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.

Observations for Psychology Assignments: Students from Dr. David Rakison’s Child Development class have already begun their periodic observations this 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 Yevdokiya Yermolayeva’s Developmental Research Methods class will start with a lab entitled the Find the Houses Game to explore the evolutionary basis for adults’ tendency to have superior memory for information relevant to survival. Specifically, they will test whether 4 year olds’ incidental memory will be better for natural objects that are food or water vs. flowers or other non-edible items, as well as whether the effect is stronger for objects shown in context vs. in isolation. Students in Bryan Matlen’s Developmental Research Methods class will start with a lab entitled The Day / Night Game to explore 3 and 5 year olds’ developing “executive function” but asking them to give a response that is counter to their perception and knowledge (e.g., saying “night” when shown a picture of the sun) or just counter to their perception (e.g., saying “night” when shown a checkerboard). Students from both classes will then work in groups to conduct a study of their own design, which will be approved both by their teacher and by Dr. Carver.

Feel free to contact Dr. Carver to discuss any questions you have about research.

Research Spotlight

The Similarity Game

Dr. Anna Fisher’s research team is investigating how young children learn synonyms. They are particularly interested in examining how factors such as co-occurrence in child directed speech (e.g. bunny-rabbit) influence how children learn synonyms. In addition, they are exploring whether children are able to use their knowledge of synonyms in order to solve reasoning problems. In this study, the researchers will present children with reasoning tasks in which children must rely on their knowledge of synonyms in order to solve the problem. In the Similarity Game, children are shown identical pictures of doors or trees similar to the ones presented below. The children are told about objects that are hidden behind the doors/trees. For example, researchers might tell children that there is a turtle, a basketball, and a crab behind each door. The children learn that one of the objects has a particular property, and then the children must decide whether this property can be generalized to the other two objects.
Research Spotlight continued …

The Listening Game

Research Assistant Amy Barrett, who works with Dr. Anna Fisher, is investigating how young children learn synonyms. The researchers are particularly interested in examining how factors such as co-occurrence in child directed speech (e.g., bunny-rabbit) influence how children learn synonyms. In addition, they are exploring whether children are able to use their knowledge of synonyms in order to solve reasoning problems. In this study, children listen to audio recordings of word pairs (co-occurring synonyms, like rock-stone, or non co-occurring synonyms, like rock-cup) while engaging in a task such as coloring a picture or building a puzzle. In another session, children will complete a variety of reasoning tasks, such as the Help Zibbo Game or the Similarity Game, requiring them to rely on their knowledge of synonyms in order to solve the problem. The researchers are interested in the degree to which children utilize their knowledge of synonyms in various reasoning tasks. Parents will receive separate descriptions for each of the reasoning tasks used.

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. Anna Fisher 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.

Your Baby Could Be A Scientist!

The Carnegie Mellon University Infant Cognition Lab and Language & Learning Lab are looking for infants between 3 and 26 months to participate in our safe, quick, and fun studies. What we do: We are interested in how babies learn about the world around them. Our studies last no more than 45 minutes, and take place in the infant labs located next to the Children’s School. We will have your child watch a computer display and play with some small toys while we observe his/her behavior. To learn more or schedule participation, please contact us! (412) 268-6122, cmu.icl@gmail.com
Research Spotlight continued …

The Apple Game

Researchers from the ENGAGE project are designing an educational computer game to teach basic physics concepts to 5- to 9-year-old children (grades K through 4). The game is designed to help children understand the distribution of weight and distance for balancing structures. Socio-emotional learning goals are being incorporated into the game as well as scientific inquiry. In order to better understand the socio-emotional aspects of learning, Mitra Fathollahpour is conducting a study in which participants complete a one-time short, multiple-choice illustrated questionnaire on computers. The researchers are particularly interested in whether the responses children suggest for challenging situations reflect Positive Interdependence, Collaboration, and Discussion. A voice-over feature (recorded by Mrs. Flynn, who taught at the Children’s School for the past three years) is available for children who are not yet reading. The sample problem below is designed to see whether children will suggest asking for help rather than quitting or trying to manage less effectively alone.

