



Language Development in Young Children with Down Syndrome



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Agenda for Today

- Down syndrome
- Caregiver-Child Interactions
 - Study 1: Gesture Recodes
 - Study 2: Mothers and Fathers in shared book reading
- Current study and late talkers



Financial Disclosures

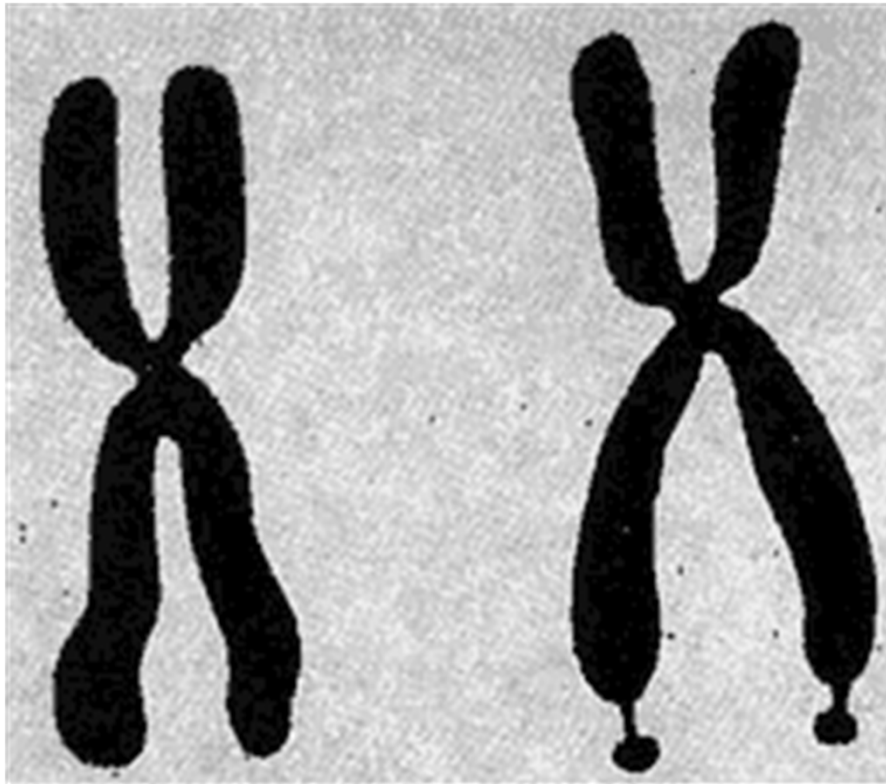
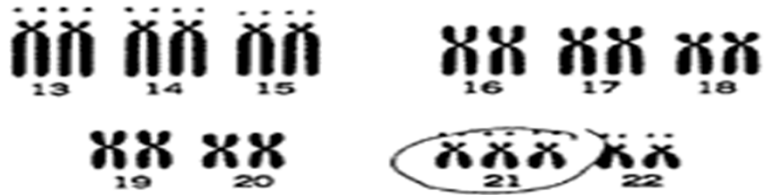
- I am a faculty member at the University of Wisconsin-Madison, Associate Chair, and an Investigator at the Waisman Center. I receive a salary for these roles.
- I receive grant money from the NIH and internal grants from UW-Madison which support the work presented as well as salary support.
- I have reviewed grants for the NIH and received compensation for my work.



+



Language Learners



Presence of a
+ disability changes
the language
acquisition



Down Syndrome

Associated Conditions

- Language impairment
- Intellectual disability
- Middle ear infection/Hearing loss
- Visual impairment
- Autism (5-39%)
- Congenital heart defect
- Obstructive sleep apnea
- Dementia



Caregiver-Child Interactions





Caregiver-Child Interactions





How do caregivers respond to gestures?

- Caregivers can build on child gestures
- Powerful language learning tool
- Recodes: Translations and expansions of child communication



AJSLP

Research Article

Maternal Responsiveness to Gestures in Children With Down Syndrome

Emily Lorang,^a Audra Sterling,^a and Bianca Schroeder^a



How do caregivers respond to child gestures?

