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](http://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 will be doing periodic observations this fall. For each assignment, they observe specific differences between preschoolers and kindergartners in motor skills, social interactions, etc.

**Research Methods Class Studies:** Students in Yevdokiya Yermolayeva’s Research Methods course will start with a lab to explore whether using color cues to highlight the one-to-one correspondence between two rows of objects will help children understand that the number of items does not change when they are spread further apart or pushed closer together. Then they will 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 Classroom Game**

Karrie Godwin, a graduate student working with Dr. Anna Fisher, is replicating a longitudinal study of children’s **selective attention** that she pilot tested last year. The purpose of her study is to investigate how children allocate their attention in learning environments. She is particularly interested in examining how physical features of the environment (e.g., toys, posters, art work, etc.) can contribute to or hinder kindergartners’ ability to attend to the content of a lesson, and she is examining whether children’s ability to effectively distribute their attention has consequences for learning new content. The researchers are teaching children 15 mini-lessons in a small group format. For 10 of the lessons, the physical environment includes items that are typically found in early childhood classrooms that may be potential sources of distraction (e.g., posters, artwork, manipulatives, etc.). For the remaining 5 lessons, the physical environment only includes visual aids and materials directly relevant to the lesson. Each lesson lasts approximately 15 minutes. During each lesson, children listen to a short story and answer questions about the content of the story. For example, they might listen to a story about plants and then be asked to circle the picture, from among four choices like those to the right, that they saw in the book.
Research Spotlight continued …

Testing Reasoning Skills

Graduate student, Karrie Godwin is working with Dr. Anna Fisher and several other research assistants to investigate young children’s reasoning skills. In particular, they are interested in investigating the relationship between young children’s reasoning skills and other general cognitive processes such as memory, attention, processing speed, and language ability. Because the study involves diverse measures, our 3 and 4-year-old children will participate in multiple research sessions with Karrie over the course of a month’s time, and then again in the spring. As usual, parents will receive descriptions of each session on the day the child participates.

• The Thinking Game

In the Thinking Game, children are presented with a variety of reasoning tasks from the Weschler Preschool and Primary Scale of Intelligence (WPPSI). They are presented with various objects and asked to answer questions about the objects or physically manipulate the objects (e.g., rearrange, build, or sort the objects). Children are also asked to label various pictures, complete a puzzle, and build a block tower.

• The Memory Game

In the Memory Game, children will listen to a list of words. Subsequently, children will be asked to remember the words from the list. In the first part of the game, children will be read a series of familiar nouns and asked to repeat them in the same order they were presented. For example, children may be presented with the words "duck, house, chair" and then asked to recite the words in order. In the second part of the game, children will be asked to repeat the items but in the reverse order in which they were presented. For instance, if children are given the words, "duck, house, chair", the correct response would be "chair, house, duck".

• The Help Zibbo Game

In this game, 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.

• 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. Continued …
Research Spotlight continued …

• The Similarity Game continued …

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. The goal is to determine the degree to which children utilize their knowledge of synonyms in various reasoning tasks. 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, we 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.

Did you hear bee or pea?

Dr. Dan Hufnagle and Dr. Lori Holt are investigating how children learn sound categories. In Session 1 of this game, children hear a friendly space alien who is learning how to say words correctly. The children help the alien learn how to say bee and pea. Then, they hear those words many times and tell the experimenter which word they hear. Sometimes the sound is ambiguous (acoustically between “bee” and “pea”). In cases like this, adults rely on pitch as a clue. The experimenters are testing whether kindergartners similarly use pitch to disambiguate sound categories like “b” and “p” as a means of understanding how native language speech sound categories develop across time. The data from this session will establish a baseline for how strongly pitch affects the child’s responses. Adults judge a sound to be more “bee”-like when it has a lower pitch, all else being equal. A follow-up session then tests how sensitive children are to changes in pitch, such as those that might be encountered in listening to a person with a nonnative accent.