The Help Zibbo Game

In this reasoning study being conducted by Dr. Anna Fisher’s research group, children will assist Zibbo as he organizes and counts objects. In this task, children will be told where Zibbo will put a particular object. Then children will be asked to predict where they think Zibbo will put other objects. For example, children may be told that “Zibbo will put his cup here. Where do you think Zibbo will put this cup/basketball?” Subsequently, children will be shown pictures of various objects and asked to help Zibbo make “more-or-less” judgments about the pictures. For example, children may be shown 7 pictures of flowers (5 red roses and 2 white daisies). Then children may be asked to help Zibbo find out if they have more roses or if they have more flowers.
Undergraduate Research

Yevdokiya (Dussy) Yermolyeva’s and Bryan Matlen’s Developmental Research Methods students are preparing their final projects for the semester. Though the research procedures are still being finalized, the topics are 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 outside the Children’s School Office. Notice the interesting range of important topics in early childhood development!

Children’s memory for 2-dimensional vs. 3-dimensional representations of home and school rooms (The Room Arranging Game, K only)

The impact of supportive vs. unsupportive visual cues on story memory (The “Going to Grandma’s” Game, 3’s and 4’s)

The effects color scheme and music tempo on the speed of simple shape identification and motor tasks (The Stars and Beads Game, K only)

Children’s short-term memory for color sequences presented and recalled verbally vs. visually (The Color Game, 4’s only)

Children’s ability to recreate toy actions they see a videotaped adult perform, after a preliminary play session with the identical toy or a similar toy (The Copy Cat Game, 3’s and K)

The role of demonstration vs. physical participation in children’s ability to remember color sorting patterns immediately vs. after a few minute delay (The Sort the Beads Game, Afternoon Children)

The effects of neutral acknowledgement vs. effort reinforcement on sorting accuracy (The Sorting Game, 3’s and K)

The speed and accuracy of gender identification for faces of children, adults, and elderly adults (The Faces Game, 4’s and K)

Children’s accuracy of tracing familiar upper & lower case letters compared to unfamiliar figures with the same component lines (The Tracing Game, 4’s and K)

The impact of verbal fluency and visual vs. auditory cues on children’s emotion labeling (The Emotions Game, 3’s and K)

Scholarship Fundraising Efforts

As you know, the Children’s School participates in the Educational Improvement Tax Credit (EITC) program. Through the EITC, eligible Pennsylvania businesses can earn tax credits while providing financial assistance for children to attend the Children’s School. Thus far in 2012-13, we have received $33,000 from Duquesne Light and subsidiaries of ThermoFisher Scientific. If you would like more info or can help us to build a list of prospective businesses, please contact the Main Office.

Benefit Dinner at Eleven: Our Benefit Dinner at Eleven was well attended by current Children’s School families, as well as a few alumni. The event added $3,288 for our Scholarship Fund!

Pittsburgh’s Day Of Giving: For the first time, The Children’s School participated in the Pittsburgh Gives Day of Giving. Children’s School families and alumni donated just over $4,000 and we are waiting to learn what our match from The Pittsburgh Foundation will be.
Research Spotlight

Another Listening Game

In this study, Dr. Erik Thiessen and graduate student Lucy Erickson are investigating how young children discover words in fluent speech, which lacks reliable pauses between words. One cue that may help children segment speech is its statistical structure. For instance, syllables within words tend to have a higher probability of co-occurrence than syllables that span word boundaries (e.g., the syllables in ‘pre-tty’ and ‘ba-by’ occur together more frequently than the syllables between those two words, ‘ty-ba’). Prior research with artificial languages stripped of all other cues to word-identity has demonstrated that both infants and adults are sensitive to this cue. Furthermore, this learning often happens after brief, passive exposure periods and without any conscious awareness of learning on the part of the participants. However, in studies where participants are asked to do a secondary task while listening to the speech, performance is disrupted. This finding suggests that attention is necessary for learning, but the specific role attention plays in the process is not yet known. In this research, researchers are exploring how performance on a task of sustained attention (The Moving Eyes Game, see October 2012 newsletter) is related to performance on this word segmentation task. In this Listening Game, children listen to an audio recording of a speech stream while drawing a picture and are told that we are interested in how listening to different sounds while coloring can affect creativity. After the exposure phase, they are presented with pairs of words and asked which one sounds more like the sounds they heard before. All of the words they hear are syllable combinations that were present in the stream, but within each pair one of the words is characterized by higher statistical coherence than the other (i.e., the syllables predicted each other 100% of the time compared to 33% of the time).