- RQ1. Do children with DS gesture more compared to age- matched neurotypical children?
- RQ2. How do mothers respond to child gestures in DS and neurotypical? How do maternal recodes to child gestures differ based on the child's age and diagnosis?



Participants

	Down syndrome n = 22 (11 boys)		Neurotypical Children n = 22 (12 boys)		Group comparisons ¹
	M	SD	M	SD	
Chronological Age	42.80 (mo)	12	44.0	10.40	p = .715
Maternal Education	15.57	1.55	16.14	2.06	p = .383
MSEL early learning composite²	56.41	8.86	115.33	18.41	p<.001
Expressive language raw score²	21.32	7.42	41.48	7.65	p<.001

¹Independent sample *t*-tests between groups. ²Scores from the Mullen Scales of Early Learning



Method

- Mother-child interactions in home
 - Free play, snack, and book reading
 - 21 minutes of video coded for child gestures and maternal recodes
- Mullen Scales of Early Learning



Coding

	Definition	Example	Adapted from:
Child Codes			
Gestures	Intentional hand or head movement that did not include object manipulation and was used to express an idea or communicate information. Had to be paired with a joint referent or adult attention	Signs, points, head nods, shows, gives	Dimitrova et al., 2016; Iverson et al., 2003
Maternal Codes			
Recodes	Direct spoken translation of the child's gesture either with or without a maternal gesture	Child points to a picture of a dog and the parent says, "dog,"	Brady et al., 2013

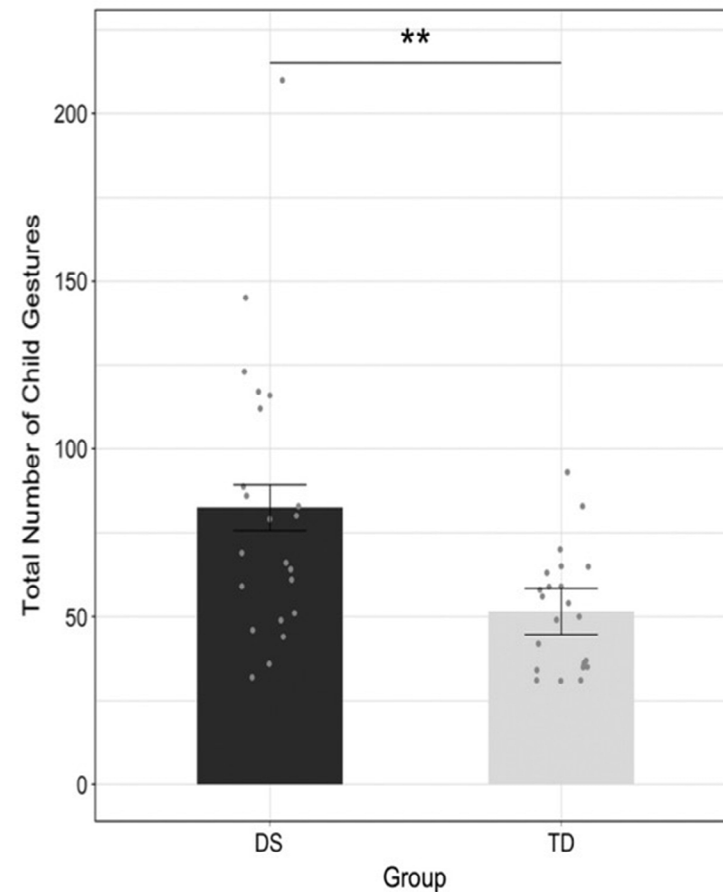


How do caregivers respond to child gestures?

