Research Spotlight

The Look Alike Game

This game involves pictures of novel bug-like creatures. The top animal has lots of features in common with one of the animals on the bottom of the picture (for example, body, tail, and wavy ‘fingers’) and only one feature in common with the other animal on the bottom (can you find it? here is a hint: look at the top of the antennae!). Researcher Dr. Anna Fisher is interested in how children perceive such images. Specifically, she would like to know whether children always judge two pictures with multiple features in common as looking more similar, or whether single features can sometimes determine whether two things looks similar. The research involves novel objects to eliminate the possibility that factors other than feature overlap would influence children’s judgments (prior knowledge of object names, for example).

The Discovery Game: Ocean

Audrey Kittredge, a post-doctoral researcher working with Dr. David Klahr, is comparing the effect of different teaching styles on children’s goal-directed search. During the Discovery Game, the child is asked to find animals in an ocean (pictured below) and put them in a special bag. Each child will get a specific kind of instruction: (1) instruction that simply describes the goal of the game, (2) instruction that additionally demonstrates one way to find animals, (3) instruction that demonstrates one way to find animals while reminding the child that there could be many other ways to find animals, or (4) instruction that simply tells the child there could be many ways of finding animals. Depending on how much the child searches, s/he might discover just one hiding location (e.g. finding fish under sea-shells) or multiple hiding locations (e.g. finding fish under sea-shells and starfish under logs). After exploring the ocean, a friendly puppet (pictured below) will ask children questions about the game. Will the instructions that children hear impact how much they explore and how many animals they find? The results of this research may reveal the ability of different instructional techniques to encourage independent exploration in early childhood. This, in turn, would allow educators to choose curricula and instructional techniques in a more informed manner.
Research Spotlight, continued …

The Fraction Identification Game

Teachers face two challenges when teaching a new concept to their students. If the new concept is either intimidatingly unfamiliar or uninteresting, students may fail to apply their mental resources to the task of learning it. To overcome these challenges, teachers may present new concepts in “concrete” forms that convey extra details beyond the abstract core. Some details convey real-world information that is relevant to the concept to render it more familiar, which, in turn, can allow students to apply their prior knowledge to the learning task. For instance, fractions are often depicted as slices of pizza, which may allow children to access prior knowledge, like the fact that slices become smaller as the pizza is divided to more slices. Alternately, details that are perceptually rich (e.g., bright colors) can engage students’ attention and render the concept more interesting. However, this approach may come at a cost: The students’ mental representations of the concept can become cluttered with these details, making it hard to recognize and interpret the concept in new situations that are superficially distinct from the situations in which they were learned. The purpose of Dr. Anna Fisher and graduate student Layla Unger’s study is to test the impact of these types of details when they are varied in a controlled and independent manner. In this study, children are taught how to identify fractions based on the total number of parts into which a whole is divided, and the number of parts within this whole that are highlighted. Instruction materials appear in one of four levels of concreteness that conveys a specific amount of real-world and/or perceptual detail (see example below). The impact of each level of concreteness on a subsequent test of learning is then assessed.

Coming Soon … Near InfraRed Spectroscopy (NIRS)

Carnegie Mellon researchers interested in the neurological mechanisms underlying developmental change have acquired the technology for functional NIRS studies. NIRS is a non-invasive brain imaging method based on measures of light absorption (similar to pulse-oximetry). The portable NIRS apparatus allows subjects to move freely during the research tasks so it can be used with even very young children. The NIRS method poses minimal risk to children, but it is not currently included in the Children’s School permission form, so studies involving NIRS will require additional permission from parents. Watch for specifics of new studies in 2014!