The Picture Finding Game

Early childhood is a time when children discover many new words. Word recognition tasks are often used to determine the average age of acquisition for these words. These data can then be applied to the study of other cognitive topics, including generalization or inductive inference, when using words and pictures. The purpose of the current study by Layla Unger, a new graduate student working with Dr. Anna Fisher, is to test whether four-year-old children can recognize and accurately identify a new set of stimuli that include pictures of birds, bats and butterflies on the basis of their category labels in order to determine whether they can be used in subsequent studies.

Specifically, in the Picture Finding Game, children are shown slides that display pictures of birds, bats and butterflies. Then, children are asked to find the picture representing one of the animals on each slide. For example, we might ask children to find the picture of a bird. The data collected in this study will be used as the basis for selecting a subset of pictures that four-year-old children can reliably identify. These pictures will be used in subsequent studies to investigate the ways in which children use category membership and perceptual attributes to make novel inferences about unobservable properties of objects.
Research Spotlight, continued

The Concentration Game

The world around us is complex and maintaining focused attention can sometimes be challenging - even for adults. The goal of graduate students Karrie Godwin and Derek Lomas’ research project is to investigate the developmental course of deliberate selective attention. They are particularly interested in examining whether attentional selectivity can be improved through training with an instructional computer game. In the present study, they are examining how the design elements of a computer game affect children’s engagement and motivation to continue playing.

In the Concentration Game, children play two short computer games that differ in their design elements - the Moving Objects Game and the Hide-n-Seek Game. In the Moving Objects Game (Below Left), children see several objects moving on a computer screen landing on one of the nine screen locations, each location is associated with a different cartoon character. 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 which cartoon character was last visited by the object they had been watching.

In the Hide-n-Seek Game, children watch as friendly characters run around a room and hide behind everyday objects. Children’s task is to ignore the distracter characters in order to identify the hiding location of a target character. For example, the target character may run around a playroom (similar to the room shown below on the right) and then hide behind a rocking horse. The child’s task is to click on the object that the target character is hiding behind (i.e., the rocking horse).

After children play each game for 5 minutes, they will be presented with a choice of playing either The Moving Objects Game or The Hide-n-Seek Game for another five minutes. The game children select and the duration of play will be recorded as a behavioral measure of children’s motivation and engagement in the game.

Karrie and Derek are both students in Carnegie Mellon’s Program in Interdisciplinary Education Research (PIER), for which Dr. Carver is the Co-Director. Karrie is working on a PhD in Psychology under the direction of Dr. Anna Fisher, while Derek is completing a PhD in Human Computer Interaction with advisor Dr. Ken Koedinger. Drs. Fisher and Koedinger are parents of Sasha (K).
Research Spotlight

The Chinese Word Game

This experiment involves children playing an iPad learning game (uTalk) with Chinese words and pictures of simple colors and body parts, to test how easily children can learn new second language words in a game context. Professor Erik Thiessen and his research team hypothesize that although the task will be harder for children than adults, the children will show learning of new Chinese words. Also, they hypothesize that older children will learn more due to increases in memory and attentional capacity. Finally, they hypothesize that the greater simplicity of the color labels (compared to more complex pictures for body parts) will lead to better learning in this limited training context. There is little exploration of how effective training techniques designed for adult language learners are when they are used with children. However, the fact that children are more successful language learners in general means that providing useful and age-appropriate language learning experiences before puberty is an important goal. Therefore, we aim to modify existing training approaches for younger learners. Ideally, instructed practice like this game would be only one component of a richer, more interactive second language learning program.