- RQ1: Gestures in DS and neurotypical children

	DS Mean (SD)	TD Mean (SD)	p^1
Gestures	82.59 (41.70)	51.18 (17.62)	.003

¹Independent samples *t*-test



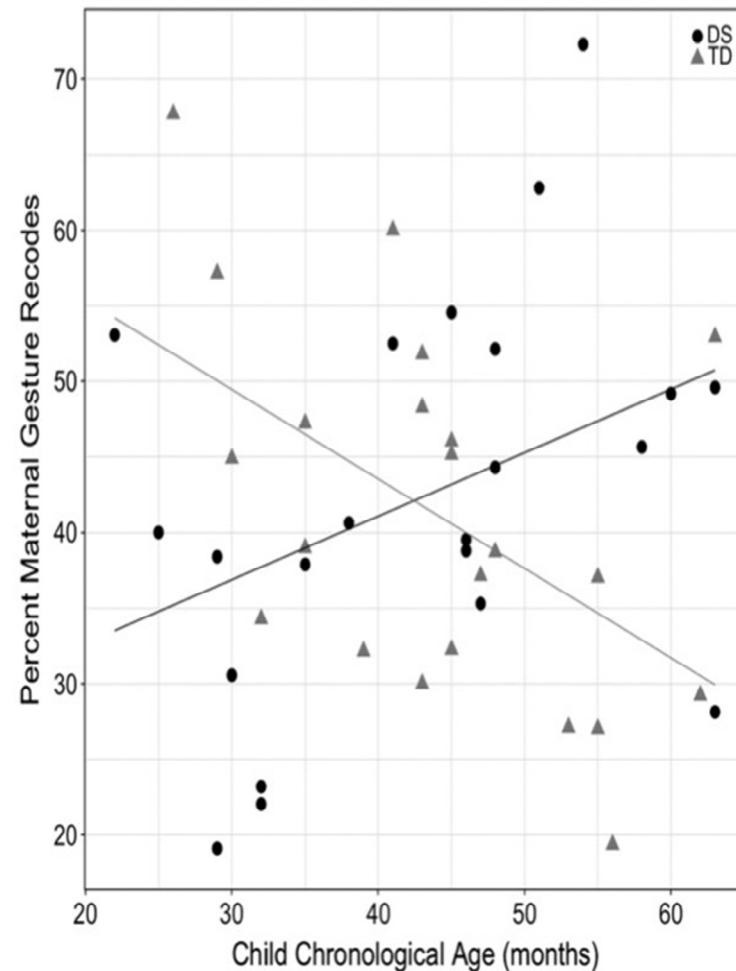


How do caregivers respond to child gestures?

- RQ2: Maternal recodes in DS compared to neurotypical children. Does age make a difference?

	DS M (SD)	TD M (SD)	p^1
% gestures with recodes	42 (13)	41 (12)	.767

¹Independent samples *t*-test





How do caregivers respond to child gestures?

Discussion:

- Mothers are naturally recoding child gestures.
- Could we increase this to help child language growth?
- Is this easy to teach and buy-in from caregivers?

Limitations:

- Only mothers
- Small samples
- Only DS! Expand to other groups of children



What about mothers AND fathers?

- Heavy reliance on work in mothers
- Changing roles related to caregiving
- Fathers play an important role in child language development (Cutler & Palkovitz, 2020)
- Focus on contextualized vs. decontextualized input in shared book reading



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BRIEF RESEARCH REPORT

Assessing the Quantity and Quality of Language Used by Mothers and Fathers of Children with Down Syndrome During Shared Book Reading

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Shared Book Reading in Children with DS

- RQ1: Compare the quantity and quality of input provided by mothers and fathers of children with DS during separate parent-child shared book reading interactions.
- RQ2: Examine the relationship between parental input and various child characteristics (e.g., chronological age, language ability).



