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

**Research Spotlight**

**The Learning About Living Things Game**

Previous research has suggested that, as children grow older, they increasingly recognize that living things can be divided into different biological taxonomic groups, such as mammals, birds, and plants. The purpose of the Living Things study that graduate student Layla Unger is conducting this fall is to test whether an instruction session that explicitly highlights these biological taxonomic groups facilitates the organization of children’s knowledge about living things. All of the participants will complete a pre-test and post-test during which they are asked to arrange a set of pictures on a game board according to which are "the same kind of thing" and then again by which ones “go together”. Between the two tests, half of the children will participate in an instruction session that highlights similarities between living things that look very different but are part of the same category (e.g., “This ostrich is a bird, and this penguin is a bird. See? They’re both birds.”). The researchers may repeat the instruction and related post-test multiple times to strengthen the effect of the instructional manipulation.
Research Spotlight, continued …

The Picture Finding Game

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. For example, Dr. Anna Fisher’s research team is particularly interested in the degree to which children utilize their word knowledge in various working memory and reasoning tasks. In the Picture Finding game, children are shown slides of pictures of animals and plants and then asked to find the picture representing the target word on each slide. For example, we might ask children to point to the picture of the rabbit.

The Flowers Game

Professor Anna Fisher and graduate student Karrie Godwin are investigating the relationship between learning and other general cognitive processes such as attention, memory, processing speed, executive function, and general reasoning ability. In the Flowers Game, they are examining how children allocate their attention in different learning environments. In particular, they are interested in examining whether children’s ability to effectively distribute their attention has consequences for learning new science content. In this computer game, children are presented with a series of pictures of flowers. 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 flowers, children may be presented with a picture of a flower and asked to recall the flower’s name (e.g., “What was the name of this flower?”).

The Butterfly Game

Fisher and Godwin’s Butterfly Game is a similar computer game in which children are presented with a series of pictures of butterflies. 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 butterfly, children may be asked to identify the morpho (e.g., “Point to the morpho”).

The Remember That Game

In a series of games like the Flowers Game, the Butterfly Game, the Land Animals Game, and the Fish Game, children learn about novel science content by reviewing a series of pictures of animals or plants and practicing the name for each picture. In the Remember That Game, experimenters examine whether children’s ability to engage in sustained attention during those initial games affects their long-term retention of the science material. In the Remember That Game, children are asked questions about the animals and plants they learned about over the semester. For example, children are presented with a series of pictures and asked to recall the name of the objects (e.g., “What was the name of this Butterfly?”). Children are also asked about educational displays that were present in the classroom to see if children remember the classroom visual environment. For example, children may be presented with pairs of objects and asked to identify which object he or she saw in the classroom previously.
Research Spotlight

The Reasoning Game

In this study, Dr. Anna Fisher and graduate student Karrie Godwin are investigating young children’s understanding of categories and the development of category-based reasoning. In particular, they are interested in examining the role of conceptual and perceptual information on category-based reasoning and induction in early childhood. Specifically, they are interested in the degree to which children utilize their knowledge of categories and perceptual similarity in a reasoning task where these sources of information are in conflict. They are also interested in whether labels help children make inferences. In the Reasoning Game, children are shown sets of three pictures similar to the ones presented here. For example, we might show children a lemon, a tennis ball, and a lemon slice. For half of the trials, children may be told the object labels. For the other half of the trials, no labels will be used. Children will 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.

The Naming Game

In a related study, Dr. Anna Fisher and graduate student Karrie Godwin are investigating young children’s understanding of categories and the development of category-based reasoning. In particular, they are interested in examining the role of conceptual and perceptual information on category-based reasoning and induction in early childhood. Specifically, they are interested in the degree to which children utilize their knowledge of categories and perceptual similarity in a reasoning task and whether familiarity with labels helps children make inductive inferences during a reasoning task. In the Naming Game, children are shown a series of pictures similar to the one presented below. Then, children are asked to identify the animal or object pictured. For example, “We are going to play a game with pictures. I am going to show you a picture and I want you to tell me what the picture is called. Okay, let's play the game. What is this called?”