Perceptual Similarity and Young Children's Understanding of Categories

In this series of studies, Dr. Anna Fisher (mother of Sasha, K), graduate student Karrie Godwin, and their research team are investigating the role of conceptual and perceptual information in category-based reasoning and induction in early childhood. In the Animal Name Game, children are given a category and asked to generate as many items as they can that belong to that particular category. For example, children may be given the category ‘Pets’ and asked to name as many pets as they can think of (e.g., dog, cat, fish, etc.). In order to better understand how children make category decisions when different sources of perceptual and conceptual information are in conflict, children will play one of three different games. In the Similarity Game, children are told that objects that look similar go together. For example, children might see a whole lemon, a lemon wedge, and a tennis ball. Children would then be asked to identify which objects go together based on physical similarity (e.g., shape, color, size). In the Matching Game, children are told that objects that are the same kind of thing go together (in this case, the whole lemon and the lemon wedge). In the Reasoning Game, children learn that one of the objects has a particular novel property, and then must decide whether this property can be generalized to the other two objects.

User Testing of Technology Innovations

The Children’s School is a partner in several design projects, so our children participate in user testing of prototypes. The ENGAGE team is designing computer games to teach physical science concepts, together with assessments to document children’s learning. Also, the Message from Me team is currently prototyping an iPad version of the family communication tool that we already have in our classrooms.
The Impact of Attention Allocation on Learning and Retention

In another series of studies, Dr. Anna Fisher, graduate student Karrie Godwin, and their research team are investigating how kindergartners allocate their attention in learning environments to determine how physical features of the environment (e.g., toys, posters, art work, etc.) can enhance or hinder children’s ability to attend to the content of a lesson and whether the children’s distribution of attention changes over time. They are also examining whether children’s ability to effectively distribute their attention has consequences for both learning and retaining new content. First, in the Science Game, children are asked questions about various science content (e.g., which of the bones shown is the strongest bone in your body?). This pre-test helps researchers determine what children already know about the lesson topic. Next, as an orientation, in the Read-Aloud Game, children listen to a short story and then answer questions about its content, again by marking the picture that shows the correct answer. Then, the children will participate in the Classroom Game daily over a 2-week period (for a total of 8 sessions). On each day, a researcher teaches the children a mini-lesson in a small group format. For 4 of the lessons, the physical environment includes items that are typically found in early childhood classrooms but that may be potential sources of distraction (e.g. posters, artwork, manipulatives, etc.). For the remaining 4 lessons, the physical environment only includes visual aids and materials directly relevant to the lesson. Each lesson lasts approximately 10 to 15 minutes. During each lesson, children listen to a short non-fiction story and then answer content questions to test their initial learning of the material. Finally, in the spring, the children’s long-term retention of the science content will be assessed via the Story Game.

The Animal Name Game

In this study, Dr. Anna Fisher’s research group is investigating the relationship between young children’s reasoning skills and other general cognitive processes such as memory, attention, processing speed, knowledge organization, and language ability. In the Animal Game, children are presented with a series of word pairs. Children are asked if the second word of the word pair is an animal. For example, children might hear the word pair “bunny – rabbit” and then decide if the second word (“rabbit”) is an animal or not. Children respond by pressing a yes or no button on the computer. Researchers anticipate that children’s performance on the Animal Game will improve with age and that it will correlate with their performance on the Help Zibbo Game and the Similarity Game (See October 2012 Newsletter).
Research Spotlight

The Faces Game

Ashna Shome, a high school student at The Ellis School, is interested in understanding whether children aged 3-10 show any evidence of same-race preferences. The intent is not to study or observe racism, but to observe children as they play two brief games, in order to understand whether children innately prefer faces of their own race. In the first task, the participating children will be shown two faces [as shown below]. The faces will vary in race, but be neutral in terms of gender, age, emotion, etc. After a few seconds, the faces will disappear and be replaced by a dot that corresponds to the position of one of the previously shown faces. Depending on which face the dot’s position corresponds, the child will be asked to press a specific key. The software used will measure reaction time. From this timing data, it is possible to determine where the child was looking because it will take longer to react when the dot appears in the location of the face where the child was not focusing. In the second game, a chatroom-style interface will appear. The faces shown will all be children’s faces, and varied in race. The researcher will ask the participating child to choose a talking partner from the children shown on the screen. This study will last for only 10-15 minutes per child and there will be no direct references to race at any point in the study.

