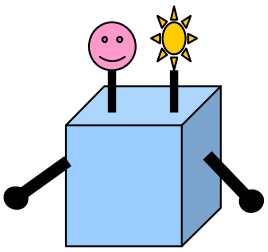


Research Project Samples

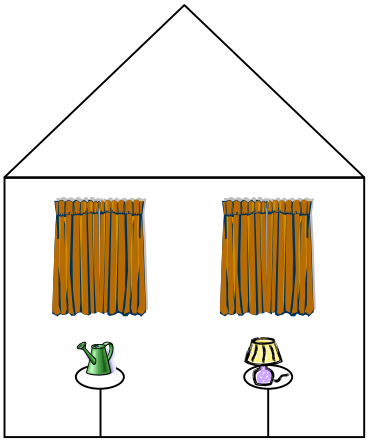
P08-3 The Pop-Up Toy Game (Fisher)

Several researchers from Dr. Anna Fisher's Cognitive Development Lab, Andrea Poon, Brian Goldfain, and Samantha Creighan, are investigating causal reasoning in 4- to 5-year-old children. They present children with a toy box that has two levers; pressing these levers causes two toys to pop-up at the top of the box (see a picture below). In this game, they ask children to press one lever at the same time as the experimenter presses the other lever, so that it remains ambiguous which lever activates which toy. After briefly playing with this toy together with the experimenter, children are given some time to play alone. During this time, they can choose to keep playing with the toy box or with a new toy. The researchers are interested in whether children will prefer to play with the old toy when the mechanics of this toy are ambiguous to the child.

P08-11 The Go / No-Go Game (Burakowski / Fisher)

Young children often have difficulty adjusting their performance in response to explicit instructions. This phenomenon, know as perseveration, is traditionally investigated using card sorting tasks. Lauren Burakowski is conducting her honors thesis project with Dr. Anna Fisher to investigate children's ability to flexibly modify their behavior in the context of a task involving response inhibition. In this task, children are presented with simple images of yellow and green butterflies and birds on a computer screen. The stimuli can be described along the dimensions of color (yellow or green) or shape (bird or butterfly). Children are told to respond to images along one dimension (e.g. shape) by pressing a button, and inhibit responding to images along the other dimension (e.g. color). Half way through the game, the rules reverse and the children are asked to respond to the previously inhibited dimension. Lauren's goal is to examine whether children can change their performance to match the change in rules of the Go-No-Go task, or if children continue to follow the rules from the first part of the task. The results could help explain why children perseverate and how we can help them, leading to a better understanding of attention and its disorders.

P08-4 The Exploration Game (Jirout / Klahr)



Jamie Jirout, a graduate student working with David Klahr, is interested in creating a measure of children's exploration. An important goal of early childhood science programs is to foster children's curiosity, motivating them to explore and learn. The goal of this project is to investigate what characteristics of a situation are most likely to lead to exploration.

There are many situations in daily life where there is ambiguous evidence about the cause of some outcome. For example, if a child wanted to figure out if larger wheels give a smoother bike ride than small wheels, but could only compare a large wheeled bike with a hard seat, to a small-wheeled bike with a soft seat, then we would say that the evidence was ambiguous, or "indeterminate" because it isn't clear which of the two factors (seat or wheel) was causing the difference. In this study, researchers are trying to determine if some children are more likely than others to notice such ambiguous situations and to seek additional information so as to resolve the ambiguity through exploration, as well as whether most children prefer to explore either ambiguous or unambiguous situations.

For the experimental task, children are presented with a series of situations, some of which will have enough information to draw a conclusion (unambiguous) and others of which will not have enough information (ambiguous). For example, a child will be shown a house with two windows with curtains. Underneath each window will be an object to give children information about what tree they will see behind the curtains. Sometimes, the object will give the child enough information to know what tree it will be (unambiguous), but sometimes there will be a clue that will narrow the possible trees down to three options, or will not provide any information about the tree behind the curtain (ambiguous). Children will be given the opportunity to explore several ambiguous and unambiguous situations. Sessions are tape-recorded so that full attention can be given to each child during the game.

