



Georgia State University/Georgia Tech
Center for Advanced Brain Imaging

CABI NEWSLETTER

VOLUME 4, ISSUE 2

CABI FEATURED RESEARCH

“Aging affects our ability to prepare for and remember negative events”

Dr. Audrey Duarte, Lisa Levine, and Brittany Corbett investigated the effect of unexpected negative events on episodic memory in younger and older adults. In everyday life, negative events can happen without notice, such as a car accident or a robbery. This study investigated if being prepared to experience a negative event can change the way it is encoded for younger and older adults. In an fMRI paradigm, participants viewed negative (e.g., barking dog) and neutral (e.g., purse) pictures preceded by cues that were either reliable predictors of the valence of the image (valid) or cues that were unreliable predictors of the valence (invalid). Participants were asked to rate the emotional intensity of these pictures during encoding and to complete a recognition task immediately after the fMRI scanning. Results show that negative stimuli preceded by an invalid cue are rated more intensely than negative stimuli preceded by a valid cue. As seen in Figure 1, an age-related increase in cue-related activity in the OFC following negative cues suggests that older adults are using the cues to engage anticipatory processes for negative stimuli, whereas younger adults may not be. Our results suggest that expected emotional events and unexpected emotional events are remembered differently with age. Younger adults have better memory performance for stimuli preceded by an invalid cue, whereas older adults have better memory performance for stimuli preceded by a valid cue. Collectively, these results suggest that older adults are able to use the cues to anticipate emotional events and improve their memory performance. This is in contrast to findings of expectation effects on aging in other areas suggesting the integrity of emotional processing in aging.



Fig. 1 Older adults show greater negative emotional anticipation effects in the OFC than younger adults.

“Context-dependent neural responses in insula and amygdala when viewing affective animal videos”

Dr. Eric Schumacher, Christine Godwin, and Sunya Fareed investigated the neural responses to emotional videos of animals. Animals have the ability to elicit complicated and diverse sets of affective responses. However, insects and other pests have been associated primarily with feelings of disgust. This has frequently been interpreted in the context of disease avoidance. Yet the extent to which individuals experience feelings of disgust and other emotions, such as fear, in response to pests and insects may vary greatly depending on the surrounding environment. In this experiment, participants saw 15-second video clips of animals in dynamic, complex environments. In one condition, they saw insects in natural, outdoor environments. In a second condition, they saw insects in home environments (Figure 1). A third condition consisted of video clips of dangerous animals (e.g., sharks). Participants also rated each video for fear, disgust, and pleasantness. Videos of insects in the home were associated with increased insula activation (mediating disgust) and increased self-reports of disgust when compared with videos of insects in nature (Figure 2a) – suggesting a role for disease avoidance in our response to insects. Conversely dangerous animal videos elicited greater activation in the amygdala compared to both insect video categories (Figure 2b) – suggesting a fear, rather than disgust, response. Overall, these data emphasize the importance that context has on emotional processing. Furthermore, these results provide further support that at least partially-segregated brain networks support the emotions disgust and fear.



Figure 1: Example scene from one of the video clips depicting pests in the home environment.

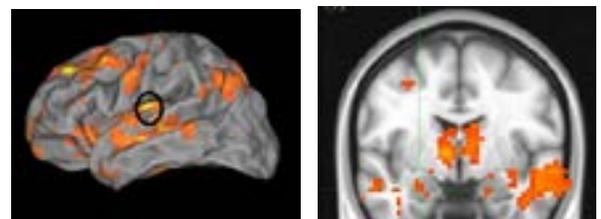


Figure 2. A) Results from contrasting pests in the home vs pests in nature. Increased insula activation (circled here) was observed for pests in home environments. B) Results from contrasting fear-inducing animals compared to all pests. Increased amygdala activity (circled here) was observed when viewing fear-inducing animal videos compared to pest videos.

