Music & Movement Classes

Welcome back, Lauren Hraber! Mrs. Hraber conducts Music and Movement classes with all of the children at the Children’s School every other week. Our first classes for the fall were held on September 22nd and will continue approximately every other week for the rest of the school year.

Lauren Hraber is an experienced preschool and elementary music teacher with a MED in Special Education from the University of Pittsburgh and a BFA in Piano Performance from Carnegie Mellon University. She spent 10 years teaching General Elementary Music in Baldwin–Whitehall, Woodland Hills, and Canton City Schools. Lauren founded Piano Tots for preschoolers and has spent the last 10 years teaching Piano Tots classes. Presently, Lauren serves as the music teacher at several preschools in the Pittsburgh area. Lauren’s family includes husband Zach and 2 children - Maddy & Jax, a Children’s School alum.

Keeping Parents Informed about Research

The Research Spotlight section of the monthly newsletter is one way Children’s School parents can learn about research in progress. Also, each time your child participates in a study that involves playing a “game” with a researcher (i.e., as opposed to merely being observed), he or she will get a participation sticker suggesting that you, “Ask me about the … game” and a study description detailing the task. We also have recent articles resulting from Children’s School research posted on the school web site (www.psy.cmu.edu/childrensschool) and a notebook of articles in the office. Feel free to contact Dr. Carver to discuss any questions you have about research.

Observations for Psychology Assignments: Students from Dr. David Rakison’s Child Development class conduct periodic observations throughout the fall. For each assignment, they observe specific differences between preschoolers and kindergartners in motor skills, social interactions, language, etc.

Research Methods Class Studies: Students in Professor Anna Fisher’s Developmental Research Methods class will start with a lab entitled The Animal Names Game to explore age related changes in children’s working memory capacity by having them do a word span task. The experimenter starts with a short list of animals for the child to repeat and gradually lengthens the list. As part of this study, the students are varying the length of the animal names (e.g., frog vs. butterfly) to determine whether it is the number of items in the list or the amount of time it takes to say the items that determines how much can be remembered. Later in the semester, students will work in small groups to conduct a study of their own design, which will be approved both by their instructor and by Dr. Carver.
Research Spotlight

The iPad Game

Cassandra Eng, a new graduate student working with Dr. Erik Thiessen, is studying the vocalizations young children make in response to stories presented in typical book format and via iPad with animations embedded within the story. They’d like to see if the animations encourage children to vocalize more frequently than would a normal storybook. During each session, a researcher reads a child one story, *Zoom City* (Hurd, 1998), in two different formats: a regular board book and on an iPad. As the experimenter reads the story on the iPad, she activates animations embedded within the words of the story. For example, when the researcher clicks on the word “zoom”, a picture of a car glides off the screen. The order of the two book types varies and children’s responses are videotaped so the researchers can compare their vocalizations across the two conditions. The study results may inform the development of future electronic books for children.

The Moving Eyes Game

The world around us is complex and maintaining focused attention can sometimes be challenging, even for adults. The goal of this project in Dr. Erik Thiessen’s lab is to investigate the developmental course of deliberate selective attention and to examine factors that play a role in attentional selectivity at different points in development. In this project, researchers ask children to play a game in which they see several objects moving on a Tobii T60 eye tracker (which looks like a typical computer screen) landing on one of the nine screen locations, each a different color. Children are instructed to watch a particular object while ignoring the rest of the objects. When the objects stop moving and disappear from the screen, children are asked to name the color of the grid in which the object disappeared. Children play the Moving Eyes Game several times, tracking either many objects or just a few objects at a time. Children’s performance in the Moving Eyes Game will help researchers to map the developmental course of deliberate selective attention and improve scientists’ understanding of this cognitive ability required for successful performance in many everyday tasks.