The value of this study is to advance our understanding of what motivates children to explore, and to identify ways that educators can use this understanding to design lessons and classroom activities.

P08-9 The Numbers Game (Mu / Siegler)

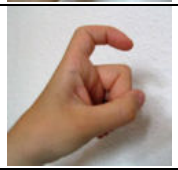
Psychology graduate student Yan Mu is working with Dr. Robert Siegler and collaborating with teachers at the Children's School to teach all of the 5 year old and some of the 4 year old children a system of hand gestures to represent numbers from 0 - 99. Based on studies with preschoolers in China, we hypothesize that mastering the use of these gestures will improve children's understanding of the place value system (ones, tens, etc.). The teachers will be incorporating these gestures into their regular lessons and activities throughout the year for the kindergarten and morning 4's classes.

At several points, Yan will be playing math games with all of the 4 and 5 year old children to determine which number concepts they understand. We can then compare the initial results collected in September with children's performance every few months. To determine number concept understanding, children are asked to do five small tasks within two brief sessions.

- Count numbers from one up to as high as possible.
- Find the proper place for numbers on a 0 to 100 number line.
- Compare two numbers and indicate which is bigger/smaller.
- Answer some questions involving addition and subtraction.
- Use their hands to show some numbers.

Generally speaking, this research will contribute to our understanding of how gesture can impact numerical understanding, which has the potential to help us further improve math teaching in preschools and kindergarten. At the Children's School, if we see impressive gains by the children learning the hand gestures, then we can incorporate these approaches in all of our classes and begin to track progress over a wider age range.

Sample Hand Gestures

8		The thumb and index finger make an "L", other fingers closed
9		The index finger makes a hook, other fingers closed.
10	  Left Right	Use left hand to make a "1" and use right hand to make a "0". Note: this is the double hands version of ten.

P09-5 In or Out Magic Game

Mayu Nishimura is a post-doctoral fellow working with Dr. Marlene Behrmann (Department of Psychology) to examine the development of face and object recognition. Recognizing faces is an important social skill, and adults have a remarkable ability to recognize and discriminate many faces. In particular, adults have an amazing sensitivity to the spatial relations among facial features, such that adults can notice a change in eye position (e.g. moving the eyes closer together) in a photograph within a few pixels! This study examines how this skill develops by comparing the ability of young children to older children and adolescents. Children will be told that a tricky wizard has changed our photographs, so that the eyes of a face are in the wrong place. We need children to help us out by sorting each photograph into bins of "eyes too far out" or "eyes too far in", so that we can use the appropriate magic to move the eyes back in or out. This game will be repeated with photographs of dominos (dots too far in/out) and cars (wheels too far in/out) to examine how this visual ability develops with age, and whether it develops specifically for faces (because faces provide important visual information to interact successfully with others) or more generally for all objects.

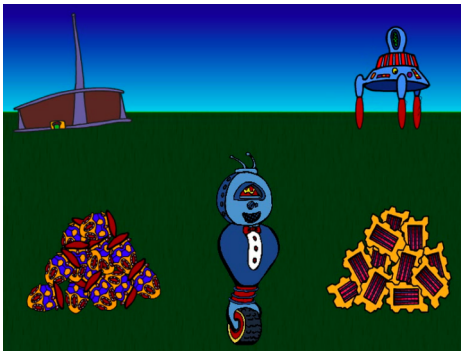
P09-7 The Memory Game

Dr. Robert Siegler, the Theresa Heinz Professor of Cognitive Psychology and Dr. Clarissa Thompson, postdoctoral research associate, are investigating whether the way children estimate numbers on a number line impacts the way that the children remember numbers presented in short stories. An example of a short story that your child listened to is: *Beth went to the library to read. At the library, she saw 18 newspapers*. Later, your child was asked to recall or recognize from a short list the numbers that he/she heard in the short story. Previous research has indicated that children will be more accurate at remembering smaller numbers (like 2) as compared to larger numbers (like 98). Your child also listened to short stories that contained a list of three words. An example of this type of short story is: *In Amy's room, there were: pillows, tables, and windows.* Later, your child was asked to recall what was in Amy's room.