During Session 2 of this game, children hear bee and pea many times and tell the experimenter which word they hear. As in Session 1, sometimes the sound is acoustically ambiguous between “bee” and “pea”. The goal of Session 2 testing is to understand how kindergartners learn the cues that make up sound categories (like “b” and “p”) and how those categories develop across time. Session 2 emphasizes and de-emphasizes pitch to test how quickly children learn new patterns of how the secondary pitch cue relates to the sound categories. Adults learn to adjust perception very quickly when pitch varies, but psychologists do not yet know whether this quick learning is present early in language development. In an earlier experiment with different sounds (deer and tear), the same researchers found that pitch strongly influenced how children perceive ambiguous dear/tear sounds, but children did not learn to adjust the mapping of pitch to sound category when it varied in the experiment. In this follow-up study, the experimenters emphasize pitch more and use sounds for which adults are more sensitive to changes in pitch (“b” and “p”). Understanding whether children are able to flexibly remap how sound cues relate to speech categories will help psychologists understand the nature of auditory perception and language development.
Alumni Staff Member: Allison Drash

Oh, the good ole days! The 1970s was a decade defined by civil unrest, the rise of feminism, the gas crisis, and thankfully, disco. As the spring of 1975 approached, the Vietnam War was finally coming to a resolution, and I was ending my year in the 3’s program at The Children’s School. Then, as now, the school was a loving, safe haven, where we were encouraged to explore the world around us. Each day held new adventures, whether it was learning to make homemade candles, jelly during cooking time, or letting our imaginations, and tricycles, run wild on the playground. Nothing was better than zooming around the bike circuit on those trikes…using the rubber toe cup of our ZIPS tennis shoes as brakes. By the time 1978 rolled around, I had developed a keen sense of independence and a love of music. Much like Mrs. Bird’s and Mrs. Flynn’s circle times, the circle times of the ‘70’s were filled with guitar and flute music played by my teachers.

Working at the Children’s School is a truly wonderful experience, and I feel lucky to still be part of this incredible family. Where else can you walk the halls and be transported back to your earliest happy memories?

Research Spotlight

The Moving Eyes Game

The world around us is complex so maintaining focused attention can sometimes be challenging, even for adults. The goal of Dr. Anna Fisher’s project 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 task, researchers asked children to play a game in which they see several objects moving on a computer screen and then landing on one of the nine screen locations, each associated with a different character. Children were asked to watch a particular object while ignoring the rest of the objects. When the objects stopped moving and disappeared from the screen, children were asked which cartoon character was last visited by the object they had been watching.

Children’s performance in the Moving Objects Game will help the experimenters to map the developmental course of deliberate selective attention and improve the understanding of this basic cognitive ability, which is required for successful performance in many everyday tasks.
Research Spotlight continued …

The 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 suggests that attention is necessary for learning, but the specific role attention plays in the process is not yet known.

In this research, we are interested in exploring how performance on a task of sustained attention (The Moving Eyes Game) is related to performance on this word segmentation task. In the 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 Relationship of Parenting Styles to Inhibitory Control

Dr. Anna Fisher and senior Brandee Feola are exploring the influences of parenting styles and discipline strategies on the development of children’s inhibitory control. Inhibitory Control is the ability to suppress inappropriate responses or behaviors. This ability is related to a number of important aspects of cognition, such as general intelligence, attention, and problem solving. There is evidence linking the development of inhibitory control to parenting styles, however little is known about possible influence of different discipline strategies on inhibitory control.

With this newsletter, parents are receiving a request from these researchers to complete a questionnaire about parenting styles and discipline strategies. Over the next few months, these researchers will also be assessing children’s inhibitory control and some other important cognitive functions. Specifically, the “Help the Mouse Game” will be used to measure inhibitory control and sustained attention. The “Day and Night Game” will be used to measure inhibitory control and working memory. The “Picture Memory Game” will be used to measure working memory, and the “Card-Sorting Game” will be used to measure inhibitory control and task switching. The knowledge gained from this study will further our understanding of how to foster the development of inhibitory control.

• The Help the Mouse Game

In this game, the child is told that the mouse wants to get the cheese and escape the cat. The child is asked to help the mouse with his goal of finding the cheese while avoiding the cat. The child is presented with pictures of a cat and cheese on a computer screen. To help the mouse, the child is asked to not press the button when a picture of a piece of cheese is shown, but to press the button as soon as there is a picture of a cat.
Research Spotlight continued …

• The Day and Night Game
In this game, the child is presented a card picturing the sun and a card picturing the moon and stars. Children are instructed to say “night” when they see the sun card and to say “day” when they see the card with the moon. This task is a part of the battery of tasks we will use this year to investigate the development of inhibitory control – the ability to suppress inappropriate responses.

