

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.

Lab Members, 2017-2018

Directors

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

Post-Doctoral Fellows

Julia Xing (Yellow Lab)

Lab Coordinators

Sona Kumar (Blue Lab)
Katie Williams (Yellow Lab)

Research Assistants

Yellow Lab

Esha Bhandari, Kerry Brew, Jenny Chelmow, Taylor Clark, Taylor Dillon, Amanda Fiorentino, Jamie Hom, Meghana Kandlur, Sofia Kinney, Praise Owoyemi, Joanna Paul, Katie Vasquez

Blue Lab

Joy Adedokun, Cara Bendich, Stephen Ferruolo, Rebecca Houston-Read, Jordan Legaspi, Vivian Liu, Leslie Maldonado, Natalie May, Hannah Ratner, Kaila Scott, Sifana Sohail, Esme Stern, Lindsay Zelson

2017-2018 News

This past year we joined a number of community events around Middletown. Members of the Blue Lab attended the Halloween Downtown Trick or Treat and Fall Festival and shared games from our Preschool Math Curriculum with families at Preschool Math Night, hosted by the Cromwell Early Childhood / School Readiness Council. This Spring, both labs participated in the Middletown Easter Candy Hunt and Daffodil Day at Wadsworth Mansion. Sharing our research with the community is one of the best parts of the work that we do!

Natalie May B.A. '17, M.A. '18, completed her innovative Master's thesis project "Start With Yourself: A Teacher Intervention for Socio-emotional Growth."

Natalie developed and led workshops designed to improve socio-emotional awareness and coping strategies in early childhood educators, to help them enjoy their jobs and facilitate socio-emotional skills in preschool children. The Blue Lab is now working with the School Readiness Council in Middletown and other sites to bring this research-tested program to a wider audience of early childhood educators. Congratulations and well done, Natalie!

Additionally, we presented our research at the 2018 Cognitive Development Society biennial meeting in Portland, OR; the New England Psychological Association annual meeting in Boston, MA; and the 2018 International Meeting of the Psychonomic Society in Amsterdam, the Netherlands.

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

Yellow Lab Studies

Understanding Numerals and their Magnitudes

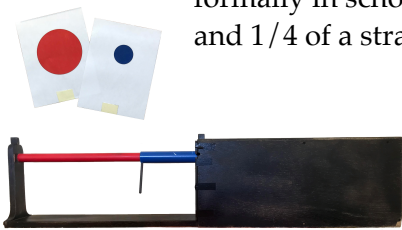
Once children learn how place value works and gain experience with multidigit numerals, they should understand that numbers like 399 and 401 have approximately the same numerical magnitudes. In some situations, kids do show evidence of this knowledge - but our recent research finds that their numerical judgments are more influenced by leftmost digits than you might expect! We used games that ask kids to make magnitude-based judgments (so that responses to “399” and “401” should be about the same), and found that their responses are heavily influenced by the hundreds digits “3” and “4” (so that responses to “399” and “401” were actually very different). We are currently exploring how kids’ ability to attend to overall numerical magnitudes might be related to other aspects of their number and math skills.

Thinking about Space (and Numbers and Time)

In one ongoing line of work, we are investigating children’s ability to remember and estimate both numerical and non-numerical magnitudes (like spatial distances, or temporal durations). We are exploring how people’s judgments are influenced by the context in which they appear: for example, a time interval can seem longer when it is presented in one context, and shorter in another. Our studies are exploring the role of context in kids’ and adults’ quantity judgments, and we are also trying to use these behaviors to understand some general principles about minds and brains.

Matching Proportions

How do children think intuitively about proportional relationships before they learn about them formally in school? For example, do they recognize the relationships between $1/4$ of a circle and $1/4$ of a straight line? We played a simple proportion-matching game with children to explore this ability at an early age. While young children do not show adult-like patterns of proportional reasoning, preschoolers produced relatively accurate judgments in this implicit proportional reasoning game. In our ongoing work, we aim to better understand the development of proportional reasoning abilities.



Decisions about Resource Allocation

Previous research shows that when adults make decisions, like choosing from a set of items or allocating resources to others, they are influenced by the way the options are presented. For example, a person buying 12 yogurts from a shelf of strawberry, vanilla, and coffee flavors will tend to spread their selections across all 3 flavors, possibly selecting four of each kind. But if they mentally categorized the options into “fruit” and “nonfruit”, they’d be more likely to “diversify” across those two types - perhaps choosing six strawberry (fruit) and six total vanilla and coffee (nonfruit). This is called “partition dependence” or PD, and in some contexts, it can lead to decisions that are irrational or unwise. Our previous work found the first evidence of PD in children’s decisions, using a new game in which kids were asked to distribute pretend food to animals at the zoo. In our recent work, we examined patterns of developmental change. We find that younger children’s decisions show more extreme PD in our zoo animal game than older children’s decisions (while adults’ decisions don’t show PD at all in this game). We believe greater experience with numbers and mathematical relationships helped the adults avoid PD in our simple child-friendly game. An ongoing line of research is exploring how partition dependence can “nudge” decisions in different kinds of situations.



Blue Lab Studies

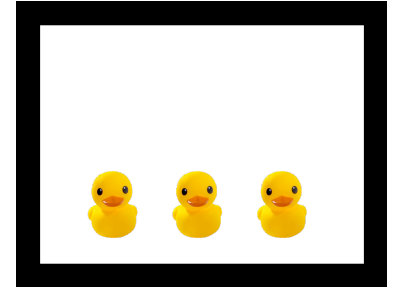
Toddlers' knowledge of "two"

We are interested in children's early number word meanings. For example, do they understand the meaning of "two" before being able to count and generate a set of two objects? In this study, the child looks at a blank curtain on a big

tablet and is told "Look! There are 3 ducks!" The curtain is then raised and either two or three ducks are displayed. We record the length of time that the child looks at the display to

determine whether the child matches what they heard (there are 3 ducks) with what they see (either 2 or 3 objects). Do they look longer at the set of two objects or the set of three objects?

Look, 2 ducks!



Navigation with Landmarks

Adults can use many different kinds of spatial information, including maps, landmarks, and landscapes, to find their way around. How do these abilities develop in children? Our current set of studies explores children's ability to use salient visual cues for navigation. In the study, children watch as a sticker is hidden in one corner of our special navigation room, which is very plain except for one interesting wall. Then, children spin around with a blindfold on so that they lose their sense of where they are in space. When they take off the blindfold, we want to know if children will use the position of the interesting wall to help them find the sticker.

In previous studies, we have explored which features of the interesting wall can influence children's ability to navigate in the room. This year, we began investigating whether symmetrical or asymmetrical murals help children orient themselves, as well as the effect of scenes (like the



landscape on the left) versus objects (like the array above). We are in the midst of collecting data for this study! Thanks to all the children who have worn the bedazzled blindfolds for our study, known to kids as the "treasure hunt game".



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 in early childhood education settings.



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

Kidcity 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

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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

St. John Lutheran Preschool

Tender Care Learning Center

The Independent Day School

Town & Country Early Learning Center

Wallingford Community Day Care Center

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

Interested in participating?

860-685-4887 | cdl@wesleyan.edu | www.wesleyan.edu/cdl



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