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

The Quick Picture Game

Ashna Shome, a high school student at The Ellis School, is interested in understanding whether children aged 3-6 show any evidence of same-race preferences. The intent is not to study or analyze racism, but to observe children as they play a brief game, in order to understand whether children innately prefer faces of their own race. In the task, the children are shown a series of three images. These images flash very quickly [less than a second each] in succession. The first is a face, the second a Chinese character, and the third an abstract image. The researcher then asks whether the child likes or dislikes the final, abstract image. This process is repeated multiple times. Sample images are shown below. The image of a face varies in race during the multiple rounds of the game. The face is neutral in terms of gender, age, emotion, etc. The researchers expect that the children’s choice of liking or disliking the abstract image will be influenced by their reaction to the face and the Chinese character. Any differences in preference depend on the race of the face, since the character is a neutral stimulus. These data can be used to determine if children implicitly and unconsciously prefer faces of their own race. Because the reactions that are being measured are entirely implicit, the children are completely unaware that the focus of this project is race.

The Animal Names Game

Both sections of the Developmental Research Methods class are studying working memory capacity. Working memory refers to our ability to hold in mind information intended for immediate use, such as dialing a phone number someone just told you or remembering directions to a new place. Such information is likely to be forgotten relatively quickly, unless we make a special effort to retain it by rehearsal or some other strategy, and the amount of transient information one can hold in mind increases with development. For instance, a 2-year-old may not be able to remember a sequence of three random instructions (for example: touch your nose, clap 3 times, and shake your head), but a kindergartner should generally be able to do so.

In the Animal Names Game, students are investigating age-related increases in working memory capacity using the Word Span task. In this task, children are asked to repeat animal names. In the beginning, children are given an easy task of repeating a sequence of animal names consisting of just two words, for example FROG-SWAN. The number of words in the sequences is gradually increased, such that the longest possible sequence contained six words, for example SNAKE-FOX-CLAM-WOLF-BUG-HAWK. A coder recorded the maximum number of words a child repeated correctly. Each child plays this game twice. One time, children are asked to repeat sequences of animal names that are only one syllable long (like the examples above). The other time, children are asked to repeat sequences of animal names that consist of multisyllabic words (such as BUTTERFLY, ANTELOPE, or ELEPHANT). Based on the existing evidence that memory span for digits depends more on the amount of time required to say the number names than the number of digits, the class expects children of all ages to correctly repeat more animal names when they each have only one syllable than when they have multiple syllables. If this result is obtained, it will provide further evidence suggesting that our working memory capacity has temporal limits rather than item-based limits.
Children’s School

March 2013

Research Spotlight

The Zibbo the Zookeeper Game

Layla Unger, a graduate student working with Dr. Anna Fisher, is testing the validity of a task her research group has used previously for investigating children’s organization of animal concepts. In the Zibbo the Zookeeper Game, children assist Zibbo as he organizes animals in a zoo. The zoo is represented as a game board that is divided into squares. In this task, children are told where Zibbo will put a particular animal in the zoo. Then, children are asked to predict where they think Zibbo will put a second animal. In the previous version of this task, each animal was represented as a wooden block that the researcher described as a particular animal. In the current version, each animal is represented with its picture on a card. The researchers use the distances between each pair of animals to infer how the children’s mental concepts that correspond to these animals are organized. They aim to determine whether children understand the game instructions by replicating their previous findings on the wooden blocks task in this new picture version of the task.