The Balancing Game

One Research Methods team is studying the impact of encouragement on gross motor skills, which are actions that require movements of large muscles, such as running, jumping, walking, and balancing. Encouragement is particularly interesting because it is simple, free, and may have the power to motivate and increase children’s attention, according to current research. Encouragement, specifically high-fives, was shown in previous research to improve performance in children. In the Balancing Game, the students tested the effects of verbal (“Good job!”) and physical (high-fives) forms of encouragement on balancing task performance. Half of the children received encouragement immediately after performing each balancing task, and the other half received the encouragement after all of the tasks had been completed. The students plan to compare the length of time children balance on each task and compare the times for children receiving encouragement between tasks vs. those receiving encouragement at the end of the experiment (i.e., when it could no longer affect performance. Ideally, results from this experiment can be applied to other activities as well, such as reading or problem solving.
Research Spotlight, continued …

The Matching Game

One of the Research Methods groups is testing the effect of familiarity on working memory. The purpose was to explore the differences in the memory performance with high familiarity objects as opposed to low familiarity objects. Some examples of highly familiar objects shown below are apples and cats; low familiarity objects would be gooseberries (a fruit) and binturongs (an animal). Based on previous studies of familiarity effects with faces and objects, the students expected that children would have better memory and make fewer errors when matching high familiarity objects than matching the low familiarity objects because they could devote their cognitive resources to the object location instead of focusing on the object identity. Each child played this game three times in one session, once with high familiarity objects, once with low familiarity objects, and once with a mixed set. The students included a mixed board to determine whether the children matched familiar objects before unfamiliar objects. If this result is obtained, it will provide further evidence suggesting that how well children remember something depends on its familiarity. This is important because teachers could use familiar objects and concepts as a teaching method for conveying new ideas to encourage better memory. Additionally, the results could be used to show how repeated exposure to objects can help a child remember the objects better. As a result, teachers and parents could use this information to further reinforce various ideas/objects/lessons through repeated exposure.

The Copy Cat Game

Another Research Methods team is studying the effect of physical activity on creativity. Multiple studies have suggested that physical activity prior to a creative challenge increases creativity scores in adults. In the Copy Cat Game, students in the Developmental Research Methods class are investigating the connection between exercise and creativity. In this task, children are first asked to repeat actions of the tester. Children in the experimental (exercise) group mimicked behaviors like jumping jacks and running in place. Children in the control (stationary) group mimicked behaviors like smiling and touching their head. All children were then given a modified “alternative uses” task, which is a type of creativity measure, where they were asked to think of as many uses for a block as possible. A coder recorded all of the ideas generated, with the goal of comparing the number and originality of ideas from both groups. Based on the existing evidence that there is a connection between physical activity and creativity, they expect the children who did an exercise-oriented copy cat game to perform better than the children who did a more stationary version of the game. If this result is obtained, it will provide further evidence suggesting that physical activity is beneficial to children and adults alike in enhancing creativity, and perhaps other types of cognition.
Student Teacher Reflections, continued …

• Jennifer Young (Kindergarten with Mrs. Perovich)

This past semester has been amazing and I can’t thank the staff and my fabulous kindergartners enough for making my time at Children’s School such a great experience. This program truly exemplifies how important a high quality early childhood program is for children. I have really enjoyed working with such a knowledgeable and helpful staff this past semester. The smiles on the children’s faces when they joined me at the rotunda each morning made my day. One of my favorite parts of this experience has been the freedom to plan and implement my own lessons. There are so many wonderful resources available at the Children's School, which helped me stretch my creativity to give the children the best experience possible. Mrs. Perovich, Mrs. Armbruster, and Mrs. Blizman have been so welcoming and open to my ideas throughout the term, and I love the way we were able to merge our different personalities in the Kindergarten classroom. Next semester, I will be teaching in a life skills classroom; and although I am sad to leave the Children’s School, I am very excited to see what this new student teaching experience has in store for me. I know that all of the tools I have gained this past semester will be extremely useful in my future teaching.