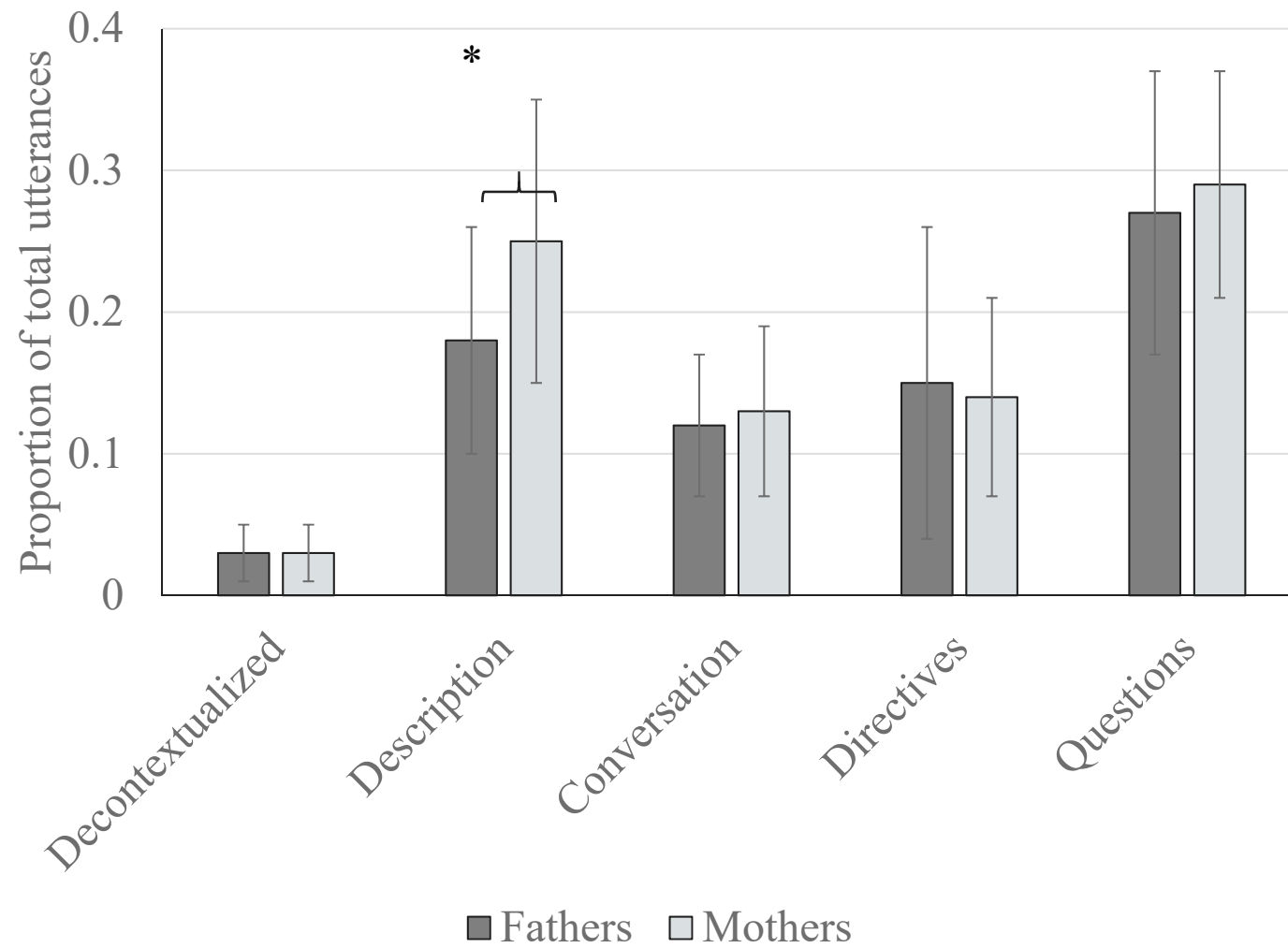
Participants

- 15 mother-father-child triads
 - Children: 2-5 years of age
 - Parents: No differences in ages, education
 - Mean age: Fathers: 39.60 (6.13); Mothers: 39.27 (5.64)
- In home assessment
 - Mullen Scales of Early Learning
 - Videotaped shared book reading



Shared Book Reading in Children with DS: RQ1

	Fathers, n = 14 M(SD)	Mothers, n = 14 M (SD)	<i>t</i>	<i>p</i>	<i>d</i>
Lexical Diversity	232.64 (70.21)	221.79 (49.77)	0.57	.579	.14
Grammatical Complexity	4.37 (.77)	3.84 (.75)	2.06	.060	.66
Talkativeness*	171.14 (38.47) Range: 104-234	200.86 (29.50) Range: 159-259	2.26	.042	1.76
Reading*	.26 (.15)	.16 (.12)	2.38	.033	.56