The Finding Pictures Game

As children learn about things in the world around them, they also learn about how different things are related to each other. For instance, children can learn that different things are *taxonomically* related when they share features with each other (e.g., *dog* and *seal* both have fur), or *thematically* related when they are associated with the same event (e.g., *dog* and *bone*). Sometimes, things can be both taxonomically related, such as *cat* and *dog*, which both share features and are often associated with each other. The purpose of Dr. Anna Fisher and graduate student Layla Unger’s study is to explore how children’s knowledge of these relations develops with age. During this study, children look for a specific target picture amongst an array of four pictures depicted on a computer screen that includes the target picture, a related distractor picture, and two unrelated distractor pictures. Each target picture appeared in 3 arrays, in which the related distractor was either taxonomically related, thematically related, or both taxonomically and thematically related. While looking for the target picture, children’s eye gaze was recorded using an eye tracker. By examining children’s looks towards the related distractor pictures, researchers can investigate the development and activation of children’s knowledge about relationships between different things.
Additional Research Opportunity

functional Near Infrared Spectroscopy (fNIRS)

Dr. Anna Fisher and graduate student Layla Unger are the first to begin using functional Near Infrared Spectroscopy (fNIRS) techniques for research at the Children’s School. This technique has been approved by CMU’s IRB as a minimal risk procedure for use with young children, but the research permission form that families signed for the 2016-17 school year does not cover its use. Thus, participation in fNIRS studies, like the one described below, requires separate parental permission.

fNIRS records brain activity by measuring changes in blood flow in a given region of the brain. Changes in blood flow are measured by emitting infrared light into the scalp and underlying tissues, including the surface of the brain, at a frequency that is primarily absorbed by blood. By detecting the amount of light that is absorbed, we can infer changes in blood flow over the course of a cognitive task. Light is emitted and detected by diodes positioned on the scalp and held in place with a soft cap. The benefit of fNIRS is that it allows the child to sit and move comfortably while doing the task. The near infrared light exposure is comparable to sun exposure MINUS the UV wavelengths. The researchers also have health and safety protocols to ensure that the caps are free from lice and that the light never shines in the children’s eyes.

During the parent orientation meeting, each family received a permission form for the use of fNIRS. The permission slip describes fNIRS studies in much more detail. Please contact Dr. Carver if you have any questions about fNIRS or would like another copy of the permission form.

The Moving Eyes Game with fNIRS

The world around us is complex and maintaining focused attention can sometimes be challenging, even for adults. The goal of this project in Dr. Anna Fisher’s lab is to investigate the developmental course of deliberate selective attention and to examine factors that play a role in attentional selectivity at different points in development. This study examines the neural bases of attention development by asking children to complete an attention task while their prefrontal cortex (PFC) activity is recorded using functional Near Infrared Spectroscopy (fNIRS).

The attention task involves children playing a game in which several objects are moving on a computer screen and landing on one of several screen locations. Children are asked to watch a particular object while ignoring the rest of the objects (e.g., watch the blue triangle). When the objects stop moving and disappear from the screen, children are asked to indicate the grid in which the target object disappeared.

Between the trials of this task, children see three arrows pointing left or right and have to report the direction the middle arrow is pointing. This non-challenging task makes it possible for us to record a baseline reading of prefrontal brain activity when children are not engaged in an effortful task. Children’s performance and neural activity in the Moving Eyes Game will help us to map the developmental course of selective sustained attention and improve our understanding of this basic cognitive ability required for successful performance in many everyday tasks.
Research Spotlight

Longitudinal Research with fNIRS

Children with permission to participate in the functional Near Infrared Spectroscopy (fNIRS) research are beginning our first longitudinal series of studies, with three sessions in the fall and three in the spring. The aim of Dr. Anna Fisher and Dr. Erik Thiessen’s project, being conducted with new graduate student Jaeah Kim is to understand how developmental changes involving increases in coordination among brain regions relate to the development of core cognitive capacities, including inhibitory control and working memory. Researchers begin by measuring brain activation in the left and right prefrontal cortex during free play to determine the child’s ‘resting state’ brain activation – in other words, brain activation in the absence of an externally prescribed goal or task. They then compare the resting state levels to those recorded during a variety of other tasks, such as the Opposites Game. This game is often used by researchers around the world to investigate the development of inhibitory control, which is one’s ability to suppress responses that are not appropriate in a given moment (such as eating cookies before dinner, answering a teacher’s question out of turn, or taking a toy that another child is playing with). In the Opposites game, children are instructed to say “day” when presented with a picture of the moon, and “night” when presented with a picture of the sun. In future sessions, children will play other games involving similar cognitive processes so that the researchers can compare the brain activation when given a challenging task to the resting state activation previously measured.