The Breathing and Thinking Games

Graduate student Emma Satlof-Bedrick, a student of Dr. Carl Johnson in the Psychology Department at the University of Pittsburgh, is conducting a study to assess children's developing knowledge about and awareness of physical and mental processes, such as breathing and thinking. The study will be conducted at several local schools with children between the ages of 4 and 8 to determine when exactly children develop general knowledge about how breathing and thinking work and when children become able to monitor these two processes. Because Emma is a Pitt not a CMU researcher, this study requires additional parental consent, so watch for a consent form to come via the children’s backpacks sometime in March. Children whose parents submit the signed consent form will participate in two short games within one 15-minute session. The Breathing Game will consist of children sitting for 30 seconds and indicating whether they are breathing. The Thinking Game will consist of children sitting for 30 seconds and indicating whether they are thinking. Children will also be asked approximately 10 questions to assess general knowledge about breathing and thinking. The researchers are interested in differences between children of different age groups, not in differences between individual children. These data will help the researchers determine the developmental timeline for awareness of and knowledge about breathing and thinking.
Research Spotlight

The Mapping Game

One of the groups in Dr. Anna Fisher’s Research Methods class is revisiting Piaget’s and Inhelder’s famous Three Mountain Experiment, investigating perspective taking in young children and how it develops with age. In the Mapping Game, researchers present the child with two different model cities, one containing 2 buildings and the other containing 6. A stuffed animal is moved around the city, stopping at each of the three sides of the model, not including the side the child is facing. The child is given 4 pictures (one from each side of the model) and asked to tell the researchers which one is the one that the stuffed animal would see. One trial from each side of the table is done for the first model city. Then, the second model city is introduced, and the task is repeated. Similar to Piaget’s initial study, the only objects in the model are the buildings, so children are assessed based on their ability to take a new perspective on the angle, order, and positioning (left-to-right) of the various buildings at a new viewpoint. This is important because, unlike Piaget, the researchers predict that children can successfully complete the task with fewer objects, showing that they do have some ability to take others’ perspectives and are not completely egocentric.

Sample pictures from opposite viewpoints:

The Puzzle Game

Another group is studying the effect of working with others to complete a task versus working alone. As children develop, they become more able to engage in pro-social behavior and work together with peers towards a common goal. During the study, researchers compare children’s performances on two different puzzle tasks (pictured below) to see if their performance time is faster when they work with a partner than when they work alone. One puzzle task is more physical, where there isn’t as much need to communicate and cooperate. The other puzzle involves more strategy, and communication is needed for the pair of children to effectively complete the task.

In the study, some children work on the puzzles individually; these children complete both the physical puzzle as well as the strategic puzzle without any help from a peer. Other children work in pairs to complete the puzzles; these children complete both the physical puzzle and the strategy puzzle collaboratively with a peer. Based on the existing evidence that children’s friendships, compared to non-friend relationships, help to support more effective task performance and more pro-social activity, the researchers predict that children who work in pairs will have a higher performance rating than children who work individually. If this result is obtained, it will provide further evidence suggesting that working collaboratively with peers supports more effective task performance.
Research Spotlight, continued …

The Moving to Music Game

This group of undergraduates is studying motor skill development as it relates to background music and speed/accuracy. Students are investigating the possibility that playing faster music while children perform a motor skills based task would increase the speed and efficiency at which they are able to perform the task.

Each child plays this game twice on the same day. Once, children are asked to move cotton balls from one container to the other with tweezers while listening to fast music. The other time, children move the cotton bals while listening to slow music. The piece of music utilized is a 1-minute recording of Mozart’s Concerto No. 20 in D minor K.466, for Piano and Orchestra, Romanze. The fast version was sped up half-tempo, and the slow version was slowed down half-tempo. We expect that children will be able to successfully move more objects between containers within the allotted time period when the faster piece of music is played in the background, rather than the slower piece of music.