Research Spotlight

The Let’s Balance Game

One of the Research Methods groups tested the impact of encouragement on gross motor skill performance. Encouragement is particularly interesting because it is free and widely available. According to current research, it has the power to motivate and increase children’s attention. In the Let's Balance game, researchers used verbal (“Good job!”) and physical (high-fives) forms of encouragement to investigate their effects on balancing task performance. Children did five simple balancing tasks to see how long they could sustain each task (up to 20 seconds each). The tasks included balancing on each foot, tiptoeing, and yoga tree poses on each foot. Children in one group received encouragement after performing each gross motor task, and those in the other group received the verbal encouragement and high-fives only after all the tasks were completed. Randomly assigning children to one of the two conditions allowed the students to test whether the timing of encouragement would cause a significant change in balancing task performance, which might then help parents and educators make decisions about the timing of their encouragement as children attempt challenging tasks.
Research Spotlight, continued …

The Playdough Game

Another group of Research Methods students tested if there are differences in preschool children’s willingness to share items depends on how enticing the items are. They randomly assigned children to a “bland” playdough condition and an “enticing” playdough condition, with an off-white playdough contrasted with green, sparkly, vanilla-scented playdough. Regardless of the type of playdough, they assessed willingness to share by asking a series of prompts, which progressed from just general conversation (“How are you doing today?”) to indirect hints for sharing (“That’s really fun playdough!”) to direct requests for sharing (“How much playdough are you willing to share?”). Researchers responded to children’s sharing by saying, “Thank you!” and to non-sharing with, “That’s okay!” The students also investigated whether there was a difference in sharing behavior depending on the birth order of the children. The goal of the experiment is to better understand how sharing skills develop in young children in order to be able to better facilitate healthy sharing skills among peers.

The Faces Game

Yet another Research Methods group designed a study related to recognizing emotions in others based on the age of the child and the gender of both the child and the face. The student researchers hypothesized that five year olds would perform better than three year olds on the task, and they wondered whether children would all be better at recognizing female emotions because of greater time spent with female caregivers, whether that bias would be reduced in older children, or whether the gender of the child would matter. During the study, children see a 2-by-2 grid with four faces, each expressing one emotion - either happy, surprised, sad, or scared. Children were then asked which friend was expressing a certain emotion (for example, “Can you point to the person feeling happy?”). Children answered two such questions per grid and then played the game twice, once with a set of female faces and once with a set of male faces.
Research Spotlight

The Sound Game

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. Audrey is developing ways to assess and improve children’s experimentation and their awareness of the goal of experimentation. Children in the 3 year-old, 4 year-old and 5 year-old classrooms may participate in the Sound Game at least once, and they may come back for a few more sessions to investigate different aspects of their experimentation skill. During the Sound Game, the child is asked to simply play a game on a tablet, in which the child can make a box glow and play music by touching it with another object on the screen. Children will either be told to play freely with the virtual objects or will be explicitly asked to figure out how it works. Each child will get a specific kind of instruction: (1) instruction that asks the child to report on the goal of his or her actions on the objects, (2) instruction that asks the child to describe his or her actions while interacting with the objects, or (3) instruction that helps the child figure out how the objects work. Some children may receive a combination of different instructions. Will children be aware that they perform spontaneous experiments to figure out how the objects work? Will asking children to describe their actions enhance children’s awareness of the goals of their actions? Will children with greater levels of awareness benefit more from instruction on how to do experiments? The results of this research may reveal the ability of different instructional techniques to enhance children’s experimentation and self-awareness in early childhood. This, in turn, would allow educators to develop curricula that better support the development of children’s scientific inquiry and metacognitive skills.