NOTE: If you would like your child to be included in this ground breaking research but have not yet signed the permission form for participation in fNIRS studies, please contact Miss Drash to have a consent form sent to you.

Undergraduate Research

Dr. Anna Fisher and Graduate Student Sandrine Girard’s Developmental Research Methods students are preparing their final projects for the semester. They are beginning to pilot test their projects on the topics listed below. Families whose children participate will receive fuller parent descriptions via the child’s backpack. Everyone can read the study descriptions on the Research Bulletin Board near the office door. Notice the interesting range of important topics in early childhood development!

• Can increased emphasis on conflict resolution in stories promote children’s sharing behavior? (The Cupcakes Game, PM 3’s, PM 4’s & K)

• Does exposure to children’s books depicting atypical gender roles decrease the strength of gender stereotyping? (The Story Game, AM 3’s and K)

• Is young children’s difficulty with false belief tasks a result of language limitations or lacking theory of mind? (The Special Object Game, AM 4’s and K)
Research Spotlight

The I-Spy Game and The Matching Game

Children learn from the world around them, despite the world being really cluttered. At any given moment children are surrounded by more information than what they can possibly process. Dr. Catarina Vales, a new postdoctoral researcher working with Dr. Anna Fisher, is exploring the knowledge children use to decide where to focus their attention. In her project, the research team is interested in one source of knowledge – semantic knowledge – that might help children orient their attention. Semantic knowledge refers to word meanings (e.g., knowing that the word “cat” refers to the animal cat) and how words are related to one another (e.g., knowing that “cat” and “bear” are both animals, or knowing that “cat” and “mouse” share a thematic relation). Over the preschool years, children’s knowledge of the meaning of words and how they are interconnected deepens, potentially allowing children to attend to their environment in “smarter” ways.

Dr. Vales is investigating the idea that the relationships among words influence how children direct their attention. To do so, preschoolers and kindergartners complete two games across three sessions. In the I-Spy Game, which they play twice, children are asked whether a given target is in an array of pictures (e.g., “Is there a cat on this screen?”). Across screens, sometimes a related item (e.g., “bear” or “mouse”) is also present and sometimes it is not (see screen shot below, left). If children have the knowledge that “cat” are “bear” are related, they should be more likely to notice the “bear” in the array, taking longer to locate the “cat”.

Because children’s knowledge is changing so quickly, researchers also want to make sure that the relations they are testing in the I-Spy Game are known by the children. They assess that knowledge in the Matching Game. In the Matching Game, researchers show children a picture at the top of the screen, and ask them which of two options goes with that picture (see screen shot below, right). For example, children might see a cat at the top and a bear and a cat collar at the bottom. If children have the knowledge that “cat” and “bear” go together because they are animals, they will choose the picture of the bear.

Screen shot of the I-Spy Game
Screen shot of the Matching Game
Research Spotlight

The Moving Eyes Game

The world around us is complex and maintaining focused attention can sometimes be challenging, even for adults. The goal of this collaborative project with Dr. Anna Fisher’s and Dr. Erik Thiessen’s research groups is to investigate the developmental course of deliberate selective attention and to examine factors that play a role in attentional selectivity at different points in development. In this project, researchers ask children to play a game in which they see several objects moving on a typical computer screen and landing on one of the thirty-six screen locations. Children are asked to watch a particular object while ignoring the rest of the objects. When the objects stop moving and disappear from the screen, children are asked to indicate the grid in which the object disappeared.

Every child will play the Moving Eyes Games twice, tracking either many objects or just a few objects at a time. During some sessions the objects they need to ignore may all be the same, while at other times they may be all different. Children’s performance in the Moving Eyes Game will help researchers to map the developmental course of selective sustained attention and improve their understanding of this basic cognitive ability required for successful performance in many everyday tasks.

Observations for Psychology Assignments:

Students from Dr. Sharon Carver’s Child Development class will conduct periodic observations throughout the spring semester to observe specific differences between preschoolers’ and kindergartners’ development. Their focus will be on the Seven Essential Life Skills Every Child Needs, based on Ellen Galinsky’s 2010 book Mind in the Making. This book is a readable synthesis of early childhood research on the natural maturation of

• focus and self-control,
• perspective taking,
• communicating,
• making connections,
• critical thinking,
• taking on challenges, and
• self-directed, engaged learning.