Research has suggested that children living in East Asian countries outperform their U.S. counterparts on a variety of mathematical tasks. We wondered whether differences in mathematical performance might stem from underlying mental capacities like intelligence or memory abilities. We are also currently investigating Chinese children's memory for numbers and words to determine if there are cross-cultural differences in children's performance on these tasks. We hope that our findings will highlight why there is such a disparity in mathematical achievement between these two countries.

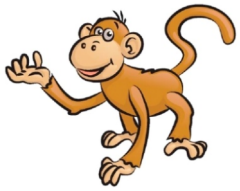
P09-11 Building Robby's House Game

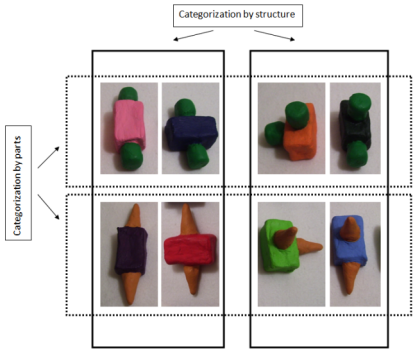
Dr. Dan Hufnagle and Dr. Lori Holt are investigating how context influences sound perception in children. The children help Robby the Robot (in the center of the picture below) to build his house by repeating the name of the building block that they hear. Another robot (upper right) tells the children over headphones what kind of block is needed, either "da" or "ga". The child then tells Robby, who chooses one from the appropriate pile of blocks. Before the robot says the name of the block, it either beeps or says, "Please say what this word is." Sometimes the name of the block is ambiguous (acoustically between "da" and "ga"). For adults, the context influences what sound they hear, depending on the pitch of the tones or words. We are interested in whether these sounds influence children in the same way they do adults in order to determine how the effect develops. The answer to this question will help us understand the nature of auditory perception.



P10-5 The Cleanup Time Game

When given a mix of objects, even very young children can successfully group them into distinct categories such as balls, blocks, animals, or vehicles. What are the foundations of this skill? Graduate student Yevdokiya Yermolayeva is working with Dr. David Rakison to investigate how changing the features of objects, such as the kind of parts they have or the structure of those parts, can influence how children group those objects. If parts are not very salient (small and the same color as the body, for example), will children rely on structure to categorize objects? If the objects all have the same type of body, will that make categorization easier or more difficult? As part of the study, children were asked to help Scribbles, the monkey, to separate sets of eight toys (represented by novel shapes) into two groups. We examined whether children chose to group objects based on parts or structure. Children played the sorting game with four sets of toys that varied with respect to the parts they had and the structure of those parts. This study will help us to understand what features children use to sort objects in different contexts.





Research Methods Project Samples

The Sorting Game

It is well-known that when presented with various objects younger children are more likely to group them thematically (e.g., dog and bowl) whereas older children are more likely to group things taxonomically (e.g., dog and bear). In our research project we will try (1) to replicate this finding by testing 3- and 5-year-old children and (2) to investigate children's ability to group things taxonomically in the absence of thematic choices. Examples of our stimuli are presented below.

Researchers:
Anna Fisher, Assistant Professor, Department of Psychology
Students in the Research Methods in Developmental Psychology class

The Blocks Game

Students from the Research Methods in Developmental Psychology at Carnegie Mellon University (Laura Alfonso, Kunjal Modi, Laura Pacilio, and Naomi Shah) are conducting an experiment to examine kindergarteners' use of objects to learn simple arithmetic. The purpose of the study is to further understand the effects of engaging objects and their benefits (if any) for learning math in children five years old.

