

# RAISE: RURAL AUTISM INDIVIDUALS - SUPPORTING EXPRESSION

## Improving language comprehension via gestures in rural Montana children with language impairment and/or autism

### INFORMATION FOR CLINICIANS

#### Our Team (expertise):

Sarah Pennington, Ph.D. (dyslexia, education, and eye tracking)  
Nadya Modyanova, Ph.D. (autism and language impairment in children)  
Kalli Decker, Ph.D. (rural services and gestures)

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**Project summary:** Our research investigates how specific types of gestures can support receptive communication skills of hearing children with Language Impairments and/or Autism in rural communities. The study uses eye tracking methodology to understand relationships between successful understanding of determiners, such as “that”, and gestures such as “same”. The overarching goals of the project are to understand how individuals/families can effectively utilize gestures to support communication with their children. →(see the end of the document for longer project summary and link to iPoster)

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<https://www.montana.edu/perl/projects.html>

#### Characteristics of potential participants:

1. Confirmed diagnosis (preferably) or unofficial diagnosis of an autism spectrum disorder, or a receptive language impairment, or both. Other additional diagnoses are accepted.
2. Ages 4-18 preferred.
3. Boys and Girls.
4. Normal hearing and vision (or vision corrected to normal with glasses or contacts).
5. Nonverbal IQ of 70 or above, and/or nonverbal mental age equivalent of 4 years or above, **and/or** the ability to play simple computer games on a computer\*\*, to look at picture books, and listen to sentences and words.
6. Native speakers of English (additional languages ok)
7. Able to speak in short sentences or, if nonverbal, able to communicate with gestures.
8. Caregivers and participants should preferably live in a rural area. However, we are also including folks who live in a city.

\*\*The participants should be able to sit (relatively still) at a computer, look at the screen, click on pictures on a screen with a mouse based on a verbal prompt, for ~10 minutes at a time. Children would get ample breaks. They should be able to keep their hands quiet. It’s also possible for participants to point to a computer screen and have the caregiver click the mouse for them.

#### Additional comments on participant criteria:

1. If a participant meets the above criteria, and they have an inborn or acquired brain abnormality, they can be eligible to participate.
2. If a participant has poor hearing, that is likely a problem because most our prompts are auditory.
3. If the participant has a nonverbal mental age below 4 years, or standard score below 70 on a nonverbal IQ measure, they may still be eligible to participate if they can listen and play a computer game and/or point to pictures under guidance of their caregiver.

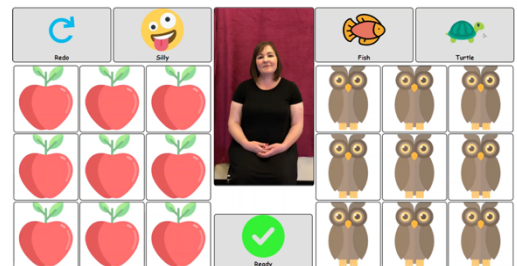


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#### Sample stimuli:



#### Sample gesture:



### Participant incentives:

1. The researchers from our team will visit participants in their homes at a time convenient for participants and their families for the assessments. Alternatively, participants and their caregivers are welcome to come our lab at Montana State University-Bozeman (parking at MSU campus will be paid for).
2. Participant will be provided with one \$90 gift certificate to Amazon.com as a token of appreciation.
3. Participants and their caregivers will be provided with a summary of current state of the art regarding how using gestures can help with language comprehension, and with a report of participant's scores which can then be shared with their healthcare provider as necessary.

### Description of assessments (estimated time to complete is 2-3 hours in total. 2-3 visits with shorter time periods):

- A. For caregivers
  - 1) Social Communication Questionnaire (SCQ) to assess participant's autism symptoms (social interaction, communicative domain, & repetitive behaviors).
  - 2) Children's Communication Checklist (CCC-2) to assess participant's language skills, especially pragmatic and social interaction skills.
  - 3) Our demographic/informational questionnaire – to assess socioeconomic status and verify diagnoses.
- B. Standardized and established measures for participants
  - 1) Kaufmann Brief Intelligence Test (KBIT) to assess participants' nonverbal IQ.
  - 2) Motor-Free Visual Perception Test- Fourth Edition (MVPT-4) to assess visuospatial skills.
  - 3) Nonverbal Inhibition Hand-Fist Task/Luria's Hand Game to test executive functioning.
  - 4) Children's Test of Nonword Repetition (CNRep) to assess short-term phonological working memory.
  - 5) Test for Auditory Comprehension of Language (TACL) to assess receptive language/grammar.
  - 6) Peabody Picture Vocabulary Test (PPVT) to assess receptive vocabulary.
- C. Experimental tasks
  - 1) Nonverbal False Belief task to test Theory of Mind skills (inferring about others' points of view).
  - 2) Determiner and gesture comprehension tasks.

Participants will be audio recorded for all tasks, and their eyes will be video recorded during Experimental tasks.

### iPoster from recent conference with our preliminary findings!

<https://nisbre2022.ipostersessions.com/default.aspx?s=2C-5C-A5-04-5B-68-84-EF-C6-F4-81-A7-4A-1E-04-B2&guestview=true>

**Longer Project summary:** Many hearing individuals with language impairments (Developmental Language Disorder (DLD), 7% of children) and/or Autism Spectrum Disorder (ASD, 3% of children) experience persistent deficits in communication. Such difficulties can lead to less-than-optimal life outcomes and wellbeing, and reduced independence for DLD/ASD individuals. Interventions are possible for children with DLD/ASD, but when they are living in rural areas, such interventions are hard to reach, and few interventions can be done at home, thus increasing **disparity in access to healthcare in rural children** with DLD/ASD and their families. With all this in mind, the **goal of this study** is to investigate how specific gestures can support DLD/ASD children in rural Montana with comprehension of determiners like “the” and “an”, which are known to be difficult in DLD/ASD communication. Extant literature indicates gestures support comprehension and production of language for DLD/ASD; however, little is known about how spoken determiners and related gestures interact for these children. This study utilizes eye tracking and pretest-training-test-posttest protocols to gain insight into hearing children's (both typical and with DLD/ASD) understanding of specific determiners when integrated with specific gestures. These methods will allow the researchers to determine children's attention and comprehension processes as they engage in the experimental tasks. Our preliminary findings suggest the gestures seem to help with comprehension of some determiners for some participants. This study **has two specific aims**. The first is to determine the feasibility of doing this study in the participants' homes. The second aim is to collect preliminary quantitative and qualitative data on how using certain gestures helps or hinders comprehension of certain determiners. The short-term outcome is to provide results of the study and existing research to caregivers in a timely manner – informing them of how caregiver gestures can help support their child's language comprehension and development. The **significance** of this work lies in its potential to identify specific gestures that are supportive of DLD/ASD individuals' comprehension of spoken language, which could be investigated in the future as part of randomized controlled trial of an intervention to help families communicate better with individuals with DLD/ASD. This project is **innovative** in that it utilizes eye tracking tools to gain a nuanced understanding of the degree to which specific gestures may be supportive of language comprehension in children with DLD/ASD.