

# Cognitive Development Labs at Wesleyan University



*Dr. Hilary Barth with Yellow Lab members*



*Dr. Anna Shusterman with Blue Lab members*

The Cognitive Development Labs at Wesleyan University explore how children think about math and numbers, space and time, language, and people. Through short, fun games, the Labs investigate how kids learn about the world around them.

The Labs include the Yellow Lab, directed by Dr. Hilary Barth, and the Blue Lab, directed by Dr. Anna Shusterman. Both of the Cognitive Development Labs are located in Judd Hall on Wesleyan University's campus.

Our research would not be possible without the support of local schools, daycares, and families. If you have a child under age 12 and are interested in having your child participate in one of our studies, please contact us at 860-685-4887 or sign up online at [www.wesleyan.edu/cdl](http://www.wesleyan.edu/cdl).

# Lab Members, 2016-2017

## **Directors**

Hilary Barth (Yellow Lab)  
Anna Shusterman (Blue Lab)

## **Post-Doctoral Fellows**

Pierina Cheung (Blue Lab)  
Julia Xing (Yellow Lab)

## **Lab Coordinators**

Madeleine Barclay (Blue Lab)  
Alexandra Zax (Yellow Lab)

## **Research Assistants**

### **Yellow Lab**

Kerry Brew, Sarah Corner, Jordan Feingold-Link, Steven Fields, Jamie Hom, Meghana Kandlur, Ilana Ladis, Maxine Lai, Praise Owoyemi, Joanna Paul, Ray Peters, Sheri Reichelson, Elizabeth Shackney

### **Blue Lab**

Joy Adedokun, Sara Dean, Megan Dolan, Jordan Ellman, Emery Frick, Harry Jiang, Emily Kaplan-Levenson, Natalie May, Gabriella Montinola, Sifana Sohail, Mary Toomey

## 2016-2017 News

Dr. Hilary Barth and Dr. Andrea Patalano, another faculty member in Wesleyan's Psychology Department, received a major grant from the National Science Foundation to support a new collaborative research project. The grant supports behavioral research studies on childrens' and adults' understanding of number, space, time, and probability. The research project is conducted in collaboration with Dr. Sara Cordes at Boston College. This grant also supports an ongoing partnership with the Connecticut Science Center in Hartford. Science Center visitors can participate in studies and learn more about child development. We are often there on Saturday mornings, so be sure to look for our station on the fifth floor!

We have also done a lot of preschool outreach this year. Members of the Blue Lab attended Cromwell's Family Math Night, during which children entering kindergarten came with their families to play math games with our research assistants. Additionally, Dr. Shusterman celebrated the fifth anniversary of Kindergarten Kickstart, a research-based five-week summer preschool program aimed at helping students at risk for educational disadvantage develop literacy, numeracy, creativity, and social and behavioral skills that will ease their transition into kindergarten.

Additionally, we had the opportunity to present our research at the 2017 Society for Research in Child Development biennial meeting in Austin, TX.

We are excited to share with you what we were working on this year!



Thank you to everyone who makes our research possible!

BASREP, Inc.

Bethany Lutheran Preschool

Bielefield Elementary School

Brewster Elementary School

Burr Elementary School

Carriage House Day Care

Center Congregational Preschool

Chester Child Center

Christ Lutheran Nursery School

Clarke Schools for Hearing and Speech

Connecticut Science Center

Discovery Center Preschool

Haddam Elementary School

Head Start

HK Recreation Department

Island Avenue Elementary School

Jeffrey Elementary School

Kid City Children's Museum

Killingworth Elementary School

KOCO Child Care Center

Korn Elementary School

Kovacs Family Day School

Lawrence Elementary School

Lyman Elementary School

Madison Beach & Rec Department

Macdonough Elementary School

Meriden YMCA

Middlefield Children's Center

Middletown Cooperative Preschool

Miss Joanne's Learning Center

Moody Elementary School

Neighborhood Preschool

Northwest Children's Center

Roberge Childcare Center

Russell Library

Ryerson Elementary School

SERC Family Resource Center

Snow Preschool and Elementary School

Southfield Children's Center

Tender Care Learning Center

Town & Country Early Learning Center

Wallingford Community Day Care Center

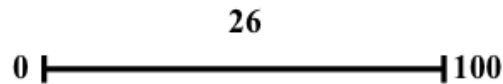
...and to all the children and families who participated!



