Music & Movement Classes

Welcome back, Lauren Hraber! Last spring, Mrs. Hraber conducted monthly Music and Movement classes with all of the children at the Children’s School. The program was such a success that we have increased her sessions to twice a month. Our first classes were held on September 24th and will continue approximately every other week for the remainder 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 Wrong Name Game to explore development of inhibitory control in 3 and 4 year old children. Inhibitory control allows one to suppress actions that are not appropriate (e.g., speaking out of turn in class or grabbing a toy someone else is using). This project uses the Day/Night task in which children are instructed to say “day” when shown a picture of the moon, and “night” for a sun. Undergraduates will add more task versions to better understand the conditions under which children can and cannot inhibit inappropriate responses. 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 Shapes and Colors Game

Sandrine Girard, a graduate student working with Dr. Erik Thiessen, is studying the process of statistical learning in children of various ages using an engaging, age appropriate paradigm. Statistical learning involves sensitivity to the statistical structure of the input. Unlike the spaces demarcating word boundaries in writing, words in fluent speech are not consistently marked by pauses. This makes segmentation difficult, especially for individuals (such as infants) who are unfamiliar with the words in the speech stream. However, infants and adults can use a statistical feature of the input to segment words: sounds within words (such as the syllables that go together to make a word) are more likely to co-occur than sound sequences that spuriously occur across word boundaries. By detecting which sounds are more likely to co-occur, learners can identify words.

In this project, the researcher will ask children to watch a sequence of objects appear on the screen, one at a time and press the space bar every time that they see a grey circle. At the end of the video, children are asked to decide which group of objects should go together. To accomplish this task, children have to learn the particular grouping of objects in the video stream. If children learn the groupings, they are able to anticipate the presentation of the grey circle (and so press the spacebar faster) and they are also able to identify the correct grouping of objects during the testing portion.

Children’s performance in the Shapes and Colors Game will help researchers to compare the rate of learning (how fast they press the spacebar when the grey circle appears on the screen) and the outcome of learning (how accurate they are at identifying the correct grouping of objects). Their performance in this task will also be compared to their performance on the project called “Moving Eyes” designed to assess selective sustained attention. If parents completed the optional questionnaire on their child’s language use and history, researchers can also link the child’s language profile to his or her performance on the statistical learning task and the selective sustained attention task. Linking all three sets of data will allow researchers to investigate the link between statistical learning, selective sustained attention, and language background.

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. Additionally, if there are technical issues with the eye-tracking hardware, a session may be begun on one day and finished on a later day. 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 basic cognitive ability required for successful performance in many everyday tasks.
Research Spotlight, continued …

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. 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.

The Look Alike Game

Learning to identify category membership is theorized to involve detecting the features shared by items in the same category, such as pointy ears and long tail for the category of cats, and ignore features that vary within a category, such as color. The purpose of this study by Dr. Anna Fisher and Layla Unger is to investigate the effect of category knowledge on perceived similarity. In the Look Alike game, children are asked to choose which of the two animals in the bottom row looks like the animal on the top by pressing one of two buttons on a response box. On every trial, the animal on the top looks similar to one of the animals on the bottom and dissimilar from the other animal on the bottom. On some rounds (No Conflict Trials, left example above), the similar animal also belongs to the same category; whereas, on other rounds (Conflict Trials, right example above), the correspondence between similarity and category membership was reversed. Each of these sets of animals was presented both with all animal pictures upright and with all pictures upside down. The researchers predict that category knowledge will influence children’s responses on this task such that they take longer to identify the animal that looks like the one on the top when it belongs to a different versus the same category, but ONLY for rounds in which all animals are presented upright. We predict that presenting animals upside down will interfere with access to category knowledge, so that it will not impact similarity judgments.

The Odd One Out Game

In a similar study, children are shown an array of 16 pictures of animals arranged in a 4x4 grid with a dividing line down the middle on a computer screen. 15 of the pictures are identical Distractors, and one was a different, Oddball picture. The images were designed so that the Distractors and Oddball either looked very similar, or very different. The category membership of the animals was also manipulated so that the Distractors and Oddball belonged to either the same or different categories. Arrays were presented with animal pictures either upright or upside down. Researchers predict that children will identify the Oddball more quickly overall when it is dissimilar from the Distractors and when it belongs to a different category, but only when the images are upright.
Research Spotlight, continued …

The Reading Game

Professors Anna Fisher and Ken Koedinger are beginning a new line of research on the development of reading. Undergraduate June Walitzer is conducting an initial investigation of how reading comprehension relates to different patterns of eye gaze in beginning and fluent readers. In the reading game, each child is asked to read a short story book displayed on the screen of a laptop computer. If the child is a beginning reader, the researcher helps the child read the story to ensure a positive experience in the study. After reading the book, the child answers several comprehension questions. While the child is reading, the researcher monitors the eye gaze patterns using a portable eye tracker, depicted below. The research team is interested to determine how eye gaze patterns of children who are beginning and fluent readers differ from each other. Specifically, they aim to learn whether beginning readers are more likely than mature readers to shift their gaze between text and illustrations, and whether these frequent gaze shifts are negatively related to children’s comprehension and memory of the stories they read. If we observe this pattern of results, it would suggest that the layout of the books designed for beginning readers can be improved by reducing the competition between text and pictures, in order to enhance children’s reading experience and reading comprehension.

New Research Paradigm

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 2015-16 school year does not cover its use. Thus, all fNIRS studies require 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 while children do a task requiring inductive inference. One theory about how children do the task involves using category inclusion rules that would be processed in the Prefrontal Cortex (PFC), rather than simple perceptual cues that would be processed elsewhere. To test this hypothesis, researchers compare the fNIRS readings for versions of the task that require more rule use to see if the prefrontal cortex is more active for those that can be solved perceptually. The permission slip describes the study in much more detail. Please contact Dr. Carver if you have any questions about fNIRS or would like another copy of the permission form.