Bauer Memory at Emory Lab Newsletter

It is again that special time of the year, when another school year is starting and we are ready to share with you–our participants– some news from the *Memory at Emory* laboratory. Looking back on the 2013-2014 academic year, it is impressive how much we were able to accomplish and this couldn't be done without your help! Thank you for your willingness to participate in our research, the generous sharing of your time, and your patience and enthusiasm. All of us: Dr. Patricia Bauer, along with researchers Amanda, Aoxiang, Elizabeth, Jackie, Maria, Marina, Monique, Nicole, Rebekah, Shala, Adna, and Allison greatly appreciate your support of our work.

In our lab, by exploring memory development and knowledge construction, we try to understand how to facilitate optimal development and learning. For example, in *eye tracking* studies we record children's eye movements to find out how children read different texts. We use another method, called *event related potentials* (ERPs), to learn how children remember past events from their lives that had different emotionality. Other children participated in story-reading tasks that we designed to explore factors that help children to integrate new pieces of information to create new knowledge. Further inside this newsletter you can read about some of our exciting findings and future directions!

We also continue to actively share our research with the scientific community. This past October, several members of the lab presented their research at the Cognitive Development Society Annual Meeting in Memphis, Tennessee. The lab has also published numerous articles in top-rated journals. In addition, our findings got great attention from popular media. You can check out these publications on our lab website under "Selected Publications" and the interview with Dr. Bauer on the Emory website.

We are excited to welcome new members to our lab. Monique began her graduate studies at Emory last summer, moving from California, where she received her Bachelor's and Master's degrees in Psychology. Two graduate students, Jessica and Anais are joining our lab this Fall. Alena, a new postdoctoral fellow, who received her PhD from North Carolina State University, is going to bring her expertise in bilingual education to our research. At the same time, this spring and summer, many members of our lab have finished their direct involvement in the lab, moving on to their next endeavors. Jackie, after receiving her PhD, is starting a faculty position at California State University, San Bernardino this Fall. She also welcomed daughter Madeline last August. We also said goodbye to Elizabeth, our long-time colleague. Since 2008 she conducted research in the lab as an undergraduate assistant, honors student, and then lab coordinator. This May, Elizabeth graduated with a Master's degree in Public Health and moved to a new job at a public health consulting company. Shala, who was a post-doctoral fellow in the lab, is departing for a research position at Fort Benning, GA. We wish them all the best in their future endeavors!

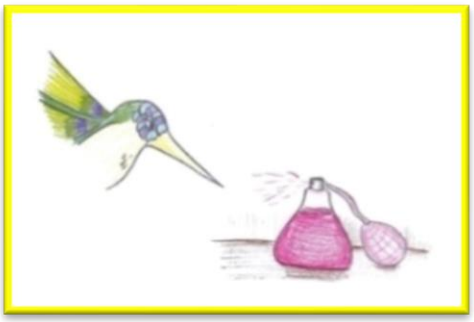
As always, if you have any questions about our research, would like to see continued updates on our studies, or want more information on how to participate in our current projects, you can call, email us or visit our website!

Memory at Emory
Summer 2014
Issue 4

Inside this issue:

How Do Children Acquire New Knowledge?

A major focus for our lab is how children learn and remember new information – a skill that's especially important in a school setting. We began this line of research in 2009 using picture books to teach children new facts. For example, in one story children may learn a fact about flowers (e.g., a corolla is a bunch of flower petals). Then, after a short break, we read them a story that includes a second fact about flowers (e.g., flower petals are used to make perfume). At the end of the session, we then ask them to put the two facts together to create a third, "new" fact (e.g., the corolla is used to make perfume). Children and adults alike are often required to combine their knowledge in order to form new understandings, a fundamental skill for building a knowledge base. As such, one of the goals of this research is to better understand how this skill develops over the school-age years, as well as how to promote its development.



In the first several studies using this design, we found that both 4- and 6-year-olds are very good at combining learned facts. Since then, we have looked at different ways of presenting information to children and the factors that may increase or decrease children's ability to combine these learned facts. In the most recent studies of this nature, we sought ways to enhance this type of knowledge integration.

To do this, we had 4-, 6-, 7-, and 8-year-olds come into the lab for one session. During the session children were read stories much like the ones mentioned above and again asked to create new knowledge. This time, however, we were interested in seeing what happens if we supply children with additional information about the topic beforehand (e.g., about flower petals). For instance, if a child knew that "tulips have six flower petals," prior to learning that "a corolla is a bunch of flower petals," and that "flower petals are used to make perfume," would they be more likely to correctly answer "what is a corolla used to make?" Because children learn information both inside and outside of the classroom, some children received the additional background stories in the laboratory while others we read the stories at home before their visit to Emory. Interestingly, the findings suggest that providing additional background information helps older children (7- and 8-year-olds) but not younger children (4- and 6-year-olds) to integrate knowledge. Though we sometimes assume that the more information we can provide about a topic, the better it is learned, this doesn't seem to be the case for younger children. In fact, additional information appears to overwhelm 4-year-olds preventing them from making efficient use of learned information altogether.

