater self-reported resiliency showed enhanced mood, despite stress exposure. In the fMRI study, a parametric modulation of emotion ratings during positive reminiscence engaged corticostriatal circuits previously implicated in reward-processing (ventral striatum, mPFC) and emotion regulation (VLPFC), and we observed greater connectivity between VLPFC and DLPFC as a function of increasing positive feelings. These findings highlight the restorative and protective function of self-generated positive emotions via memory recall in the face of stress.

## **JUTTA JOORMANN, YALE UNIVERSITY**

### ***Control when it counts: Changes in executive control under stress predict depression symptoms***

Individual differences in self-regulation of affect following stressful events have been associated with an increased risk for experiencing depression. In two studies, we examined whether individual differences in stress-induced change in executive control is related to emotion regulation and depression symptoms. In the first study, 92 students completed an n-back task before and immediately following a stress induction. Changes in n-back performance following the stress induction were related to depression symptoms. In Study 2, 43 students completed the n-back task before and after a laboratory stress induction in the first weeks of their first semester at college. Results demonstrate that stress-induced change in executive control predicted an increase in depression symptoms at the end of the semester. Individual differences in the degree of decline in executive control following stress exposure may be a key factor in explaining why some individuals are vulnerable to depression during a stressful time of life.

## **DATA BLITZES**

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## **GAYATHRI PANDEY, CORNELL UNIVERSITY**

**Co-authors: Vivian Zayas**

### ***An idiographic approach to delaying gratification: Within-person variability and the role of personal construals***

Resisting temptations for the sake of future rewards is crucial for achieving success in various life domains. Traditionally, delay of gratification (DG) has been mostly viewed as a trait—some possess it and others don't. This approach assumes that someone good at DG in one situation is good at DG across other situations too. However, anecdotal (e.g., Tiger Woods) and empirical evidence suggest that the same person can vary in DG across domains. But, within-person variability has commonly been treated as random “noise” to be removed (via aggregation) or statistically “controlled.” Additionally, the trait-approach methodologically focuses more on prescriptive outcomes—what one should do. But, not all individuals desire same outcomes (A lower BMI may be a desirable delayed outcome in the mind of the researcher but not the participant). Therefore, using an idiographic approach, we focused on within-person variability in DG across different domains (health, physical, social, financial, and achievement). We also assessed individuals' personal construals in each of these five domains. That is, active pursuit of delayed rewards, valuing the delayed rewards (e.g., being healthy) and the immediate rewards/temptations (e.g., eating whatever whenever one desires) and whether DG is perceived as difficult/easy. We found that more than just the nominal/objective situation, an individual's subjective construals of the situation explain within-person variability in success at DG. Specifically, using multilevel analyses, we show that active pursuit of and greater value for delayed rewards, and perceiving delaying as easy were strong independent predictors of within-person variability in perceived success at DG.

## **FIONA GE, UNIVERSITY OF MASSACHUSETTS AMHERST**

**Co-authors: Jiyoung Park**

### ***Cultural differences in interpersonal hedonic emotion regulation in romantic relationships: Implications for emotional and relationship well-being***

Past research suggests that European Americans up-regulate positive emotions and down-regulate negative emotions (i.e., hedonic emotion regulation) more than East Asians. Despite the well-documented evidence regarding cultural variations in hedonic regulation of individuals' own emotional states, there is a paucity of research that examines the interpersonal aspect of emotion regulation – i.e., how people help others regulate their emotions. This present research focuses on the cultural differences in how romantic partners help each other regulate emotions hedonically. We address this issue by examining (a) whether European Americans and Asians differ in the extent to which they help their partners regulate their emotions hedonically, (b) what factors may account for this cultural variation, and (c) what implications of this cultural difference may have for emotional and relationship well-being. Three key findings emerged from four studies. First, Asians tended to help their romantic partners regulate emotions less hedonically (i.e., dampening positive emotions and maintaining negative emotions more) than European Americans. Second, dialectical views about emotions mediated the effect of culture on interpersonal hedonic regulation. Finally, European Americans reported greater emotional well-being and relationship quality when their partners helped them hedonically regulate their emotions, but this link was significantly attenuated for Asians. Taken together, the findings underscore the importance of understanding and implementing interpersonal emotion regulatory strategies that are congruent with their immediate cultural context.

## **JOCELYN SHU, COLUMBIA UNIVERSITY**

**Co-authors: Samuel Hassell, Jochen Weber, Kevin N. Ochsner, Dean Mobbs**

### ***The role of empathy in experiencing vicarious anxiety***

Vicariously experiencing another person's anxiety may allow one to use others' emotions to detect threats in the environment, but in environments with few direct threats, this capacity may be maladaptive. With depictions of threat common in popular media sources, the experience of vicarious anxiety may be prevalent in the general population. However, little prior research has investigated the mechanisms underlying vicarious anxiety. In two studies, we delineate the relationship between empathy - the capacity to feel another's emotions - and experience of vicarious anxiety using a stimulus set of film clips depicting target victims facing approaching threats. Study 1 demonstrated that trait empathic concern is associated with perceiving greater anxiety to be experienced by target victims facing threats, as well as with experiencing greater vicarious anxiety. The degree of anxiety perceived in victims mediates the relationship between trait empathic concern and experience of one's own anxiety. In Study 2, we manipulated state empathy to demonstrate a causal role between empathy and experience of vicarious anxiety. Participants taking an empathic as opposed to an objective perspective using reappraisal strategies reported greater anxiety while watching target victims, increased risk-aversion after doing so, and more disruption during sleep the following night. These

findings indicate that empathy facilitates the perception of anxiety in others who are in threatening situations and increases the experience of vicarious anxiety as well as anxiety-related behaviors. Thus, our social environment may play a critical role in the experience of anxiety, particularly for those who are high in dispositional empathy.