• The Picture Memory Game
In this game, the children are presented several picture cards and asked to remember the order in which the cards are placed on the table by the researcher. When the researcher is finished placing cards on the table, children are handed the cards and asked to put the cards in the same order as before. For example, children may be presented with several pictures in the following order: a duck, a house, and a chair. Then the cards are mixed and children are asked to reproduce this order. This task assesses a basic cognitive function called working memory.

• The Card-Sorting Game
This task is designed to measure cognitive control via a computer-based card-sorting task. Children are shown cards on a computer and asked to sort them either by shape or color first. They are then asked to switch rules to sort by the opposite dimension. The example to the right shows the shape dimension of the card-sorting game. The child would be asked to sort the middle card into the either the fish or star pile. After the rules change, the child would play the color game and sort the blue objects into the blue or red pile.

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

The Falling Game

Catherine Chase, a postdoctoral scholar working with Dr. Vincent Aleven, is exploring **young children’s knowledge of stability**. Do they have an intuitive understanding of what attributes of a structure make it stable or non-stable? In this study, children will attempt several comparison tasks where they will be shown two blocks that vary on one or two dimensions (e.g., height or base width). They will be asked to predict which block would fall first if the table underneath the blocks were to shake. They will also be asked to explain why. Sessions are videotaped for later analysis of children’s gestures and explanations. The practical aim of the study is to create an assessment for young children’s concept of stability. The assessment will ultimately be embedded in an educational game that is designed to teach children building principles for stable structures.

*If the table shakes, which block will fall first?*

Supplemental Permission Slips

In case you’ve wondered why you’ve gotten so many consent forms for research lately, the reason is that you and your child are being invited to participate in research projects that do not fall within the parameters of the Children’s School’s consent form that you signed during the enrollment process. Such cases either involve researchers interested in studying parents or older siblings, researchers from outside Carnegie Mellon (e.g., the Anti Bullying intervention project described in the enclosed consent form for Preschool 4’s and to be highlighted in the January Newsletter), researchers collaborating with a commercial company that would involve a conflict of interest (e.g., Disney, Google, etc.), or research funded by agencies that require separate consent for each study (e.g., the Defense Advanced Research Project Agency, which is funding the research described above to facilitate young children’s physical science learning). Dr. Carver reviews all such projects carefully for their fit with our philosophy and objectives and then sends the consent forms to families for consideration. Carnegie Mellon’s laboratory school is a valuable resource for scholar research, training, and practical applications of scientific theories, so we encourage your participation in these extra projects. We aim for excellence in all aspects of our research policy and practice, as we seek to contribute meaningfully to the advancement of developmental and educational science.
Research Spotlight

The Building Foundations for Friendship (BFF) Game

Several school psychology researchers from Dr. Kara McGoey’s directed research group at Duquesne University are investigating the effectiveness of a preschool anti-bullying curriculum they have designed. Each of the Preschool 4’s classes will participate in eight weekly sessions of the BFF curriculum during which they will learn about friendship skills, identifying different types of peer interactions, and responding appropriately to others’ aggression. Prior to the start of these sessions, each child for whom parents have submitted a consent form will be observed in the classroom, teachers will complete a brief questionnaire about the behavior of the child, and the child will participate in the BFF Game. This game is designed to assess the child’s knowledge of key aspects of friendship, as well as their processes of problem solving, before exposure to the curriculum. Each child will also be observed in the classroom during the weeks that BFF sessions are conducted. After the eight sessions are conducted, the child will again be observed in the classroom, teachers will complete the same brief behavior questionnaire, and the child will participate in the same BFF Game to assess how much knowledge he or she has gained from the curriculum.

The BFF Game utilizes dynamic assessment techniques with progressively more specific prompts offering increasingly more explicit hints to probe deeper into the child’s knowledge base. All learners will progress through the same sequence of prompts during the five to ten minute assessment. For the purposes of the current study, prompts will cover the full range of the targeted knowledge and skills included in the curriculum itself. By comparing children’s pre- and post-lesson responses to prompts such as, “Tell me about friends” and “What do you do when a friend is not nice to you?” the researchers can assess how the BFF anti-bullying curriculum increases knowledge about friendship.

Research for Undergraduate Courses

Carnegie Mellon’s Psychology Department offers multiple courses to provide undergraduates with a variety of theory, research, and practice experiences.

Non-Participant Observation: Students from Dr. Carver’s Principles of Child Development class will do two observation projects during the spring semester to provide firsthand experience with the dramatic developmental progress that occurs during the early childhood period (i.e., rather than just reading about it in a book). For each assignment, they observe specific differences between preschoolers and kindergartners in motor skills, social interactions, etc., using a checklist to record observations and then discussing the similarities and differences in an essay.