In a similar line of research, we used this picture book task to see if giving children several stories that were related in the same kind of way would aid them in combining knowledge. Following the example above, if children first learned that "potatoes are used to make French fries,"

(continued on pg. 3)

The Researchers:

would they be more likely to combine new knowledge to learn that "the corolla is used to make perfume"? As we expected, exposure to similar relational stories helped 6-year-old children combine information later in the session. In essence, as time went on, the children "learned to learn." In a follow-up experiment with 5-year-olds, we are currently looking at whether learning information through combining knowledge, rather than through direct instruction, better promotes long-term memory for that information.

Future Directions

Learning new facts and combining them to generate new knowledge is a task children and adults of all ages face. As such, in the upcoming year we plan to extend this line of work to older children and adults. Specifically, we will use event-related potentials (ERPs) to examine brain activity when children and adults view novel facts for the first time and when they combine those facts together to form a new understanding. Through use of this brain imaging technique, we can see if there is a pattern of brain activity associated with successful learning and further knowledge extension, as well as how it changes between childhood and early adulthood.

"Where Was I When That Happened?"

Bauer Memory at Emory Lab
Emory University
36 Eagle Row
Atlanta, GA
30322

memoryatemory@emory.edu

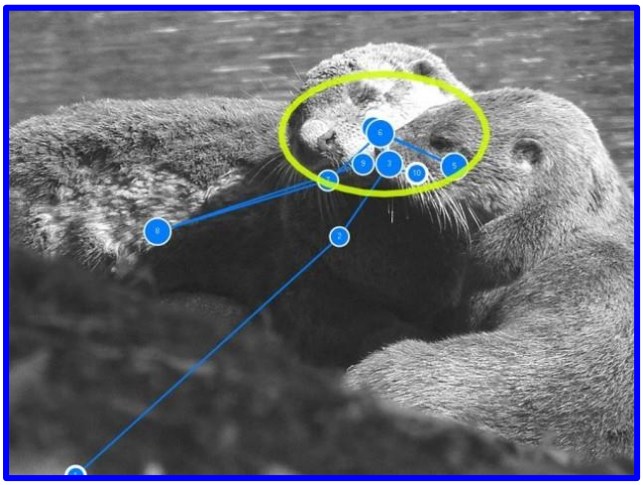
Click here for a link to our website!

Memory for the location where the personal events in our lives take place is one of the main components to remembering an event. To learn about memory for the "where" of personal events, we conducted a study with 4-year-olds.

Children completed four different activities in four different locations in and around the lab. At the end of the session, we asked them to tell us what activities they completed. One week later, children returned to the lab and were asked the same questions but were this time given a reminder cue of where they completed the activity. When children were given the reminders, they remembered more activities. Forming a connection between both the activity and the location is essential for strengthening children's memory over a delay in time.

A Look at
Children's Eye Movements While Reading

While we continue to examine learning and new knowledge formation using story-reading, over the past year we have used different ways of studying this concept. In a recent study we used eye tracking to understand how children process and develop new knowledge from information that they read. This approach is very different from what we have done in the past and involves the use of a very cool device that measured how and where children look on the computer screen. Eye tracking is a novel way to measure what may be occurring during integration.



An example of how the eye tracker can detect fixations by the eye

In this study, 7-10-year old children, read facts on a computer screen that tracked their eye movements. Some of the facts they read could be combined, or integrated, whereas other facts could not be integrated. We were interested in assessing the changes in children's reading and eye movements as a result of whether the facts could or could not be integrated. Children really enjoyed seeing how the eye tracker worked and seeing how their eyes moved as they read the facts. The results of this study will be available shortly.

Emotion and Memory with ERP

Adults often have better memory for emotional experiences, and this has been observed in their behavioral responses and brain activity. In an ongoing series of studies, we are examining whether children too have better memory for emotional experiences- both from their own lives and represented in emotional scenes (such as a cute puppy or a gross bug).

