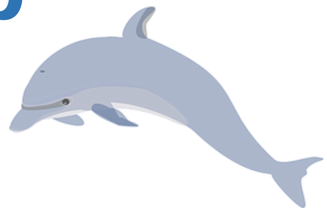
Bauer Memory at Emory Lab



Newsletter 2019

We at the Bauer Memory Development Lab are pleased to send the annual newsletter to our participating families. With this letter, we express our appreciation to the families who have volunteered their time for our studies as well as update you about our research. All of us at the Bauer Lab sincerely thank you for joining us in our efforts to learn about memory and development! We greatly appreciate your continued involvement in the Emory Child Study Center.

In the following pages you will find updates and descriptions of some of the studies in which you and your children may have participated! We also include other updates and pictures from professional conferences our researchers attended.

In addition to the productive work being done in the lab, many members have celebrated accomplishments this year. Ana Maria earned her Master's Degree in December 2018. Jillian earned her Ph.D. in March 2019 and earned the Eleanor Main Graduate Mentor Award. Since then, Jillian has started as a Postdoctoral Fellow at New York University. Julia earned her Master's Degree in May 2019. Lab Coordinators Jimmy and Lucy will be starting graduate school in the fall- Jimmy at the University of Texas-Austin and Lucy right here in the Bauer Lab! We also celebrated the graduation of many of our undergraduate students this past May. We are excited to share our updates with you and see what this next year brings!

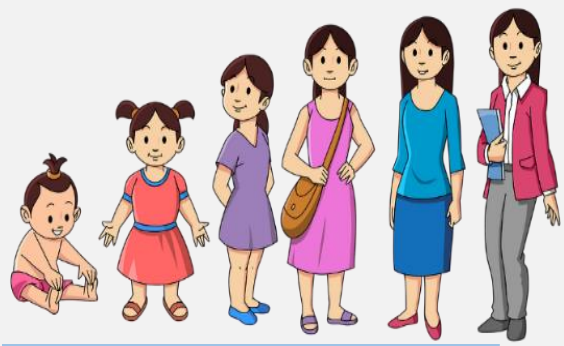
For more information about projects, findings, or ways to contribute, you can visit our website or call us at (404)-712-8330 and email us at memory2@emory.edu

Dr. Patricia Bauer, Ph.D.

Lab Director

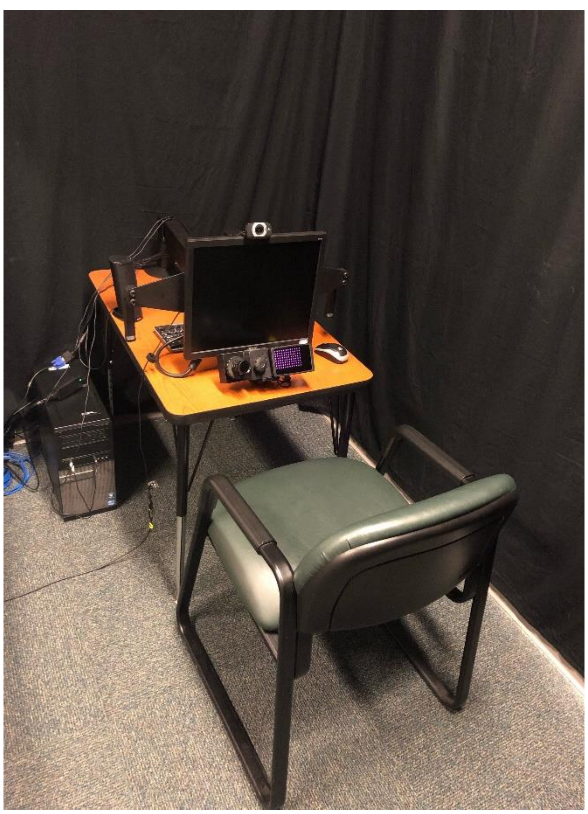
Our Research

Much of the research in our lab investigates different skills and processes that affect how children learn, use, and remember new information. These skills are particularly important to study because the ability to combine information to generate new understanding is critical to building a knowledge base. As such, one of the goals of our research is to better understand how these skills develop and change over time.



Development from Infancy to Adulthood

Eye-tracking Technology



This year our lab bought a new eye-tracker! It uses infrared light to measure reflections from the pupil and cornea to calculate where somebody is looking on a screen. We use the eye-tracker in many studies to show us how children or adults focus their attention and how much effort they are using during a task. This is important because it gives us insight to internal cognitive processes that may help explain human behavior.