Research Methods Class Studies: Students in Dr. Erik Thiessen’s Research Methods course will start with a lab to learn basic strategies for conducting ethical research with young children. Then they will work in groups to conduct a study of their own design, which will be approved both by their teacher and by Dr. Carver. The course is designed to teach undergraduates both the theoretical and practical skills necessary to conduct effective early childhood research.
Research Spotlight

The Story Game

The purpose of graduate student Karrie Godwin’s study is to investigate how children allocate their attention in learning environments. In particular, Karrie and her advisor, Dr. Anna Fisher, are interested in examining whether children’s ability to effectively distribute their attention has consequences for learning and remembering new content. To answer this question, we are investigating the role of divided and sustained attention on children’s long-term memory. In this study, we will examine whether children’s ability to engage in sustained attention during a short lesson affects children’s long-term retention of the lesson content. To test retention, your child will be asked questions about several stories that he or she heard during the fall semester. For example, if your child listened to a story about modes of transportation, your child may be asked questions similar to the example provided below.

“Circle the picture of a type of transportation you could use on the sea.”

Research Methods Class Project: The Doll Game

Each group of students in Dr. Erik Thiessen’s Research Methods in Developmental Psychology class will work with a few children to collect data for a class project. Their Doll Game is a modified version of the Sally-Ann Task (Frith, 1989), which assesses Theory of Mind. Theory of Mind is the ability to attribute mental states (beliefs, intents, desires, pretending, lies, knowledge, etc.) to oneself and to others, as well as to understand that others have beliefs, desires and intentions that are different from one’s own. In this experiment the child observes two dolls, Susan and Ann, playing with a marble. Susan places the marble in her basket. Then, Susan and your child either watch or cover their eyes while Ann moves the marble from the basket to a box sitting nearby. A short time later (after uncovering the eyes if applicable), the child is asked: "Where will Susan look for her marble?" The marble is then returned to Susan’s basket and the experiment is repeated with the child watching but Susan having left the scene prior to the marble being moved. Upon Susan’s return the child is asked, "Where will Susan look for her marble?" It is hypothesized that the children who are given the opportunity to experience Susan’s perspective by covering their eyes are more likely to be correct in the second scenario, which requires them to understand that since Susan was away from the scene she will look for the marble in her basket where she left it. It is further hypothesized that the older children (5 years old) will correctly answer the task more readily than younger children (3 years old). It is believed that children are aware of their own mental states and, with the aid of role-playing other individuals’ perspectives, we hope to help them infer the mental states of other people. While exploring the impact of this training on children’s Theory of Mind, the students are also learning to interact with young children and to follow our laboratory school’s research procedures carefully.
Research Spotlight

The Fish Game

Dr. Anna Fisher is investigating the relationship between young children’s reasoning skills and other general cognitive processes such as memory, attention, processing speed, executive function, and language ability. In this “fish game”, graduate students Karrie Godwin and Bryan Matlen are measuring the extent to which children can inhibit distracting information and selectively focus on relevant information.

The task involves a computer game during which children are presented with a series of fish similar to the ones pictured below. Children are told that their task is to feed the center fish by pressing either the left or right mousepad button, depending on the direction that the fish is facing (e.g., "Your job is to feed only the fish in the center. So what matters is where the middle fish’s mouth is pointing."). In this game, the center fish is surrounded by four other fish (two to its left and two to its right). Sometimes the four fish may be swimming in the same direction as the center fish and other times the four fish may be swimming in the opposite direction. This task is called a “flanker” task because it tests whether children can ignore the objects that flank the focal object and respond only based on the object of interest. In the case below, no inhibition is necessary because all the fish are facing in the same direction, but the task is much harder when the flanking fish are facing the direction opposite of the center fish.

