

# COGNITIVE DEVELOPMENT NEWS

brought to you by the Cognition Learning And Development (**CLAD**) Lab at Notre Dame

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## What's new in the CLAD Lab? Hellos and goodbyes

This past spring was full of changes for the CLAD Lab. We started a new study with local preschools, welcomed 8 new lab members, said goodbye to our seniors, and moved into a new building.

Congratulations to our newest alumni who are moving on to new adventures! Regina Ekaputri will be a 3rd grade teacher as part of

the ND ACE Teaching Fellows program, Rachel Iverson will be an AmeriCorps VISTA member at North Park University, Zosia Zdanowicz will begin medical school at Loyola University in Chicago, and Jenna Galuska will be working as an analyst. Congrats also to Megan Miranda, *research assistant*, who will begin graduate school at Tufts University

in the school psychology program. We'll miss you!

We also said farewell to Haggar Hall, our home for the past 12 years. Along with the rest of the psychology department, we moved into Corbett Family Hall, which was part of the Campus Crossroads project at the football stadium. We are settling in and looking forward to the new possibilities it offers!

## Reading & opportunities to pick books prevents summer learning loss

Parents and educators often wonder how much to encourage focused learning over the summer while also allowing their child time for free play. A study conducted by Jimmy Kim at The Center for Evaluation American Academy of Arts and Sciences confirmed that summer book reading was positively related to fall reading achievement. In addition, he found that increased access to books also promotes summer book reading. In this study, a summer reading survey was administered to a diverse population from 18 elementary schools to determine how many books each child read over the summer, what books they read over the summer, and how they accessed the books to read. By using achievement testing scores from spring to fall, Kim determined from the survey results that the quantity of books read over the summer positively affected reading achievement scores in the fall. More specifically, he found that reading four to five books had significantly larger effects than reading three or fewer books over the summer. In turn, the more access the children had to books via public libraries, school libraries, and bookstores, the more their volume of books read increased, thus improving their reading achievement over the summer months.

These results suggest that parents and educators should both encourage their children to read multiple books over the summer months, while also finding ways to increase their opportunities to access books. By reading more over the summer, children will be more likely to maintain or improve their reading skills.



## Featured CLAD Lab Study: Making sense out of math word problems

Word problems are synonymous with middle school math for many students. Unfortunately, students frequently do not make sense of traditional “textbook” word problems. They will often neglect any impact of their own real-world knowledge and provide nonsensical responses (e.g. they may respond to a problem saying that “a school needs to order 12.5 buses for a field trip.”)

Graduate student **Patrick Kirkland** tested whether rewriting traditional word problems to introduce some doubt or uncertainty about the result would be beneficial to student performance and sense-making. Middle school students solved a series of word problems in their usual math classrooms. They were randomly assigned to one of three conditions. In the textbook control condition, students solved traditional word problems taken from current 7th grade textbooks. In the disfluency control condition, students solved the same word problems, but the problems were presented with a variety of fonts. In the Yes/No intervention condition, students solved the same problems with the question rewritten so that it could be answered with a “yes” or “no.” After solving 6 problems in their assigned condition, all students solved the same 3 “problematic” problems designed to assess students’ sense-making (from Verschaffel & De Corte 1997).

Surprisingly, students in the Yes/No intervention condition spent more time on the word problems on average and solved significantly fewer traditional word problems correctly than students in the other two conditions. However, they subsequently demonstrated more sense-making on the problematic problems. Perhaps this is a case of a desirable difficulty, where making the question a Yes/No leads students to think more deeply about the problem. Students spent more time on the word problems, perhaps engaging more with the realistic context of the problem. These results suggest that having students solve non-routine word problems may help students make sense of the realistic context of a problem.

