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.)