The Shape Game

Dr. David Klahr and graduate student Bryan Matlen are interested in what types of examples optimize children’s learning of basic shape categories. To determine these features, they show children standards of various shape categories (e.g., rectangles, triangles, pentagons, etc.) and ask the children to compare them. Some comparisons have two positive examples of a particular shape (e.g., one rectangle shown straight and the other on an angle), and others have both a positive and a negative example of a particular shape (a rectangle and a five sided figure as shown below). After learning about a shape category from these examples, children are presented novel shapes and asked whether they are also examples of the trained shape category. We are interested in what kinds of comparisons optimize the correct generalization of a shape definition, as well as which comparisons appropriately limit the definition’s generalization to shapes that are not in its category. This research will help educators determine how to best explain and exemplify concepts during instruction.
Research Spotlight, continued …

The Magnet Game

Undergraduate Benjamin Howe is completing dual thesis as the culmination of his studies in Architecture and Psychology. With the guidance of Dr. Sharon Carver and architecture professor Dale Clifford, he is designing an educational activity that demonstrates the fusion of learning and design principles in order to effectively engage children in exploring magnetism and learning key concepts about magnets. At the Children’s School, Ben will observe children’s engagement with his Magnet Learning Center and do pre- and post-test interviews with children about their knowledge of magnets. As a comparison, half of the children will spend an equal amount of time exploring a popular commercially available magnet toy to see whether those who interact with the toy Ben designs learn more. This research could be beneficial in providing a new educational magnet toy on the market for use in schools or informal settings at museums only if it can be demonstrated that the Magnet Learning Center truly has an educational impact that other magnet toys on the market may not be able to match.

Undergraduate Spotlight

Tyler Dossett is a junior Psychology major at Carnegie Mellon. Tyler writes, “I am always thrilled to go to work at the Children’s School. After I graduate, I plan to use my major and minor to become a children’s drama therapist where I will use acting and the arts to conduct therapy sessions. Working at the Carnegie Mellon Children’s School is such a rewarding experience not only because of its wonderful teachers, who are all very passionate about teaching, but also because of the amazing children that I get to work with every week. The Children’s School has such a positive and upbeat aura, and it is always inspiring to see the children so interested in learning and exploring the world around them, especially when I get a chance to participate by reading to them or playing games with them. Every day, I see the children grow so much by learning new skills, such as writing or counting. It is so great to have a part in their development into amazing people.”

Katie Schaefer is a senior education major at Carlow University who is doing a seven-week, full time student teaching experience at the Children’s School. She has joined the Preschool 3’s Team to work with her cooperating teacher, Mrs. Flynn, until Friday, April 6th. For the previous seven weeks, Katie was a 3rd grade student teacher at the Campus School of Carlow University.
Research Spotlight

Dr. Erik Thiessen’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. What an interesting set of important topics in early childhood development!

**Effect of Music Emotion on Children’s Story Themes** – Exploring whether kindergartners exposed to sad background music will tell different types of stories about a neutral picture than those exposed to happy music. (The Picture Story Game)

**Effect of Music Tempo on Children’s Self-Control** – Determining whether energetic or calm music better enables 3 and 5-year-old children to delay gratification. (The Goldfish Game)

**Direct Instruction vs. Discovery Learning** – Testing whether kindergartners learn better puzzle solving skills from direct instruction or discovery learning. (The Puzzle Game)

**Effect of Experience on Sensitivity to Prototypic Faces** – Exploring whether 3 and 5-year-old children are differentially sensitive to prototypic faces of their own ethnicity. (The Face Game)

**Impact of Prosocial Priming on False-Belief Judgements** – Testing whether 3 and 5-year-old children are better attuned to the appearance-reality distinction after a prosocial task.

**Gender Effects on Executive Control Tasks** – Testing whether male or female 4-year-olds are better able to inhibit ineffective actions when guided by same or different gender experimenters.

The Fruit Basket Game

Vivek Pai, a senior in the Information Systems department is conducting his senior thesis with the guidance of Professor Raja Sooriamurthi. His goal is to determine whether children will learn more from computer games when the system monitors the user’s expression and adapts the game sequence to the expressed emotion than if it follows a traditional prescribed sequence of progressively harder tasks. Vivek programmed the computer game during our Healthy Mind & Body unit, so he used the cover story of fruit falling from the sky and the user catching it in baskets matching the color of the fruit. Initially, the there are only two colors of fruit dropping in only a few locations, but gradually the number of colors, thus number of baskets, and the number of drop locations increases, and the pairing of colors with locations become random instead of predictable. For children in the control group, the game advances as the children’s accuracy improves and goes back to an easier level when the child struggles. In the affect-mediated experimental condition, the game advances while the child’s face displays positive affect and reverts to an easier level when emotions of worry or frustration are detected. In addition to testing the feasibility of accurately monitoring children’s expressions during computer game play, Vivek will compare the learning paths and final scores of children in the experimental and control conditions to see which yielded better performance.
Research Spotlight, continued …

The Story Game

Graduate Student, Karrie Godwin and her advisor, Dr. Anna Fisher, are investigating how children allocate their attention in learning environments. In particular, they are interested in examining whether children’s ability to effectively distribute their attention has consequences for learning new content and for retention of learned material. To answer this question, they are investigating the role of divided and sustained attention on children’s long-term memory. In this study, they will examine whether children’s ability to engage in sustained attention during a short lesson affects children’s long-term retention of the lesson content. In this game, your child will be asked questions about several stories that they heard during prior research sessions. For example, if your child listened to a story about muscles and bones, your child may be asked questions similar to the example here.