# Yellow Lab Studies

## Thinking about numbers & space

Number lines can tell us a lot about what children do and do not understand about numbers. We have found that using number lines to estimate the sizes of numbers requires a collection of skills that are important for a good understanding of math. With increasing age, children also gain the ability to use the midpoint of number lines as a reference point, a strategy that leads to greater estimation accuracy. In a related project, we are also investigating preschoolers' and grade-schoolers' ability to estimate non-numerical magnitudes (like the location of a dot on a line). We find that although children's numerical and spatial thinking does change as they get older, children and adults do not think about numbers or space in fundamentally different ways. We are currently extending this research to look at how children and adults think about time intervals.



## Thinking about fairness when part of a group

How does being part of a group impact children's ideas about fairness? In this game, children were given a t-shirt and saw a photo of two people: One of these people wore a shirt that matched the child's, and the other did not. Children then distributed objects (like candy or craft supplies) to the two people in the photo. We've found that children give more objects to the person who is wearing the same color t-shirt as they are when forced to choose between two predetermined options, but when allowed to distribute the objects freely they are more likely to give the same number to both people. Additionally, older children are better than younger children at realizing that giving nothing to both recipients is one way of maintaining equality.



## Making decisions

Studies have shown that the way options are presented can shape how adults make decisions (including real world decisions like choosing retirement options or other financial choices). Is this true for children too, even when very young? We use games in which children choose options or distribute resources to ask if children's decisions are shaped by the different ways we display the options. In our latest study, we asked children (preschoolers through junior high school students) to hand out pretend "food" to animals at a zoo by placing tokens in boxes for different animals. We found that for children of all ages, the distribution of the food was strongly affected by the way the options were presented: Children behaved a lot like adults in this situation.





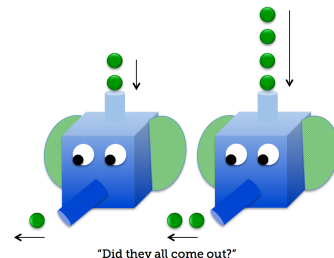
# Blue Lab Studies

## Toddlers' knowledge of "two"

What do very young children (age 18-30 months) understand about the quantity 2? In the "Mr. Elephant" game, children see Mr. Elephant eat 1, 2, or 4 "peanuts," which he then sneezes out of his trunk.



But sometimes, some of the peanuts get stuck in his trunk. Which quantities will children accurately track? In a related study, we show infants and young toddlers two sets of objects on a screen and label one set with a number word. We measure how long they look at the correct set of objects.



## Counting Errors

Children often make errors in counting. For example, in counting a set of three objects, they may say "1 2 3 4 5" without touching each individual object, or even "1 2 4." Are they aware of these errors? To probe the nature of counting errors, we ask children to count and generate sets of objects and record how often they make mistakes and what kind of mistakes they make. We also show them an animal puppet who sometimes does a good job in counting and sometimes makes mistakes. For instance, the puppet may skip a word in the count, or count the same item twice. We hope to better understand the relationship between children's counting behavior and their understanding of counting principles.

## Socioemotional Assessment

Learning productive and positive social skills is an important part of early child development. Many researchers and educators focus on how to help children develop these skills. However, there are very few effective assessment tools to track children's social and emotional development. The Socioemotional Assessment (SEA) uses a picture book format to measure children's social and emotional knowledge in a fun and interactive way. The picture book presents children with typical scenarios, such as having a toy taken by another child. We ask children to talk about how the child in each scenario feels and what he or she should do.

During circle time, everyone gets a bell for a song. Nancy's friend Katie is passing out the bells and drops the box, spilling the bells everywhere.



## Preschool Math Curriculum

Many teachers find that their existing preschool math curricula do not fit their classroom's needs. The Wesleyan Preschool Math Games were designed to be easily used and teacher-friendly. The games are based on current research on the cognitive development of mathematical knowledge, and extensively tested in local preschools. After years of iterative development, the curriculum was implemented and evaluated by early childhood educators in Naugatuck, CT through surveys and focus groups. The games received encouraging feedback and high ratings. We are preparing to test their effectiveness in improving young students' numeracy skills.

# Interested in participating?

860-685-4887 | [cdl@wesleyan.edu](mailto:cdl@wesleyan.edu) | [www.wesleyan.edu/cdl](http://www.wesleyan.edu/cdl)



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