**JEFFREY D. BOWEN, UNIVERSITY OF CALIFORNIA, SANTA BARBARA**

**Co-authors: Nancy L. Collins**

***Painting the big picture: Commitment, construal, and self-control in relationship maintenance***

Self-regulation is a critical ingredient in the maintenance of stable and rewarding romantic relationships. Traditionally, self-regulatory capacity has been shown to operate in tandem with one's motivation to sustain a relationship (i.e., commitment) in predicting long-term relationship survival. When partners encounter situations that are diagnostic of the well-being of their relationship, those higher in commitment draw on their self-regulatory capacity to reshape the meaning of these encounters to prioritize partner and relationship well-being over selfish needs and goals, and long-term (vs. short-term) considerations. However, it is not clear by what mechanism this reshaping occurs, and how commitment harnesses self-control during these diagnostic events. Given the tremendous outgrowth of self-control research from the perspective of Construal Level Theory, we developed and tested a model of commitment-motivated abstraction to elucidate the role of shifting mental representations in promoting pro-relationship cognition, emotion, and behavior among committed partners. In a first study, we demonstrated that more committed partners spontaneously adopt a broader, more abstract form of mental processing when presented with threatening (vs. non-threatening) relationship events. Next, we explored the extent to which this mental abstraction predicted relationship maintenance behavior in response to these threats. Finally, we manipulated abstraction as a procedural mindset to demonstrate that among more committed partners, abstraction causally brought about relationship maintenance behavior (e.g., sacrifice). Our findings have implications not only for the role of mental representation in self-control in interpersonal contexts, but also for our understanding of the underlying processes by which commitment operates.

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***The effects of daily positive emotion on self-regulation and mindfulness***

Self-regulation works like a muscle by getting "tired" with exertion, resulting in ego depletion (Baumeister, Bratslavsky, Muraven, & Tice, 1999). Positive emotions have been shown to replenish self-regulation resources following ego depletion (Tice, Baumeister, Shmueli, & Muraven, 2007), however most studies have been conducted in single laboratory sessions. We proposed that daily positive emotion would build positive resources like resiliency over a one-week period, resulting in reduced depletion from self-regulation tasks. Fifty-four undergraduate students completed a baseline laboratory assessment including the Stroop task (Stroop, 1935) and the Mindfulness Attention Awareness Scale (Brown & Ryan, 2003). Then they were randomized to either receive positive text messages or neutral text messages, three times a day for a week. Post-in-

tervention, mindfulness was re-assessed and participants completed a serial subtraction anxiety induction (Kirschbaum, Pirke, & Hellhammer, 1993) followed by the Stroop task to measure ego depletion. Positive condition participants made significantly less errors ( $M= 2.59$ ) on the Stroop task than controls ( $M= 3.96$ ;  $F(1, 51)= 5.01$ ,  $p= 0.03$ ). Although the positive intervention did not increase mindfulness, participants with high baseline mindfulness ( $M= 4.34$ ) did not experience as much ego-depletion as participants with low mindfulness ( $M= 2.01$ ;  $t(1, 51)= 2.23$ ,  $p= 0.03$ ). The results supported our hypothesis that daily positive emotions build positive resources over time and reduce ego-depletion. Future interventions can build on this idea that self-regulation can be strengthened. Additionally, the study utilized an intervention that was successfully conducted outside of the laboratory, thus providing ecological validity for future mobile interventions.

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***Resting cardiac autonomic balance (CAB) predicts current major depressive disorder***

Studies have shown that major depressive disorder (MDD) is associated with impaired cardiac vagal control and heart rate variability (HRV). Recently, cardiac autonomic balance (CAB) has been proposed to index the ratio of parasympathetic to sympathetic activation (Berntson et al., 2008), and may reflect adaptive flexibility. Few studies have examined CAB in relation to depression, and whether the relation is influenced by known health variables. Thus, the purpose was to determine if CAB and cardiac autonomic regulation (CAR) predict current MDD status and covariation with aerobic fitness and body mass index (BMI). We examined CAB and CAR during a 5-min vanilla baseline task in 190 participants (100 with MDD, 90 nondepressed controls;  $Mage=21$  yrs). Autonomic function was assessed through HRV and impedance cardiography measures of CAB (zRSA(-zPEP)) and CAR (zRSA+(zPEP)). Variables were derived from respiratory sinus arrhythmia, an index of parasympathetic activity, and pre-ejection period, an index of sympathetic activity. Findings indicated impaired HR,  $F(1,189) = 13.5$ ,  $p<.001$ , RSA,  $F(1,189) = 6.3$ ,  $p<.05$ , and CAB,  $F(1,189) = 7.2$ ,  $p<.01$ , in MDD relative to nondepressed controls, while PEP and CAR were nonsignificant. Regression analyses demonstrated that CAB significantly predicted current MDD status, even after controlling for known individual physical health characteristics of BMI and cardiorespiratory fitness. These findings suggest that CAB may be a successful indicator of current MDD, although may not be influenced by traditional exercise and dietary interventions.