Forming a Knowledge Base

As mentioned on our first page, we are interested in the development of memory, especially as it pertains to adding new information to our knowledge base. Much of the research in the lab investigates the different skills and processes that affect how children learn, use, and remember new information—skills that are especially important in a school setting.

In particular, we at the Bauer Lab are interested in how children combine information learned across different times and contexts and then generate new understanding, a skill that is critical to building the knowledge base across our lifespan. Our lab calls this process **self-derivation through memory integration.** One of the goals of this research is to better understand how this skill develops over the school-age years, as well as to investigate the ways in which we can promote and facilitate its development.

This line of work began in 2009, and since then, we have gained a great deal of information about how children combine new facts through pictures, stories, single sentence facts, and games.

Self-derivation through Memory Integration Example:

Children come into the lab and meet with a researcher who presents the child with a series of facts (either learned from a PowerPoint or learned from reading a story).

For example, a child might learn that a corolla is the name for the bunch of flower petals on a flower. Then, after a short break, the child might learn that flower petals are used to make perfume. At the end of the session, we ask the child a series of questions (i.e. What is the corolla used for?). In order to answer these "integration" questions one must put the two related facts together to create (or self-derive) a third, "new" fact (i.e., the corolla is used to make perfume).

Self-derivation through Integration in Young Children

We have discovered that children as young as 4 years old can learn facts and combine information to self-derive new knowledge. However, children this young tend to struggle more than older children do and they require more hints and feedback. The following studies are examples of how we use stories passages teach younger children facts.

For her Master's degree, Ana Maria invited 4-year-old children to the lab and read them story passages. Each story contained a true, but previously, unknown fact about a specific topic, such as plants, geography, and sea life. The facts within the stories were related and could be combined to self-derive new knowledge. After hearing the stories, 4-year-olds are asked about the individual facts they learned in the stories before being asked integration questions. We hypothesized that asking 4-year-olds about the individual facts from the stories would help them see that the facts were related and therefore help them more easily self-derive the new information.

We are still collecting data for this study. If you know of any 4-year-olds who would like to participate in the study, please contact the Child Study Center at Emory University. Thank you to all our families who participated in the study so far! We look forward to sharing our results with you.

In another study, Jimmy and Jackie researched how knowledge is re-organized as we grow older. For instance, young children tend to group dolphins with other aquatic creatures but this may change after they learn that dolphins are mammals and sharks are fish. In a study with 6- and 7-year-olds, we tested whether organizational groupings change after we teach children facts about categories during a laboratory session. The children place stickers of plants and animals on a grid, grouping them by similarity. Then they listen to stories teaching them a set of facts and perform the sticker activity again during a second visit one week later. We measure the difference in distance between each sticker and analyze how their groupings have changed.

We are continuing to recruit 6- and 7-year-olds to participate in this study and look forward to sharing our results when data collection is complete.

"Self-driving" Integration

In most of our studies, we test for memory integration by asking children "integration questions" that they can only answer if they have put together (integrated) the two related facts and "self-derived" the new information. However, in life outside the lab, the process of integration and self-derivation is often unprompted - we must put together pieces of information without specifically being asked "integration questions." The following studies shed some light on integration when it is not prompted by a question.



In one study, Lucy, Blaire, and Hilary are using eye tracking to examine knowledge integration in 7-9 year olds. In particular, we are interested in whether children put together related information before being asked a question that prompts them to do so (unprompted). During the study, children see pairs of images and hear new facts related to the images. We measure how long children look at the images using our eye tracker. Data collection thus far shows that 7-9 year olds do not look at related images more than unrelated images, suggesting they are not putting together related information before they are asked a question. However, in a similar study with Emory University undergraduate students, we are finding that they do put the related information together before being asked any questions. These results suggests we are capturing a developmental difference in the processes involved in unprompted knowledge integration.

For her Master's degree, Julia investigated whether children ages 7-9 integrate information to produce new knowledge without prompting by showing children images on a computer screen and playing them audio-recorded facts related to the images. In a "twist" on our usual method, in this study, there are 3 related facts instead of just 2. The only way to integrate the second and third facts is by first integrating the first and second facts. In this study, Julia sometimes asked children questions to prompt integration of Facts 1 and 2 and other times, she does not. We are eager to learn whether children integrate Facts 2 and 3 even without prompting Facts 1 and 2. Data collection is ongoing, but we expect that children will have trouble integrating information and producing new knowledge without prompting.

