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# Language Regression as a Predictor of Outcomes in Autistic Children Through the Preschool Years

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## BACKGROUND

- Parents frequently report observing word loss (i.e., regression) in young autistic children, but the evidence for differences in resulting language outcomes remains equivocal.
- Most previous studies reported worse language outcomes in the regression group (e.g., Bernabei et al., 2007). Some evidence suggests no effect (Pickles et al., 2009; Tamanaha et al., 2014), and one reported better current outcomes in the regression group (Davidovitch et al., 2000).
- Most studies require strict word loss criteria be met based on the ADI-R, which may exclude many children experiencing subthreshold losses (Pearson et al., 2018). By employing three progressively less strict sets of definitional criteria, the current study sought to capture what may be a more dimensional symptom onset pattern.
- In addition, little is known about regression in preverbal communication skills such as cooing, babbling, and vocal imitation.
- Autistic children demonstrate an uneven language profile across the preschool years, but it is not yet known whether regression impacts expressive and receptive language equally (Davidson & Ellis Weismer, 2017).
- Using a standardized measure specifically designed to assess expressive and receptive language independently, this study added needed clarity and refinement to our current understanding of the impact of regression in ASD.

## RESEARCH QUESTIONS

- Do autistic children with a history of language/communication regression demonstrate different expressive and receptive language outcomes across the preschool years than autistic children without a history of language/communication regression?
- Among autistic children with a history of language/communication regression, does the number of words used before loss predict expressive and receptive language outcomes across the preschool years?

## METHOD

**Participants.** Data were collected as part of a larger longitudinal project investigating language outcomes among 129 autistic children from age 30 months to 66 months. ASD diagnoses were confirmed via administration of the ADOS, ADI-R Toddler Module, and best estimate clinical diagnosis per DSM IV-TR criteria (current standard at the time of data collection).

## METHOD

**Procedure.** Participants were administered a battery of assessments including autism diagnostic, cognitive, and language measures at 3-4 visits spaced approximately 12 months apart. In the present study, Visit 1 (30 months) ADI-R data were used to define regression by three progressively less strict sets of criteria (Table 1). Visit 1 Mullen Scales of Early Learning (MSEL) nonverbal ratio IQ scores were included in analyses to control for nonverbal cognition. Preschool Language Scales Fourth Edition (PLS-4) Auditory Comprehension (AC) and Expressive Communication (EC) raw scores from visit 2 (44 months) and visit 4 (66 months) were used to measure language outcomes.

Level of regression	Criteria	
Definite Word Loss (per ADI-R criteria)	Definite loss of 3 or more words; defined by score of 2 on ADI-R Toddler Module Q34	Strict ↓ Broad
Any Word Loss	Word loss of any amount; defined as score of 2 or 1 on Q34 and/or Q42 and score of <0 on Q37	
Any Communication Skill Loss	Definite loss of any communication skill; defined as meeting criteria for definite word loss or any word loss or score of 2 on any of the following preverbal communication skill loss items: Q38, Q39, Q40, Q41	

Table 1. Schema for operationally defining language regression using ADI-R Toddler Module loss questions

**Analysis Plan.** Question 1: for each set of regression criteria, ANCOVA models were fit using regression group (loss/no loss), child age, and nonverbal cognition as predictor variables and visit 2 and 4 PLS-4 EC and AC raw scores as outcome variables. Question 2: among only participants who experienced loss according to each of the three sets of criteria with number of words used before loss, linear regression models were fit including child age, and nonverbal cognition as predictor variables and visit 2 and 4 PLS-4 EC and AC raw scores as outcome variables.

## RESULTS

### Question 1:

- Controlling for child age and nonverbal IQ, children with history of regression had lower AC raw scores at visit 2 (44 months) than those without, no matter which set of regression criteria were used (Figure 1). This difference was not significant for any set of criteria at visit 4 (66 months).
- Controlling for child age and nonverbal IQ, children with history of regression had a greater discrepancy between AC and EC raw scores at visit 2 (44 months) than those without, no matter which set of regression criteria were used (Figure 2). This difference was not significant for any set of criteria at visit 4 (66 months).

## RESULTS

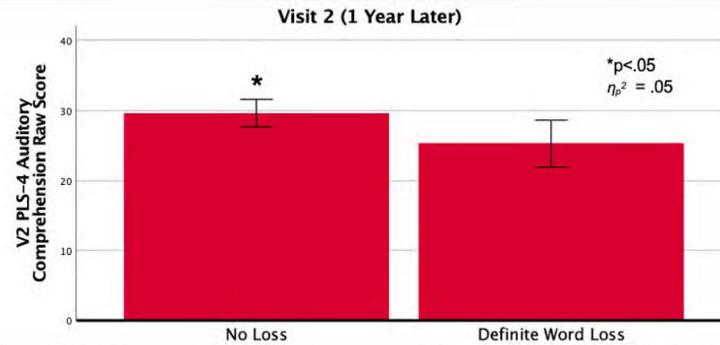


Figure 1. PLS-4 AC raw scores for loss and no loss groups per Definite Word Loss criteria, controlling for child age and nonverbal IQ among children who met criteria for Definite Word Loss at visit 2 (44 months old)