$*p = .046$
 $d = .64$

Child Variables	Maternal Input Variables (<i>n</i> = 15)				
	Grammatical Complexity	Lexical Diversity	Proportion of Reading	Proportion of Decontextualized Talk	Proportion of Contextualized Talk
Child chronological age	.15	.13	.07	.44	-.24
Expressive language raw score	.43	.43	.37	.17	-.45
Receptive language raw score	.51	.44	.44	.07	-.46
Grammatical complexity	.35	.57*	.52*	.01	-.46
Lexical diversity	.44	.52*	.39	.26	-.44
Child Variables	Paternal Input Variables (<i>n</i> = 14)				
	Grammatical Complexity	Lexical Diversity	Proportion of Reading	Proportion of Decontextualized Talk	Proportion of Contextualized Talk
Chronological age	.04	-.12	-.09	.72**	-.004
Expressive language raw score	.41	.15	.39	.64*	-.46
Receptive language raw score	.55*	.41	.41	.50	-.46
Grammatical complexity	.13	.11	.02	.32	-.07
Lexical diversity	.18	.004	.05	.72**	-.14

Note. **p* < .050; ***p* < .010.



Shared Book Reading in Children with DS

Discussion

- Parents had many similarities with a few differences.
- Majority of time in contextualized talk (76%), followed by reading (21%), then decontextualized (3%).
- How can we support these interactions and build on them?
- Impact of contextualized vs. decontextualized input over time.

Limitations:

- Two caregiver households
 - Same sex couples, single parents, other caregivers, etc
- Small sample size



Current Study: Technology for Outcome Measures for Interventions

- Funded by: NIHR21HD111807
- NIH INCLUDE Project: INvestigation of Co-occurring conditions across the Lifespan to Understand Down syndromE





Need for appropriate and meaningful outcome measures

- Researchers and clinicians are challenged to identify **appropriate outcome measures** to evaluate language growth of young children with Down syndrome.
- Most standardized assessments do not consider outcomes in the context of a child's typical environment, which is typically **at home** and with the **child's parents**.



- Traditional measures are insufficient

They require **extensive resources** to collect, code, and transcribe.

They are **costly** in terms of travel time for families and/or researchers and clinicians.

They are **not practical** for clinical trials and clinical practice.



Possible Solution?

- One way to reduce costs is to **coach families to self record home-based caregiver-child interactions** to share with researchers/clinicians.
- The goal of our current project is to examine the **feasibility** of caregivers collecting their own home-based caregiver-child interactions that can then be used to assess the communication skills of **2- to 5-year-olds with Down syndrome**.



Two Caregiver-Child Interactions

15 minutes each, two different days

• Choice Activity

1. We would like you to play with your child as you typically would using your own toys or routines.
2. Examples of some free-choice activities are:
 - Reading books
 - Playing with toys and/or dolls
 - Building with blocks or Legos
 - Doing a household chore
3. Please do not record while eating, as it is difficult to understand children while eating.

• Playset Activity

1. We would like you to play with your child as you typically would. We want this interaction to feel as natural as possible, so do whatever feels most comfortable for you and your child!
2. We have provided you with toys and books to help encourage language from your child. You can use just one, some, or all of these toys or books.
3. If you find your child does not enjoy these toys or books, please use other toys in your home.