Working together to learn about the world

A large part of forming a knowledge base comes from working together with other people. Our lab is specifically interested in how children work with each other and how children and parents interact in order to learn more about the world around them. The following studies describe how we research this idea of collaboration.

In this study, Blaire and a team of research assistants are examining collaboration in 8-9 year olds. In particular, we are interested in how a pair of school-aged children, who have never met before, work together (or do not work together) in order to answer questions. During the study, children read fun facts aloud separately and then come together to play a game like Jeopardy. Our Jeopardy game asks questions that are relevant to the fun facts learned earlier in the session. Critically, each child had one part of the information necessary to answer the question. Data collected thus far suggests that school-aged children do not readily collaborate or work together to answer questions, even when it is necessary in order to get the question correct.



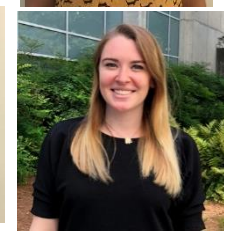
In a project with Hilary, Lucy, and Natalie, we are looking at how 4- and 5-year-old children learn science information from book reading with their caregivers. In this work, we have caregivers read books to their children about animal topics, such as why animals have shells (for protection!) and what makes an animal an insect (6 legs and 3 body parts!). We then ask the children questions about the books to see what kinds of information they remembered.

This work helps us understand how children learn from science books and how caregiver interactions influence learning. We hope to use this work in the future to enhance early science learning in the home. Data collection for this study has just finished and we are working on analyzing the data. We thank families who participated and look forward to sharing our findings.

Integration in Everyday Settings

Children put together information everyday as they go through life whether they realize it or not! Therefore, it is important to study how the process of integrating information happens in a wide range of scenarios. The following studies investigate integration in sessions that imitate classroom learning and learning across two different modalities.

Jessica and Katie are working on a study of how children gather knowledge across a variety of different contexts and materials. Health topics, such as dental hygiene and exercise, are important for children to learn as they develop and are subjects that children likely learn about through videos and pamphlets. To study how children gain new knowledge by integrating across video and print materials, we showed groups of children videos and pamphlets on health related topics. We later asked them to generate new knowledge from the facts they had read. Based on previous work, we think that gaining new knowledge by integrating across different media will present a challenge for children because the video and text formats in which the facts are presented are low in similarity of surface features. Stay tuned to see if we are right!



Alena, Jessica, Ana Maria, Jimmy, and Katie along with a team of undergraduate research assistants finished up data collection for a five year long study. This year we investigated how first, fourth, and fifth grade students put together information learned across text and graphic formats in the classroom. An example of this is children seeing the fact "The Great Barrier Reef is located off the coast of the smallest continent" written out on a PowerPoint and later seeing a picture of map that shows Australia is the smallest continent. We then ask them "What continent has the great Barrier Reef?" to which the answer is Australia. We did some of this testing here at Emory, and we also travelled to a rural elementary school and did more testing in existing classrooms. Data analysis is on-going and we look forward to sharing results soon!

Thinking about Space

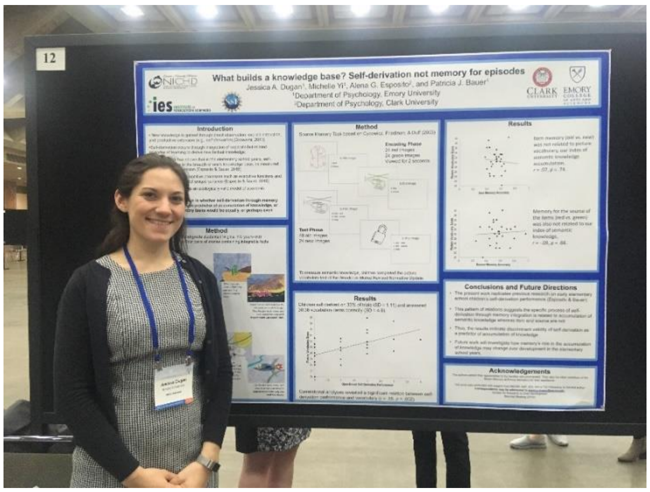
Another area of research our lab studied this year was spatial reasoning skills. Spatial reasoning skills are an important aspect of learning, specifically in Science Technology Engineering and Math subjects. The following studies investigate spatial reasoning skills in different age groups as part of Jillian's dissertation.