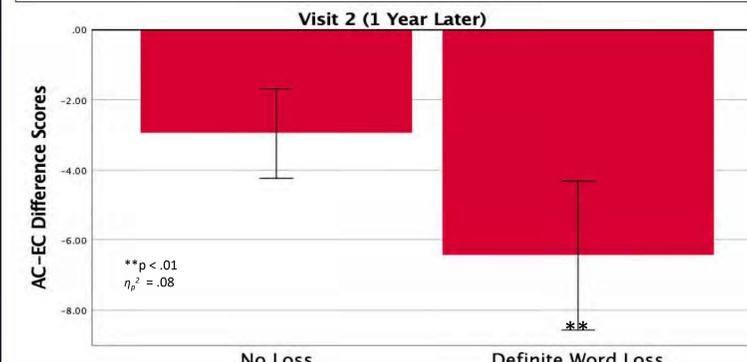


Figure 2. Discrepancy between PLS-4 AC and EC raw scores controlling for child age and nonverbal IQ among children who met criteria for Definite Word Loss at visit 2 (44 months old)

### Question 2:

- Controlling for child age and nonverbal IQ, number of words used before loss predicted AC (Figure 3) and EC (Figure 4) raw scores at visit 2 (44 months) among those who met criteria for Any Communication Skill Loss. This effect was not significant for any set of criteria at visit 4 (66 months).

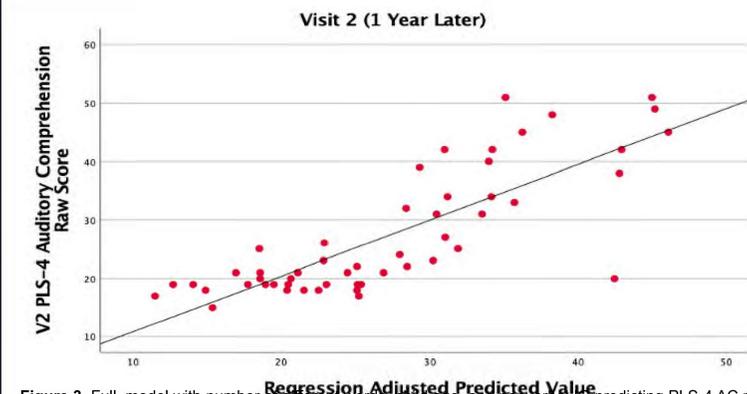


Figure 3. Full model with number of different words, child age, and nonverbal IQ predicting PLS-4 AC raw scores among children who met criteria for Any Communication Skill Loss at visit 2 (44 months old)

## RESULTS

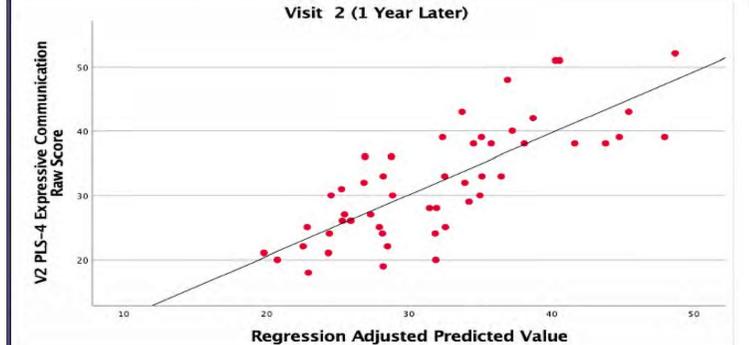


Figure 4. Full model with number of different words, child age, and nonverbal IQ predicting PLS-4 AC raw scores among children who met criteria for Any Communication Skill Loss at visit 2 (44 months old)

## CONCLUSIONS

- Regression in ASD may have a small, transient (within the first 12 months following assessment) effect on receptive language
- Differences in language outcomes between children with and without regression are no longer detectable by school entry (66 months),
- Regression in ASD may be dimensional rather than dichotomous, underspecified by traditional criteria
- Regression in ASD does not appear to develop into a unique language profile or require a specialized clinical approach
- Clinicians are advised to personalize speech-language intervention to the individual strengths and needs of each autistic child

## REFERENCES

Bernabei, P., Cerquiglini, A., Cortesi, F., & D'Ardia, G. (2007). Regression versus no regression in the autistic disorder: Developmental trajectories. *Journal of Autism and Developmental Disorders*, 37(3), 580–588.

Davidovitch, M., Glick, L., Holtzman, G., Tirosh, E., & Safir, M. P. (2000). Developmental regression in autism: Maternal perception. *Journal of Autism and Developmental Disorders*, 30(2), 113–119.

Davidson, M. M., & Ellis Weismer, S. (2014). Characterization and prediction of early reading abilities in children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 44(4), 828–845.

Pearson, N., Charman, T., Happé, F., Bolton, P. F., & McEwen, F. S. (2018). Regression in autism spectrum disorder: Reconciling findings from retrospective and prospective research. *Autism Research*, 11(12), 1602–1620.

Pickles, A., Simonoff, E., Conti-Ramsden, G., Falcaro, M., Simkin, Z., Charman, T., ... Baird, G. (2009). Loss of language in early development of autism and specific language impairment. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 50(7), 843–852.

Tamanaha, A. C., Machado, G. M. G., Loebmann, C., & Perissinoto, J. (2014). Process of speech acquisition and development of autistic children with or without autistic regression. *CODAS*, 26(4), 265–269.

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