We provide some materials



- ❑ Toy set: three interactive toys and two books
- ❑ Playmat
- ❑ Tripod and recording device (if needed)



Details on how to self-record the interaction

How to Record on the Galaxy Tablet

1. Put the tablet on the tripod.
2. Open the camera app.



3. Make sure the entire play mat is visible on the screen.



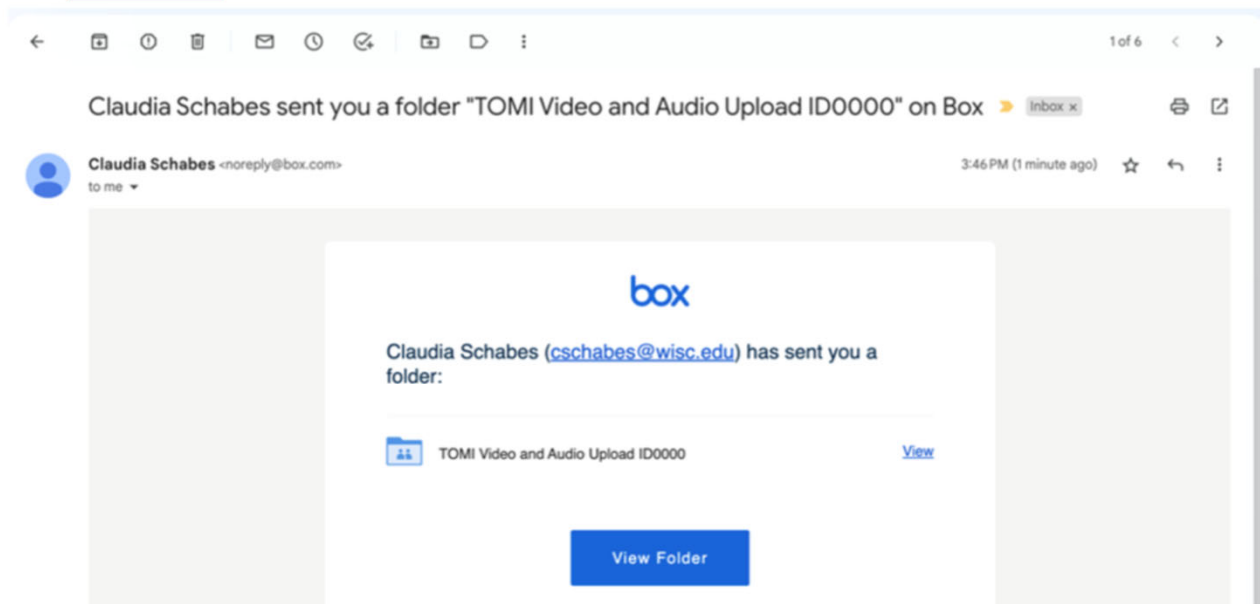


Instructions on how to safely and securely share the recordings with the study team

SHARING THE RECORDING

To Use Your Web Browser to Share with the Study Team

1. Go to your email, find the Box email, and select “[View Folder](#)”







Study is ongoing

- Goal = 40 children with DS
 - 2-5 years of age
 - 30 in study to date!
- Late talkers: TALK Initiative
 - 2-3 year olds
 - Goal = 20 children

NIH launches new initiative: Tackling Acquisition of Language in Kids (TALK)

September 28, 2023

In early 2023, the National Institutes of Health (NIH) launched the Tackling Acquisition of Language in Kids (TALK) initiative in response to congressional interest in research to support late talking children. It has since grown into an initiative with engagement across five institutes co-led by the National Institute on Deafness and Other Communication Disorders (NIDCD) and the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), and with participation from the National Institute of Neurological Disorders and Stroke (NINDS), the National Institute of Mental Health (NIMH), and the National Center for Advancing Translational Sciences (NCATS).



Future Directions

- Interventions tailored to DS and other clinical groups
 - Consider strengths and weaknesses
 - What works for the family?
- Continuing to fine-tune assessments

Acknowledgments

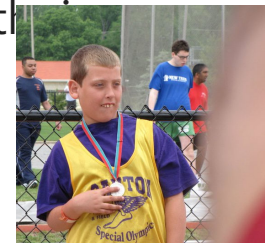
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 - Len Abbeduto, Ph.D.
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 - Emily Lorang, Ph.D., CCC-SLP
 - Laura Friedman, Ph.D., CCC-SLP
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 - Latifatu Mohammed, M.S.
- Families who have invested time and energy; allowed us into their homes, traveled across the country to participate!





Thank you!



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