The Hearts and Flowers Game

Graduate student Karrie Godwin is working with Professor Anna Fisher to investigate the relationship between learning and other general cognitive processes such as attention, memory, processing speed, executive function, and general reasoning ability. In this particular task, they are measuring children’s cognitive control and their ability to inhibit a behavioral response. In the Hearts & 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). Next, children will be shown pictures depicting the sun or the moon. Children will be asked to provide a verbal response that conflicts with the picture. For example, if children see a picture of the sun they are instructed to say “night”, when children see the picture of the moon they are instructed to say “day”. Answering correctly on these tasks is challenging because it requires children to think carefully during the task and to inhibit their natural responses. If children’s ability to regulate themselves in this way is predictive of their learning ability, then educators and parents will be encouraged to intentionally help children develop regulation skills.
Research Spotlight

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. Dr. Anna Fisher and graduate student Layla Unger are particularly interested in the degree to which children utilize this knowledge in various reasoning tasks. In the Picture Finding Game, children are shown black and white slides of pictures. Then, children are asked to find the picture representing the target word on each slide. For example, we might ask children to find the picture of the rose among the set below.

The Numbers Game

Kindergarten is also a time when children learn many new math skills and concepts, such as identifying numerals, counting, and comparing sets of different sizes. The purpose of the Numbers Game is to develop an age-appropriate assessment of Kindergarten students’ math skills and knowledge. During this task, participants are presented with problems like the one depicted in the example below, and the experimenter reads the instructions for how to complete the problem. Kindergarten students who take part in this assessment are only given generalized positive feedback (e.g., "You did a great job!"); they are not told whether their responses are correct or incorrect. The data collected from this study will only be used to contribute to the evaluation of math instruction materials that are being investigated in other studies being conducted this year. These data will not be used as an academic evaluation of participants in any way.

Experimenter instructions: “Please circle seven of these bunnies.”
Research Spotlight, continued …

The Animal Insides Game

Dr. Anna Fisher and graduate student Layla Unger are investigating young children’s understanding of categories and the development of category-based reasoning. In particular, they are interested in examining the role of conceptual and perceptual information on category-based reasoning in early childhood. Specifically, they are interested in the degree to which children utilize their knowledge of categories and perceptual similarity in a reasoning task where these sources of information are in conflict. In the Animal Insides Game, children are shown sets of pictures similar to the ones presented above. For example, we might show children a spotted dog, a perceptually dissimilar dog, and a spotted cow. Children would then be asked to identify which things have the same “insides”, e.g., which things both have “zimmer cells” inside.

Research Methods Class - The Sorting Game

Students in Professor Anna Fisher’s Developmental Research Methods class will start the semester with a lab entitled The Sorting Game. They will work in pairs and small groups to conduct a study of cognitive flexibility – one’s ability to flexibly adjust behavior in response to changes in the environment. This ability is fragile early in development but undergoes dramatic development during the preschool years. For example, a younger child may struggle to adjust behavior (e.g., finish playing to leave the playground, or get a hot dog for dinner when one expected pizza), whereas an older child may have an easier time making these adjustments. Psychologists often study cognitive flexibility using simple games, in which the rules change in the middle of the game. In this project, they are using the Dimensional Change Card Sort (DCCS) task, in which children sort cards based on shape (e.g., all trucks go together in one box and all stars go together in the other box) or based on color (e.g., all red cards go together in one box and all blue cards go together in the other box).

After sorting the cards by the initial dimension (either shape or color) children are then asked to sort the same cards by the alternative dimension. Young preschoolers often fail to adjust their responses and keep sorting the cards by the initially-relevant dimension, despite being able to articulate the new sorting rule; older children can flexibly adjust their responses and switch to sorting by the new rule. In this project, the students are investigating whether introducing a brief delay between sorting by the old and new rule can help children adjust their responses to the changed demands of the environment. Specifically, after initially sorting the cards based on one dimension, some participants will hear a story “Don’t Worry, Alfie”, which provides a brief delay before children are asked to sort cards by the other dimension. To determine whether the delay affects children’s performance, another group of participants will complete the DCCS task (i.e., sorted the cards based on one dimension and then immediately by the other dimension) before hearing the story about Alfie.