The children will participate in a math game where they will do a pre-test of eight one-digit addition problems, followed by a short teaching session where they will be introduced do some blocks. The teaching session will either consist of plain ordinary blocks or colored decorative blocks. The experimenter will then show the child how to use the blocks for addition problems. The conditions are completely identical aside from the type of blocks used. After the teaching session the child will take a post-test that consists of the same problems on the pre-test. Each game takes about fifteen minutes to complete.

Some example problems include:
(1) 9 + 1 = ___
(2) 2 + 2 = ___
(3) 5 + 3 = ___
(4) 2 + 4 = ___

The hope is that we will better be able to facilitate arithmetic learning in kindergarten children by understanding what kind of manipulatives have a more positive result.

Name of Participant: _____
Class:
_____
Name of Experimenters: Laura Alfonso, Kunjal Modi, Laura Pacilio, Naomi Shah

The Story Game

Students, Jordan Valley, Meghan Macguire, and Julian Arney, from the Research Methods in Child Development Class are conducting an experiment to explore the effects of visual stimulation on story comprehension and recall. This study will further our knowledge about how to improve techniques and materials used during story time to scaffold the early development of reading skills.

There are two conditions in this experiment. Each participating four year old will be read a short story with illustrations individually, and asked simple comprehension and recall questions afterwards. On a separate day, the same child will be read another short story without illustration, and once again asked questions. The stories are, The Magic Soup and The Giant Mushroom. Both are written and illustrated by Janaki Sooriyarachchi.

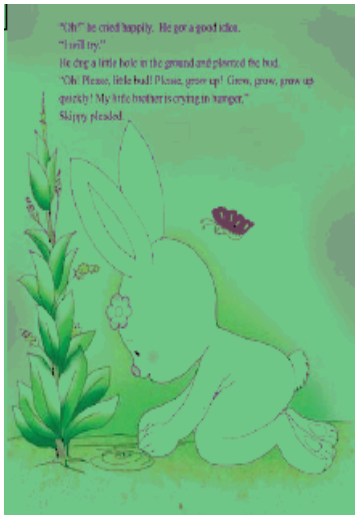
Each child spent approximately 15 - 20 minutes to play this story game. Below is a sample page from each story:

The Magic Soup

"Let's wash ourselves and get cleaned.
Otherwise Johney will get a stomachache."

The Giant Mushroom

"Oh!" he cried happily. He got a good idea.
"I will try."
He dug a little hole in the ground and planted the bud.
"Oh! Please, little bud! Please grow up! Grow, grow, grow up quickly! My little brother is crying in hunger," Skippy pleaded.



PARTICIPANT'S NAME:_____

Non-Research Project Samples

• Robot Design Project
(Fall 2008 -> Spring 2009 / integrated with our whole school music theme)

Keepon is a small yellow robot designed to study the underlying mechanisms of social communication by interacting with children. Keepon has four motors, a rubber skin, two cameras in its eyes, and a microphone in its nose. Its simple appearance and behavior are intended to help children, even those with developmental disorders such as autism to understand its attentive and emotive actions. Robotics graduate student Marek Michalowski is working to improve Keepon's synchrony with children's dancing motions while music is playing so that the robot behaves as naturally as possible. He will be introducing Keepon to our kindergarten children and and then observing the ways that they respond to each other when dancing to different types of music, using different Wii devices, and with different programs running on the robot. You'll get to meet and dance with Keepon at the Family Music Festival on February 26th.

• Industrial Design Observations & Interviews
January 2010

Dr. Wayne Chung is a professor in the School of Design who has partnered with the Radio Flyer Company for a project in the Junior Level Industrial Design Course. The company is still run by the family of founder, Antonio Pasin, whose 1917 dream was to "bring joy to every boy and every girl." The company "continues that tradition by building safe, quality toys that spark imagination and inspire active play."

The design project theme is "fun mobility" with the more specific challenge being to design a 4-season, indoor/outdoor ride-on toy. During January, Dr. Chung's students will interview Children's School educators and observe our children during their gym and playground time. Interested families may participate by answering questions and using a disposable camera to photograph children's play spaces and toys. As students progress in their projects, we may also get to test their prototype toys!