Undergraduate Spotlight

Emily Gibson writes, “I love my life at Carnegie Mellon. It can be stressful, but it’s a challenging and rewarding place where I get to do the things I love. I am a sophomore in the BHA program (Bachelor’s of Humanities and Arts), and I study dramaturgy and history. I’m also pursuing degrees in English Studies and Creative Writing, which means I’ve always got a full plate of course work to manage. It also means that I spend a lot of time in the library! I am hoping to work in theatre as a dramaturg, literary manager, or artistic director, but I’m interested in museum work and education as well. Of course, it wouldn't be much fun if I only did academics. I have a lot of other things to keep me busy between classes and homework. I am a flutist in the CMU Kiltie Band; a member of the activist group Life Matters; and the president of the newly formed Carnegie Mellon (Muggle) Quidditch Club, for which I also play the positions of Beater and Chaser. I’m currently a writer for TheaterMania, where I have a personal column, and I have two part-time jobs: one at The Waffle Shop in East Liberty, the other at The Children’s School.

I started working at The Children's School in my first semester at CMU, and it has been a great opportunity for me. I love working with children, and the environment is so relaxed and friendly. I also spend a lot of time in the office, which is a different kind of fun all together, but one that has given me experiences I know I'll use in internships and jobs to come. I consider myself really lucky to have stumbled upon the school as a freshman, because every day that I see the children, I learn something new and I have the chance to be amazed by how brilliant, funny, and kind they all can be -- and that is more than I could have asked for from a work study job.”

Dr. Carver adds, “Notice how well Emily exemplifies the skill of ‘taking on challenges’, which is the subject of my Director’s Corner this month. Thanks for being such a great model, Emily!”
Research Spotlight

The Moving Shapes Game

By conducting this two-day study, Yevdokiya Yermolayeva, a graduate student working with Dr. David Rakison, is interested in better understanding children’s expectations about how objects move. Specifically, she wants to discover whether observing one type of movement gives children clues about other types of movement that an object may exhibit. In this study researchers focus on three motion properties: being a causal agent (i.e., causing something else to move through physical contact); being a causal recipient (i.e., being caused to move by something else through physical contact); being self-propelled (i.e., starting to move from a standstill without an external force). Typically things that are agents tend to be self-propelled, and things that are recipients tend not to be self-propelled. Likewise, things that are self-propelled tend to be agents and not recipients. For example, people tend to cause other things to move and can move on their own, while cups tend to be caused to move and do not move on their own. We are interested in seeing whether children have expectations about self-propulsion after seeing an agent or a recipient, and if children have expectations about agents and recipients after seeing self-propulsion. We are also interested in the effect of probability on these judgments: for example, if something is an agent only 25% of the time and a recipient 75% of the time, would it still be self-propelled?

To determine children’s expectations, the research assistants will first show a child animations that depict one of two events, either objects that start moving on their own from a standstill or objects that cause other objects to move by bumping into them. After each animation, the child is asked questions about other types of movements that the objects could exhibit. If the animation was of objects starting to move from a standstill, then the child is asked whether the objects could push other objects or be pushed by other objects. If the animation was of objects causing other objects to move, then the child is asked whether the objects could start moving on their own. Across animations, the researchers also varied the probability of an object starting to move from a standstill or causing the motion of other objects. The responses that children provide after seeing different animations allow researchers to determine whether children expect things that can start moving on their own to cause other things to move, and, conversely, if they expect things that cause motion to start moving on their own and whether the probabilities affect their judgments. More broadly, they are comparing children’s performance to that of infants and adults to determine how these expectations about motion change across development as children get more experience with the way in which objects move in the world.

An example of a trial in which one object starts to move on its own from a standstill, while the second object remains stationary (arrows indicate direction of movement):
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 (AM Preschool 4’s & Extended AM).