The findings of this project may have relevance to the theories of cognitive flexibility. The results may also suggest a way in which parents and teachers can help young children flexibly change their behavior: if a brief delay helps children’s performance in the DCCS task, a brief delay between an old and a new activity (or between previous and new expectations) may be helpful to children in everyday situations that call for cognitive flexibility.
Research Spotlight, continued …

The Construction Game

Senior Ashley Taylor, with mentor Dr. Carver, is focusing her honors thesis on investigating ways to strengthen young children’s mental rotation ability. Think of a letter (for instance, a capital “E”). If you were instructed to flip the letter upside down, or rotate it 90°, you would likely be able to visualize how the letter would change. Young children, on the other hand, often have difficulty with this task, as they are not yet skilled in mental rotation ability. The ability to manipulate an image in one’s head has been shown to correlate with success in fields such as math and science, so it stands to reason that children who practice this skill early will be at an advantage in future learning.

The goal of Ashley’s thesis study is to examine how working with a partner on a game that requires the use of mental rotation ability affects an individual child’s ability to employ mental rotation in future tasks. In other words, does working with a peer help to increase a child’s ability to understand future mental rotation tasks? To examine this topic, children will be randomly assigned to work either individually or with a friend to complete tasks: either commercially-available games that require the use of mental rotation strategies (Trucky 3, Royal Rescue, and Castle Logix) or “building replication” tasks designed to employ the same building skills as the games, but without requiring mental rotation ability. Within these four conditions, children will participate in three brief, 15-minute sessions to practice their skills. Children’s mental rotation abilities will be assessed before and after these practice sessions using the Children’s Mental Rotation Task, where they will be shown an image of two shapes and asked which of the four answer options can be made by putting the two shapes together.

“If you had two puzzle pieces just like these, which of these shapes could you make if you put them together?”
(Answer circled in red.)

Royal Rescue  Trucky 3  Castle Logix
Research Spotlight

The Sound Game: Tablet

Audrey Kittredge, a post-doctoral researcher in the Psychology Department, is working with Dr. David Klahr. Audrey is developing ways to assess and improve children’s experimentation. Preschoolers and kindergartners may participate in the Sound Game at least once, and may come back for a few more sessions to investigate different aspects of their experimentation skill. During the Sound Game, children play a game on a tablet (pictured below) in which they can make a box glow and play music by touching it with another object on the screen. Each child will get a specific kind of instruction: (1) instruction that asks the child to report on the goal of his or her actions on the objects, (2) instruction that asks the child to describe his or her actions while interacting with the objects, or (3) instruction that helps the child figure out how the objects work. Some children may receive a combination of different instructions. Will children be aware that they perform spontaneous experiments to figure out how the objects work? Will asking children to describe their actions enhance children’s awareness of the goals of their actions? Will children with greater levels of awareness benefit more from instruction on how to do experiments? The research results may reveal how different instructional techniques can enhance children’s experimentation and self-awareness in early childhood. This, in turn, would allow educators to develop curricula that better support the development of children’s scientific inquiry and metacognitive skills.

The Animal Insides Game

Children must generalize, or induce, what they learn about things in the world to new situations so they can avoid having to learn about the characteristics of each thing separately. For instance, if a child learns that her canary has a heart, she can induce that other birds have hearts, rather than learning whether each individual bird has a heart. Children can use multiple strategies to determine which new things share properties of familiar things. First, they can rely on overall similarity: If a new thing looks like a familiar thing, then it is likely to share the same properties. Alternately, they can rely on a specific feature that is critical for category membership: If a new thing shares this critical feature with a familiar thing, then it will share the same properties. Several current theories posit that children can readily use the first form of induction from an early age; whereas, the ability to use the second form continues to develop throughout childhood. In the Animal Insides Game, children see triads of cartoon bugs on a computer screen. The bug that appears at the top is the Target, and the two bugs that appear at the bottom are Alternate Choices. When presenting each triad, the experimenter tells the child that the Target bug has a novel biological property (e.g., “Has zimmer cells”) and asks the child to choose which of the two Alternate Choice bugs also has this property. Children may base their choices on overall similarity or on sharing a critical feature (i.e., head shape). On half of the trials, the Alternate Choice that shared the critical feature with the Target also shared several other features, rendering it similar overall; whereas on the other half, this Alternate Choice was dissimilar overall. We predict that the rate at which children induce properties on the basis of sharing a critical feature, regardless of overall similarity, should increase with age.
Research Spotlight