In this study, Jillian and Adna investigated the development of spatial cognition and its relation to memory in 6- to 12-month-old infants. In particular, they were interested in how infants learn to reason about and predict the motion of moving objects and the crucial role of visual memory in their ability to reason about the world. During the study, infants are presented with rotating objects and various static shapes, and we measure how long infants look at the objects using our eye tracker, which allows us to quantify infants' attention to different aspects of the shapes. Data analysis thus far suggest that infants process different types of spatial information in a similar manner to the way that adults do.

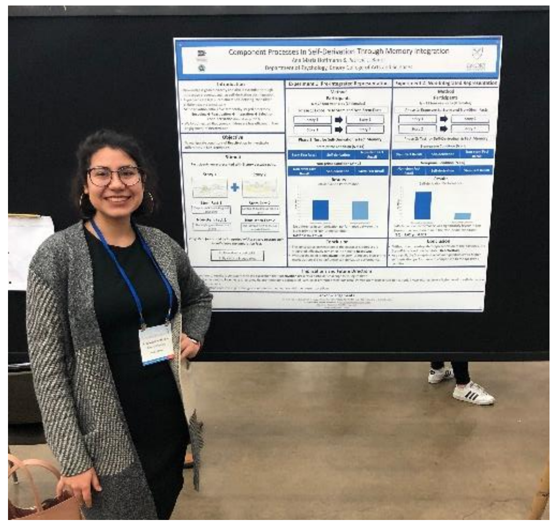
In another study Jillian and Katie are studying the development of spatial reasoning abilities during the preschool years and how these abilities relate to young children's growing understanding of math concepts, like numbers and basic addition. During the study, we first show 4-year-olds videos of objects and shapes that move in predictable and unpredictable ways while recording their eye movements via an eye-tracker. We then examine where they looked at the moving shapes to see whether children can predict their expected motion. In addition, we have the children complete different tasks that measure their memory, math skills, and vocabulary to see how their spatial reasoning abilities relate to these skills.

Presenting Our Work

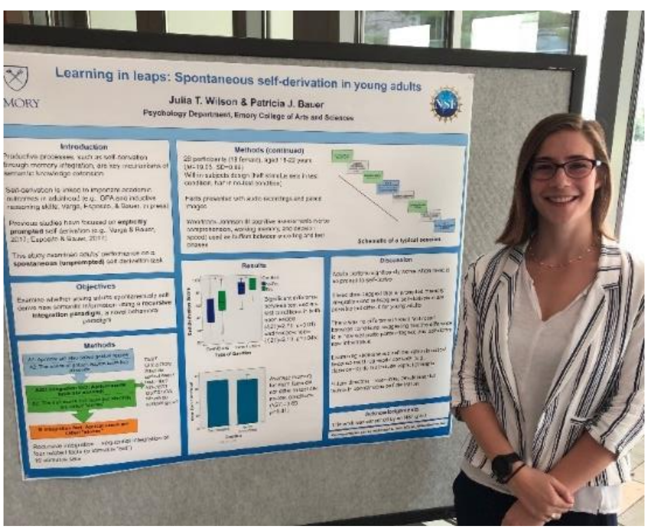
Many of our researchers had the opportunity to present their work at various conferences such as the Society for Research in Child Development (SRCD) and the Mechanisms of Learning Forum (MoL). Photos of these presentations are below.