Galinsky notes that all seven skills are rooted in the prefrontal cortex of the brain, the locus of executive functions that help us “to manage our attention, our emotions, and our behavior in order to reach our goals” (p. 4). She also provides excellent tips for practical ways families can foster each of the seven essential skills during early childhood. The related web site, https://www.mindinthemaking.org/, also provides numerous valuable parenting resources.
Research Spotlight

Research Methods Class – The Bear & Tiger Game

Students in Dr. Anna Fisher’s Developmental Research Methods class will start the semester with a lab entitled The Bear & Tiger Game. They will work in pairs and small groups to conduct a study of young children’s response inhibition. Response Inhibition is the ability to suppress actions that are inappropriate in a given context. This important ability develops rapidly between 2 and 5 years of age. For example, a 2-year-old child usually has a much harder time than an older child refraining from grabbing a toy s/he likes without asking for it first. A number of different tasks have been developed to assess response inhibition in children, but it is not always clear why children struggle with response inhibition under different task demands. One common method of assessing response inhibition is a version of the popular “Simon Says” game. In this game, a verbal command (such as “touch your nose”) should be performed only if the game leader precedes the command by saying, “Simon Says …”; if the game leader does not say “Simon Says” before saying the command, the command should not be followed. Young children find this game very challenging. Use the following link to learn the game if it is new to you so you can try it at home and see for yourself!


One issue that remains unclear is what role demonstration plays in children’s difficulty with the game. Specifically, if a game leader not only gives a command verbally but also demonstrates the action, children’s tendency to imitate may encourage them to respond without attending to whether the leader said, “Simon Says”. In this study, students in the Research Methods course will involve children in playing a version of the Simon Says game – the Bear & Tiger Game. In this game, children will be instructed to always follow simple commands given by a ‘nice’ Bear but to never follow commands of a ‘naughty’ Tiger. For some of the children, the experimenter will only say the command verbally but, for other children, the experimenter will demonstrate the action in addition to giving each verbal command. The evidence gathered in this study will help us better understand the mechanisms of response inhibition and task conditions that can facilitate performance on response inhibition tasks. Discovering that demonstrating the action affects children’s performance in a response inhibition task may help teachers and parents by giving them tools to make games like Simon Says more challenging for older children and less challenging for younger children so that they can provide an optimal level of task difficulty to children of different ages. Stay tuned for what these budding researchers learn!
Research Spotlight

The Finding Stars Game

Dr. Erez Freud, a postdoctoral fellow in the Department of Psychology, is working with Dr. Marlene Behrmann on a research study that aims to characterize the developmental trajectory of visuomotor object control. The ability to interact with objects is crucial for every aspect of our lives through childhood and adulthood. Our understanding of how we are able to reach and grasp objects so effortlessly and how these skills develop over childhood remains rather poor. To shed light on this question, researchers will play the “Finding Stars” game. In this game, right-handed 4 and 5-year-olds will be asked to grasp objects of different shapes and sizes to look for a star sticker that is placed underneath a subset of the objects. Researchers will measure different aspects of the reach and grasp behavior, such as speed, width of finger opening, etc., using a Optotrak camera that records the 3D motion of the hand, which then allows the team to describe children’s visuomotor behavior in detail. Three LED markers (lights) will be taped to the child’s right hand to enable accurate movement tracking. Importantly, the LED markers are merely infrared lights that do not emit any signal. This study will help researchers to understand to what extent shape sensitivity, in a visuomotor task, is developed in children aged 4-5 years old.

Undergraduate Researchers in Training

Students in Dr. Anna Fisher’s Developmental Research Methods class are preparing their final projects for the semester. Though the research protocols are still being developed, the students are planning to study many educationally relevant early childhood tasks. Learning the impact of the variables studied on children’s performance and learning can help parents and educators better choose approaches for supporting their progress.

- **The Finding Game** – Exploring whether adult digital game play with visuals and sound impacts Preschool 3’s and Kindergartners’ attention and performance on a picture finding task.

- **The Puzzle Game** - Testing whether using mindful breathing as a break increases persistence on a challenging puzzle in comparison to a “typical” wiggle break for preschool 4’s & Kindergartners.