The Construction Game

Think of a letter (for instance, a capital “E”). If you were instructed to flip the letter upside down, or rotate it 90°, you would likely be able to visualize how the letter would change. Young children, on the other hand, often have difficulty with this task, as they are not yet skilled in using mental rotation. The ability to manipulate an image in one’s head has been shown to correlate with success in fields such as math and science, so it stands to reason that children who master this skill early will be at an advantage in future learning.

The goal of Ashley Taylor’s senior honors thesis, which she is conducting in collaboration with Dr. Sharon Carver, is to examine how working with a partner on a game that requires the use of mental rotation affects an individual child’s ability to employ mental rotation in future tasks. Simply put, does working with a peer help to increase a child’s ability to understand future mental rotation tasks? To examine this topic, Ashley has assigned children to work either individually or with a friend to complete tasks: either commercially-available games that require the use of mental rotation strategies (Trucky 3, Royal Rescue, and Castle Logix) or “building replication” tasks designed to employ the same building skills as the games, but without requiring mental rotation ability. Within these four conditions, 4’s and Kindergartners participated in three brief, 15-minute sessions to practice their skills. Children’s mental rotation abilities were assessed before and after these practice sessions using the Children’s Mental Transformation Task (CMTT). During the CMTT, Ashley shows children an image of two shapes and asks which of the four answer options can be made by putting the two shapes together (See sample below).

“*If you had two puzzle pieces just like these, which of these shapes could you make if you put them together?*”
(Answer circled on right.)

Royal Rescue  Trucky 3  Castle Logix
Research Spotlight, continued …

The SMART Kids Game

Casey Roark, a graduate student working with Dr. Lori Holt, is investigating how children categorize sounds. This skill is important for listening to speech and deciphering environmental sounds. Quite surprisingly, there is reason to expect that young children may be better at learning sound categories than adults, at least under some circumstances. The “SMART Kids” Game is meant to discover whether children are better at learning categories with or without feedback and to relate these findings to adult learning. To address this, Casey will play five sounds for the child and ask him/her to decide which alien on the screen made each sound. This version of the game has feedback. After the child guesses, the alien associated with the sound category gets a spaceship and the child is told whether the guess was correct or incorrect with a smiley face or a sad face. The time the child takes to guess and the accuracy of the guess are recorded. This study will help us understand how children categorize sounds and whether it differs in any way from that of adults.

The Tracing Game

One of the groups in Dr. Anna Fisher’s Research Methods course is studying the speed-accuracy trade-off – one’s tendency to reduce accuracy when increasing speed, and vice-versa. This phenomenon is documented across all ages, but suspected to be more prominent early in development. In this project, student researchers are using a tracing task, in which children trace three “Snow Friends”, each with different music being played in the background (no music, slow-tempo classical, fast-tempo classical). Children were then allowed to decorate their Snow Friends before taking them home. Children’s tracing speed was measured by the amount of time it took to trace each Snow Friend. The accuracy was measured after the session by calculating the average distance from the trace line at 16 points around each circle. The findings of this project may impact developmental theory and suggest ways in which parents and teachers can provide a better learning environment for children. Songs and music are commonplace in preschools and kindergartens so this study may reveal more knowledge about music’s specific effects on performance, possibly even facilitating the development of new instructions grounded in the advantages of this knowledge.
Research Spotlight, continued …