The Pointing Game

Another group is studying story memory to determine if hand gestures, specifically finger pointing, will help improve children’s memory. The task involves reading a story called Biscuit Goes to the Fair, by Alyssa Satin Capucilli, and investigating whether there is a difference in information retention if the child pointed to specific images, such as characters or objects in the story, versus if the researcher pointed to the images while reading. After the story is read, the child answers 10 short object-oriented questions about the book, 5 questions based on images that the child pointed to, and 5 questions based on images that the experimenter pointed to. For each question, the tester presents the child with 3 possible image choices. The coder then records the number of questions that are answered correctly. During one half of the story, the child listens and watches the tester point to objects in the story. During the other half, the child plays a more active role in the storytelling process by pointing to objects in the story themselves. Based on existing evidence that a child’s memory capacity will increase when active in the learning process, researchers expect children to answer more questions correctly when they are able to point to the objects themselves during the reading. If this result is obtained, it will provide further evidence that children retain more information when playing an active role in their learning experience.

NOTE: Three other groups are still finalizing their studies, but families will receive study descriptions via the children’s backpacks on the day they participate as usual.
Research Spotlight

**The Discovery Game**
Dr. Audrey Kittredge, a post-doctoral researcher in the Psychology Department and member of the Program in Interdisciplinary Education Research, is working with Dr. David Klahr to **compare the effect of different teaching styles on children’s goal-directed exploration.** Children in the 3 year-old, 4 year-old and 5 year-old classrooms will participate in the Discovery Game at least once, and may come back for a few more sessions to investigate long-term effects of teaching styles. During the Discovery Game, the child is asked to play two games. In the first game, they are asked to find animals in a forest. In the second game, the child is asked to make 3 different roofs out of Lego blocks for 3 toy animals that are stuck in the rain. Each child will get a specific kind of instruction: (1) instruction that simply describes the goal of the game, (2) instruction that additionally demonstrates one way to play the game (one way to find animals or one way to make a roof), or (3) instruction that demonstrates one way to play the game while reminding the child that there could be many other ways. Depending on how much the child explores the forest or the possible structures s/he can build, s/he might discover just one way to play the game or multiple ways to play the game. Will the instructions that children hear impact how much they explore? Will the influence of instruction be long lasting, affecting how children explore novel environments and problems in the future? The results of this research may reveal the ability of different instructional techniques to encourage independent exploration in early childhood. This information, in turn, would allow educators to choose curricula and instructional techniques in a more informed manner.

**The Remember That Game**
In collaboration with Dr. Anna Fisher, graduate student Karrie Godwin is conducting a set of three studies for her dissertation to investigate the relationship between learning and other general cognitive processes such as attention, memory, processing speed, executive function, and general reasoning ability. In the Remember That game, she is examining how children allocate their attention in learning environments. In particular, she is interested in examining whether children’s ability to effectively distribute their attention has consequences for learning new science content.

In the **Remember That** computer game, children are presented with a series of pictures of animals or plants. Children are told the name for each picture. At the end of the game, a memory assessment is administered to see which items the children learned. For example, after learning the names of different types of butterflies and moths, children may be asked to identify the swallow tail butterfly (e.g., “Point to the swallow tail”).
Research Spotlight continued …

The Hearts and Flowers Game
As part of Karrie Godwin’s dissertation research on the relationship between learning and other general cognitive processes, she is measuring children’s cognitive control and their ability to inhibit a behavioral response.

In the *Hearts and Flowers* computer game, children are presented with a series of hearts and flowers. Children are instructed to respond to each object as follows: When children see a heart on the computer screen, they are told to press the response button on the same side that the heart was presented (e.g., if the heart appears on the left hand side of the screen, the correct response would entail pressing the left response button). However, when children see a flower, they are instructed to press the opposite response button (e.g., if the flower appears on the left hand side of the screen, the correct response would entail pressing the right response button).

![Example picture sequence from the Button Game. Children might be asked to press a button each time they see the picture of a ball.](image)

The Button Game
Another part of Karrie Godwin’s study involves measuring children’s sustained attention and inhibitory control.

In the *Button* computer game, children are presented with a series of pictures. Children are asked to press a button in response to specific pictures and not to press the button when they see other pictures. For example, children may be asked to press the space bar whenever the picture of a *ball* appears but not when they see other objects.