## Preschoolers' math development improves with playing on tablets

As tablets and educational apps become more and more prevalent it is important to understand how technology influences the learning and development of children. John Schacter and researchers at Stanford University wanted to explore how tablets could improve early mathematics learning in preschool classrooms. They developed an app called *Math Shelf* based on evidence-based practices from the learning sciences. They then recruited 20 preschools and conducted a randomized control trial to determine the app's efficacy. Preschools in the app condition had their students play on the app twice a week for 10 minutes a session. Preschools in the control condition received evidence-based, hands-on math instruction from their classroom teacher twice a week. After 22 weeks of math instruction (with either the app or the live teacher), all children were assessed on their math skills.

Results showed that children using the app learned about 9 months more math than children in the control condition. This finding suggests that the math app was effective in promoting children's early mathematics development. The study also revealed that children with less math knowledge were



particularly helped by the app. This may be because children learn at different rates and the app matches games and activities to children's individual knowledge and skill.

Another benefit of the math apps is that it provides teachers with data on individual student's development, which can be used to inform teachers' instruction. The data from the app can be used to group and regroup students for small group lessons where a teacher can provide targeted on-level lessons to their students. With the power of individualized learning programs and the added benefit of using data to inform teacher instruction, tablets and other apps have the possibility to have a positive influence on children's learning and can change the way preschool teachers help promote the development of mathematical thinking in their classrooms.

## Current opportunities to participate in studies

**2.5-3 year olds** - We are interested in how parents and children read books together. Children will participate with a caregiver in a single session in Corbett Hall that lasts ~45 minutes. If you have a child who is 3 or will be turning 3 this year and would like to participate, please email us at [clad@nd.edu](mailto:clad@nd.edu) to set up a time.

**Babies and Toddlers** - The *Infant Studies Lab* is always looking for infants from birth through 30 months to participate in language studies! If you and your baby are interested in participating, email [babylab@nd.edu](mailto:babylab@nd.edu) or take [this survey](#) for more information.

**All ages** - *The Shaw Center for Children and Families* is home to many different research projects designed to help support and build stronger families. You can see a list of their current projects at [shaw.nd.edu/community-resources/](http://shaw.nd.edu/community-resources/) or email [shawcenter@nd.edu](mailto:shawcenter@nd.edu) for more information.

# CLAD team updates

**Connor O'Rear**, *grad student*, **Megan Miranda**, *research assistant*, and undergraduates, **Wiktoria Kozłowska**, **Elizabeth Chen**, **Adrian Barragan**, and **Alice Felker**, all helped with our book reading intervention study at local preschools this spring.

We welcomed eight new lab members to help with this study. **Joanna Azar**, **Mary Fairchild**, and **Naomi Nothdurft** joined our team as staff research assistants. **Lily Kenesey**, **Allison Hubbard**, **Carolina Botero**, **Christina Hayford**, and **Alli VanOverbergh**e joined as undergraduate research assistants.

In addition to helping with our book reading study, **Patrick Kirkland**, *grad student*, completed his first-year project (see p. 2).

We're thrilled to report that this summer **Joanna Azar** became the new CLAD Lab manager! Joanna has a B.S. in education from Indiana University-Bloomington, a M.S. in education from IUSB, and nearly 20 years of experience as an educator. Welcome Joanna!

Four students successfully completed their senior thesis projects this spring. **Zosia Zdanowicz** examined how children from different backgrounds use gestures when reasoning about mathematics. **Rachel Iverson** examined how the order in which children count objects affects improvements in their understanding of math concepts and skills. **Regina Ekaputri** examined whether an art-based intervention focused on visual thinking strategies transfers into more flexible and creative thinking when solving math problems. **Jenna Galuska** examined how stereotypes about women in STEM differentially affects the math performance of women in different STEM majors.

**Nicole McNeil**, *lab director*, was appointed as an associate editor of the journal *Cognitive Science*, the official journal of the Cognitive Science Society. It publishes articles in all areas of cognitive science, including perception, knowledge representation, learning, problem solving, language, and mathematical understanding.



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