- **The Story Game** – Investigating the effect of imagining an observer vs. a participant role on suggestions for peer conflict resolution strategies given by 4 and 5-year olds.

- **The Animal Game** – Exploring whether Preschool 3’s and Kindergartners learn factual information about animals better when animal characters are represented realistically instead of in anthropomorphic ways.

Families whose children participate will receive fuller parent descriptions via the child’s backpack. Everyone can read the study descriptions on the Research Bulletin Board to the left of the Children’s School office. What an interesting set of developmental psychology topics!
Research Spotlight

The iPad Game

Literacy skills are closely linked to a child’s earliest experiences with books and stories and, with the increasing use of electronic books accessible through computers, apps, and tablets, researchers investigating whether the addition of interactive features in an e-book can support children’s understanding of the story. In collaboration with Dr. Erik Thiessen, Psychology 1st year graduate student Cassie Eng is studying the impact of animations triggered by children’s story relevant vocalizations during digital story reading.

In The iPad Game, a researcher reads each child two stories on an iPad, Cat’s Pajamas (Hurd, 2000) and Zoom City (Hurd, 1998). One iPad story is static like traditional electronic books (e-books), and the other iPad story is interactive, i.e., the pictures animate whenever the child vocalizes a word that is in the story. The researchers hypothesize that children will be better able to answer comprehension questions for the animated story than the traditional one. Their results have the potential to inform the design of digital books designed for novice readers.

The Matching Game

As a follow up study to The iPad Game, the same research team is testing children’s development of sight word vocabulary in The Matching Game. The researcher shows each child four pictures, like the ones to the right, and asks the child to point to the picture that best matches a spoken word. This assessment is the Peabody Picture Vocabulary Test and will enable the researchers to correlate the children’s performance on The iPad Game with their vocabulary level to determine whether the animations are especially useful for children with particular levels of vocabulary skill. So far, Cassie is not finding enough variance in the Children’s School data to test her hypothesis, however, because most of the children are scoring in the 99th percentile for vocabulary knowledge, which is well above their age level! With a group that has a broader vocabulary range, the researchers theorize that having animations in the interactive iPad book that are congruent with the text (e.g., if a child says “cars” only the cars animate; if a child says “moon” only the moon in the sky animates) will foster children’s ability to connect words to relevant representations.
1000PLUS Volunteer Day

On Saturday, April 8th, nineteen CMU student volunteers worked with Miss Hancock to prepare the playground and hillside garden for the spring. The students pulled weeds, removed leaf debris on the hillside, pruned our perennials, and turned over the soil in the garden beds to prepare for our spring planting days in May. Norah Gruber (Kindergarten) and her family also stopped by and helped with some spring cleaning on the playground. Thank you so much to these hardworking volunteers!!

Research Spotlight

Facilitating Memory in Preschool Children

Junior Lauren Yan, one of the Children’s School student employees, has been awarded a Dietrich College Honors Research Fellowship to conduct research at the Children’s School, beginning in the summer and continuing next spring after she returns from her study abroad program in South Korea. Lauren will work at the Children’s School during June and July to conduct a literature review on young children’s memory, observe children playing a variety of memory games during camp, and refine her hypotheses and procedures for testing whether varied types of teacher prompting can successfully facilitate children’s memory in the context of games played with the prompting and children’s use of memory strategies across subsequent games even without continued prompting. Lauren will also submit her final research proposal to CMU’s Institutional Review Board for approval so that she can conduct her study during her senior year at the Children’s School. Lauren is hoping to recruit students from a preschool in South Korea to participate in the study as well so that she can include a cross cultural comparison.

In the context of a technology course, Lauren already developed a computer version of the traditional “memory” game in which players flip two cards to see if they match and, if not, return the cards back to their original positions while trying to remember the card locations for use on subsequent turns. In the case of the screenshot to the left, players click on two fish to reveal hidden images that may or may not match. Players accumulate miniature fish in their scoring column for each match achieved.

Lauren will share the results of her research at CMU’s “Meeting of the Minds” in May of 2018. This Undergraduate Research Symposium is an annual university-wide celebration of undergraduate research, with oral presentations, poster sessions, art displays, and live performances. The event includes optional competitions, some of which even have cash prizes. This year’s event, which is free and open to the public, will be held on Wednesday, May 10th.