The Fruit Game

Another group from the Research Methods class is studying theory of mind – one’s ability to understand the beliefs and perspectives of others, such as reading social cues to understand when others are interested or not. This ability is tenuous early in development but rapidly matures around age 4-5. Psychologists often study theory of mind using false-belief tasks, in which the children are asked to predict the beliefs of a doll or other actor. In this study, children predict where a doll will look for her apple, after it has been moved without her knowledge. After the researcher moves the doll’s apple from one lunchbox to another while the doll is looking away, she then asks the child to predict where the doll will try to find her apple. Younger children often fail to understand that their own knowledge of the apple’s new location is not automatically shared with the doll, thus they will direct the doll to the new location -- even when they understand that the doll couldn’t see the apple being moved. Older children can typically separate their own knowledge from that of the doll and direct the doll to the correct – prior – location of the apple.

In this project, researchers investigated whether allowing children to hold the doll throughout the experiment would affect their response accuracy, perhaps by helping them identify with the doll’s perspective, rather than thinking about it in abstract terms. They compared the performance of children who got to hold the doll with those who did not. In both cases, after the initial task, a researcher placed the apple in a box with a picture of a banana on it and then asked the child what a friend would think is in the box. Children’s answers to this question will show children’s performance on the initial task relates to teaching techniques for helping children understand the perspectives of others in everyday situations.

The Toy Game

The third Research Methods group is studying gender-related preferences. Even young children are often exposed to factors that influence gender attitudes and expectations by family, peers, and media. In this study, the researchers are investigating whether gender influences a child’s toy preferences. Other research has shown that sometimes children avoid playing with a toy that is depicted being played with by a child of the opposite gender.

In this study, children are shown “The Toy Book.” On each page is a picture of a child of the opposite gender playing with a certain toy and a picture of another toy that is not being played with by anyone. All of the toys shown in the book have been previously rated as gender neutral: a puzzle, crayons, blocks, bubbles, a balloon, modeling clay, a board game, a drum, a sand bucket, and a teddy bear. Researchers tell the child that a character “Frog” needs help picking a gift for a friend and wants to know their favorite toys. After each pair of pictures, children are asked which toy they would prefer. In order to avoid inducing stereotypes, the researchers included a short debriefing at the end reinforcing the fact that any child can play with any kind of toy. The findings may have relevance to the way toys and other products are marketed to children, and the way children are portrayed in the media. The results may show ways to counter gender stereotypes so that all children can explore their options freely.
Research Spotlight

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.

The Learning New Animals Game

When children encounter something new, they can apply their prior knowledge rather than learning from scratch. One way in which children can apply prior knowledge is to categorize the new thing as a member of a known category, and another is to make an inductive inference about the properties that the new thing may share with members of a known category. In this process, they may rely on perceptual similarity or on category inclusion rules such as whether a new thing shares a critical feature necessary for category membership. The goal of the present study is to track children’s eye gaze while they make either categorization or inductive inference judgments to investigate whether children are using overall perceptual similarity or a critical feature necessary during these tasks. In the game, children learn two new categories of bugs that vary in overall appearance, but are each defined by their mouth shape: Grassbugs have sharp teeth, whereas Fruitbugs have tube-shaped mouths. Then, children see triads of bugs consisting of a Target bug at the top, and two Alternate Choice bugs at the bottom. The Alternate Choice bugs consisted of a Category Match and a Distractor. On half of the trials, the Category Match was more perceptually similar to the Target than the Distractor, whereas on other trials, this pattern of perceptual similarity was reversed. For each triad, children are asked either which of the two Alternate Choice bugs belong to the same category as the Target, or which of the two Alternate Choice bugs share a novel property (i.e., “Has plaxium blood inside”) with the Target. Researchers predict that children who choose the Category Match on most triads regardless of perceptual similarity will primarily look at just the bugs’ mouths, whereas children who choose the perceptually similar bug on most triads regardless of category membership will look equally at all the bugs’ features. They also hypothesize that high rates of Category Match choices and focusing on the mouth feature will emerge at an earlier age when children are asked to categorize than when they are asked to make inductive inferences about the bugs.