

Title: Longitudinal Peer Social Networks and Early Language Development: Transforming Understanding of Critical Features of Young Children’s Classroom Experiences

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In the first study to use the innovative technology of radio frequency identification and voice recorders to analyze preschoolers’ social networks over time, faculty experts in early childhood development, engineering, physics and psychology from three universities will collaborate to examine a central research question:

To what extent do peer social networks — that is, small groups of children — influence children’s language development in inclusive preschool settings over the course of an academic year?

Knowledge gained from this study will help create an intervention for use by children’s peers to support more inclusive preschool classrooms, particularly for children with disabilities or language impairment. The researchers will also study how children’s social-emotional development is affected through peer social networks.

The co-principal investigators are:

- Laura Justice, EHE Distinguished Professor of Educational Studies, director of the Crane Center for Early Childhood Education and Policy, and a speech and language developmental specialist, College of Education and Human Ecology, The Ohio State University
- Daniel Messinger, assistant professor of psychology, pediatrics and electrical and computer engineering, Child Division, Department of Psychology, University of Miami, Florida
- Dwight Irvin, assistant research professor with Juniper Gardens Children’s Project, University of Kansas

Ten inclusive preschool classrooms for 3- to 4-year-olds will be chosen in each of the three states for a total of 500 children, with special attention to recruiting inclusive classrooms in rural areas.

This project follows a pilot study completed by doctoral student Leydi Chaparro-Moreno with Justice and other faculty that recorded children’s interactions using wearable cameras.

This project will use state-of-the-art wearable sensing systems based on radio frequency identification (RFID) to record where each child is within a classroom at a given time.

Irvin and Messinger have used this technology in their research and are experienced in analyzing resulting data. The technology works through location trackers, worn on both shoulders of a vest, that interact with antennae in the classroom walls. The system records the position of children in the classroom as often as four times per second, with X and Y coordinates and time stamps.

A second piece of equipment — a voice-activated recorder — provides continuous data tied to each child, and a custom, automatic, speech recognition system captures interactions and the precise nature of peer-to-peer talk.

With these two pieces of information — position and speech activity — the researchers can decode interactions that occur in classrooms both in terms of language quantity exchanged by children and language quality.

The researchers will identify the main drivers of language development. Peer effects in the classroom have long been associated with language growth. The team wants to know what this effect looks like. Do children grow more in a classroom that has a more uniform distribution of interactions? Do they grow more when children interact within their group but not across groups? What about children who do not have a group?

Results are likely to transform understanding of peer-to-peer dynamics in inclusive preschool classrooms. The study will support teachers' use of practices to leverage the role of peers in shaping early language development.

Additional principal investigators on the project are:

- Kelly Purtell, assistant professor of human development and family science, College of Education and Human Ecology
- Tzu-Jung Lin, associate professor of educational psychology, College of Education and Human Ecology
- Hugo Gonzalez Villasanti, postdoctoral researcher, Crane Center for Early Childhood Education Research and Policy, College of Education and Human Ecology
- Lynn K. Perry, assistant professor, Child Division, Department of Psychology, University of Miami
- Chaoming Song, associate professor, Department of Physics, University of Miami
- Batya Elbaum, professor of developmental psychology, Department of Psychology, University of Miami
- Brian Boyd, associate professor of occupational science and director, Juniper Gardens Children's Project, University of Kansas
- Jay Buzhardt, associate research professor, Juniper Gardens Children's Project, University of Kansas