Jessica presenting at SRCD

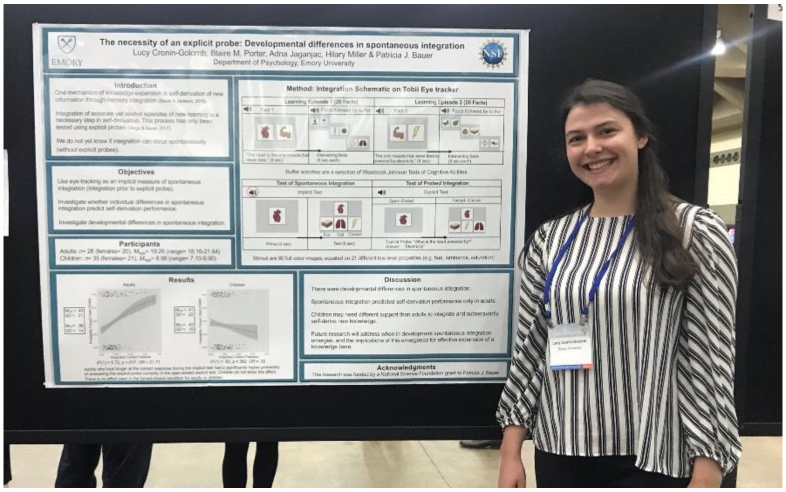


Ana Maria presenting at SRCD

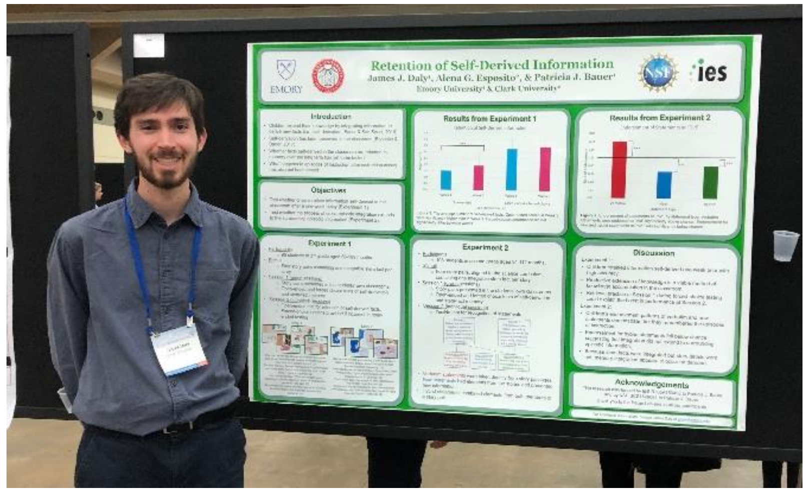


Julia presenting at MoL

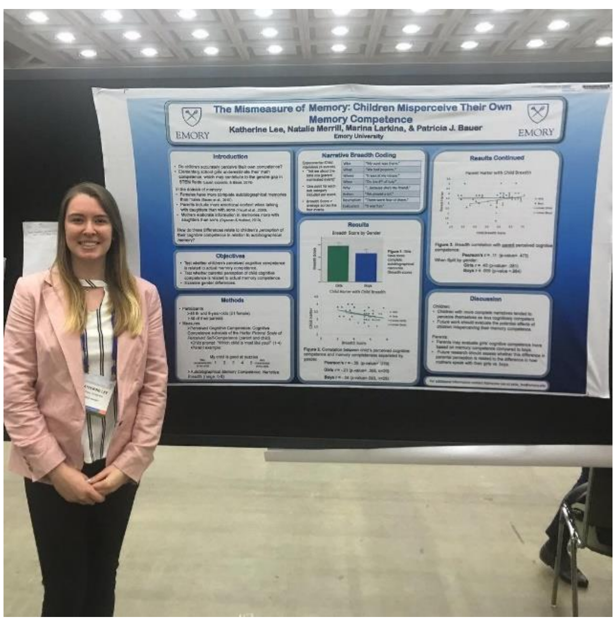
Julia, Lucy, Blaire, and Katie at SRCD



Lucy presenting at SRCD



Jimmy presenting at SRCD



Katie presenting at SRCD

Holiday Party

Thank you to our Undergraduate Research Assistants!

Many wonderful undergraduates have worked in our lab the past year. They provided support to all aspects of our research, from running sessions to entering data! We are very grateful for them and we could not have done all this research without them!

Adrienne Wang
Allie Udoff
Amber Lee Wilson
Ana Maria Blasini
Brey Weingart
Brittany Calkins
Colin Jacobs
Elana herbst
Elizabeth Bryant
Emily Beattie
Emma Simpson
Evelyn Cortezi
Francesca Cabada
Jessica Isabor
Kaveri Sheth
Kelly Doyle
Kevin Guo
Liam Ashbrook
Lindsay Gorby
Madi Stephens
Maria Rendon
Melease Lynn
Michelle Yi
Reilly Allison
Natalia Garzon
Ruwenne Moodley
Sama Radwan
Sydney Sumrall
Tulasi Kadiyala
Veronica Vazquez
Zoe Hopson

Again, we 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!

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