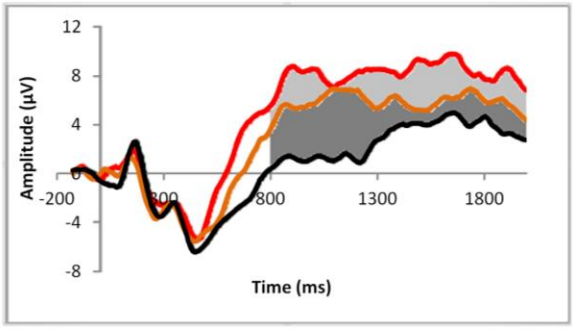
Using a brain imaging technique called event-related potentials (ERP), we can see if there are unique patterns of brain activity for emotional versus neutral experiences, and whether that activity relates to behavioral responses.

In a previous study with 5- to 8-year-olds, we used ERP to examine brain activity when children viewed emotional scenes for the first time and also during a later memory task. Children had larger brain responses for emotional scenes (positive and negative) than for neutral scenes. Though children remembered the scenes very well, only older children had better memory for the emotional

A child wearing the ERP cap

scenes than the neutral ones. This tells us that the "emotion effect" emerges earlier in the brain than it does in behavior.

In a different study we tested memory by changing the emotionality of a scene, in what we call reappraisal. We do this by describing the picture as more, or less, emotional than intended. For example, a picture of a car falling off of a cliff would be a negative image, but if accompanied by an explanation that it is a stunt car used in the filming of a new action movie, that would significantly reduce the negative emotionality. This study's findings demonstrate that emotion enhances memory in school-age children, at least for negative scenes. Importantly, these data are the first from children to show that manipulating emotion responses affects later memory, which indicates connections between emotion and memory even in school-age children.



An example of an ERP wave form
Orange- Negative reappraisal
Red- Negative Matching
Black- Neutral

In the current study we asked some children to recall emotional experiences from their own lives while other children were asked to look at emotional scenes, in both groups we recorded their brain activity using ERP. We are still collecting this data in a group of older children and teenagers and we are eager to see how children's memory for personally experienced emotional events compares with that of emotional scenes.

Want to participate?

If you have a child (or children!) between the ages of 11 and 16 and you are interested in hearing more about the studies, please give us a call at 404-712-8318 or email us at memoryatemory@emory.edu

Bauer Lab News!

Many members of The Bauer Lab went to the Cognitive Development Society conference in Memphis, Tennessee in October of last year! We presented our research and learned a great deal from other researchers as well. Check out our pictures!

Last August one of our graduate students, Jackie, gave birth to a beautiful baby girl. We were happy to welcome Maddie to our Bauer Lab family and she just turned one-year-old last month!

One of Dr. Bauer's recently published papers has generated a lot of public interest! Follow the link below to read more about how she and her colleagues have explored the phenomenon of "Childhood amnesia"

"**Psychologists document the age our earliest memories fade**"

Introducing NIH Toolbox for the Assessment of Neurological and Behavioral Function brought to you by the National Institute of Health and Northwestern University (Chicago, IL). The NIH Toolbox contains a mix of different tools measuring cognitive, emotional, motor and sensory function. These tools serve as a standard set of measures that are useful: (1) for diverse populations; (2) across different ages (3 to 85 years); and (3) for different types of studies. We are proud to announce that our own Dr. Patricia Bauer of the Bauer Memory and Development Lab has contributed cognitive measures to the NIH Toolbox. In addition, we are currently using some NIH Toolbox measures in several of our studies. If you have any questions or would like to find out more about the NIH Toolbox please visit the website at http://www.nihtoolbox.org

Thank You to Our Undergraduate Research Assistants!

Many wonderful undergraduate students have been working in our lab in the past year. They provided enormous support to all aspects of our research, from scheduling participants and running testing sessions to transcribing and coding, among many other lab activities! We are grateful to all of them! Special thanks to Angela who did scheduling for all our projects, Toby who worked in the lab for 3 years helping with many, many projects, Jee Young who greatly contributed to eye tracking studies, and Allison and Adna who did independent research projects working with preschoolers.

Adna Jaganjac
Allison Carr
Angela Wang
Anne Hermes
Danielle Trottier
Elyssa Hausman
Farrah Bhimani
Hannah Lim
Jee Young Kim
Julia Ouellette
Mary Muigai
Roheen Virani
Sami Yousif
Toby Glazer

child study center
EMORY UNIVERSITY

Do you know any families who might be interested in participating in child development studies at the Emory Child Study Center? Please visit the Child Study Center website at:

www.psychology.emory.edu/childstudycenter

or Call/Email:

404-727-7432/childstudies@emory.edu

Again, we would like to thank YOU for participating in our research! Our efforts would not be possible without such willing and enthusiastic participation. We would love to have you back for another study!

Bauer Memory Development Lab ~ Emory University ~
36 Eagle Row ~ Atlanta, GA 30322
Phone: (404) 712-8330 ~ E-mail: memoryatemory@emory.edu ~
http://www.psychology.emory.edu/cognition/bauer/lab/index.html