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Publications

Ailion A., King T., Wang L., Fox M., Mao H., Morris R., Crosson B. (2016). Cerebellar Atrophy in Adult Survivors of Childhood Cerebellar Tumor. *Journal of the International Neuropsychological Society*, 501-511.

Chand G., Dhamala M., (2016). The salience network dynamics in perceptual decision-making. *NeuroImage* 134, 85-93.

Chand G., Dhamala M. (2016). Interactions among the brain default-mode, salience and central-executive networks during perceptual decision-making of moving dots. *Brain Connectivity* 6, 249.

Cookson S L., Hazeltine E., Schumacher E.H. (2016). Neural representation of stimulus-response associations during task preparation. *Brain Research* 1648, 496-505.

Dulas M., Duarte A. (2016). Age-related changes in overcoming proactive interference in associative memory: The role of PFC-mediated executive control processes at retrieval. *Neuroimage*, 132:116-128

Fani N., King T., Shin J., Srivastava A., Brewster R., Stevens J., Jovanovic T., Bradley B., Ressler K. (2016). Structural and functional connectivity and Posttraumatic Stress Disorder: Associations with FKBP5. *Depression and Anxiety*, 33,300-307.

Lamichhane B., Adhikari B., Dhamala M. (2016). Salience network activity in perceptual decisions, *Brain Connectivity*, 6(7):558-571.

Lamichhane B., Adhikari B., Dhamala M. (2016). The activity in the anterior insulae is modulated by perceptual decision-making difficulty. *Neuroscience* 327, 79 - 94.

Mizelle C., Oparah A., Wheaton L. (2016). Reliability of Visual and Somatosensory Feedback in Skilled Movement: the Role of the Cerebellum. *Brain Topography* 29: 27-41.

SAVE THE DATE

April 4th, 2017

Callosum Poster Session @ CABI
4:00pm-6:00pm

April 13th, 2016

Vince Calhoun, PhD

Workshop @ CABI 8:00am-3:00pm

Seminar @ GSU 3:30pm-5:00pm,

Petit Science Center, Rm 124

Upcoming Events

CABI Users Meeting

9:30am - 10:30am

(3rd Thurs of each month)

Monthly meeting of CABI users to discuss neuroimaging issues.

Callosum Neuroscience Meeting

4:00pm - 5:30pm

(1st Tuesday of each month)

Monthly meeting and social for GSU and GT neuroscientists and students

2nd Annual Callosum Poster Session, April 4th, 2017, 4:00pm - 6:00pm

CABI's Annual Callosum Conference will be held at GSU/GT Center for Advanced Brain Imaging on April 4th, 2017. Posters in any sub field of neuroscience are welcome.

Vince Calhoun, PhD - VP for Research Neuroscience Lecture Series

GSU/GT Center for Advanced Brain Imaging is hosting a functional data analysis workshop; the facilitator for this event will be Vince Calhoun, from the Mind Research Network, University of New Mexico. The workshop will be held on Thursday April 13th from 8:30am--3:00pm. at the Center for Advanced Brain Imaging Conference Room, 831 Marietta St.. The seminar will be at GSU, Petit Science Center, Rm 124 on April 14th from 3:30pm-5:00pm

Message From The Director

This year CABI has continued our efforts to increase the visibility of the Center to the Atlanta Neuroscience community, to increase the support for our existing users, and to increase the number of users of CABI. To highlight some of our efforts, CABI hosted the 1st VP for Research Neuroscience Lecture at GT last semester where Professor Mark D'Esposito from UC Berkeley spoke about brain organization to over 100 attendees. This semester (April 13th) we're hosting the 2nd VP for Research Neuroscience Lecture at GSU where Professor Vince Calhoun from University of New Mexico will speak about brain connectivity. Dr. Calhoun will also give a workshop on connectivity analysis at CABI (see newsletter for details). CABI will also host our 2nd annual Callosum Neuroscience Poster Session on April 4th. All members of the Atlanta Neuroscience community are invited to present and attend. "Finally, CABI will offer another round of seed grants. Look for a call for proposals toward the end of this semester."

