



Social Communication in High School Students on the Autism Spectrum: Examining Profiles, Correlations, and Subgroups

Jessica Dykstra Steinbrenner¹, John Sideris¹ & Sallie Wallace Nowell²



¹ Frank Porter Graham Child Development Institute, University of North Carolina, Chapel Hill
² Division of Speech and Hearing Sciences, University of North Carolina, Chapel Hill



Background

- Adult outcomes for individuals on the autism spectrum are poor relative to peers with other developmental disabilities with low levels of employment, post-secondary education, friendships, and community involvement (Howlin et al., 2013; Rosenthal et al., 2013; Shattuck et al., 2012; Taylor & Seltzer, 2011, Wagner et al., 2004)
- Social-communication skills are a core area of need for individuals with ASD (APA, 2013) and are critical for success in adulthood (Magiati et al., 2014)
- Knowing the range of social-communication characteristics and profiles of high school students on the autism spectrum could help to develop and identify effective treatments

About the CSESA Study

The Center on Secondary Education for Students with Autism Spectrum Disorder (CSESA) is a 5-year research and development project that focuses on developing, adapting, and studying a comprehensive school- and community-based education program for high school students on the autism spectrum. The data for the current study is from the pretest data from a large randomized controlled trial study. More information at <http://cesea.fpg.unc.edu/>

Research Aims

1. To examine the social-communication profiles of high school students with ASD
2. To explore subgroups of high school students with ASD in relation to receptive and expressive communication, interpersonal skills, and social abilities
3. To examine relationships of social-communication skills with other skills and behaviors

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Howlin, P., Moss, P., Savage, S., & Rutter, M. (2013). Social outcomes in mid- to later adulthood among individuals diagnosed with autism and average nonverbal IQ as children. *Journal of the American Academy of Child & Adolescent Psychiatry*, 52(6), 572-581. doi: 10.1016/j.jaac.2013.02.017

Magiati, I., Tay, X. W., & Howlin, P. (2014). Cognitive, language, social and behavioural outcomes in adults with autism spectrum disorders: A systematic review of longitudinal follow-up studies in adulthood. *Clinical Psychology Review*, 34(1), 73-86. doi: 10.1016/j.cpr.2013.11.002

Rosenthal, M., Wallace, G. L., Lawson, R., Wills, M. C., Dixon, E., Yerys, B. E., & Kenworthy, L. (2013). Impairments in real-world executive function increase from childhood to adolescence in autism spectrum disorders. *Neuropsychology*, 27, 13-18. doi:10.1037/a0031299

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*, 129, 1042-1049. doi:10.1542/peds.2011-2864

Taylor, J. L., & Seltzer, M. M. (2011). Employment and postsecondary educational activities for young adults with autism spectrum disorders during the transition to adulthood. *Journal of Autism and Developmental Disorders*, 41, 566-574. doi:10.1007/s10803-010-1070-3

Wagner, M., Cadwallader, T. W., Garza, N., & Cameto, R. (2004). Social activities of youth with disabilities. *National Longitudinal Transition Study 2 Data Brief*, 3, 1-4.

Acknowledgements

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education through Grant R324C120006 awarded to UNC-Chapel Hill. The opinions expressed represent those of the authors and do not represent views of the Institute or the U.S. Department of Education.

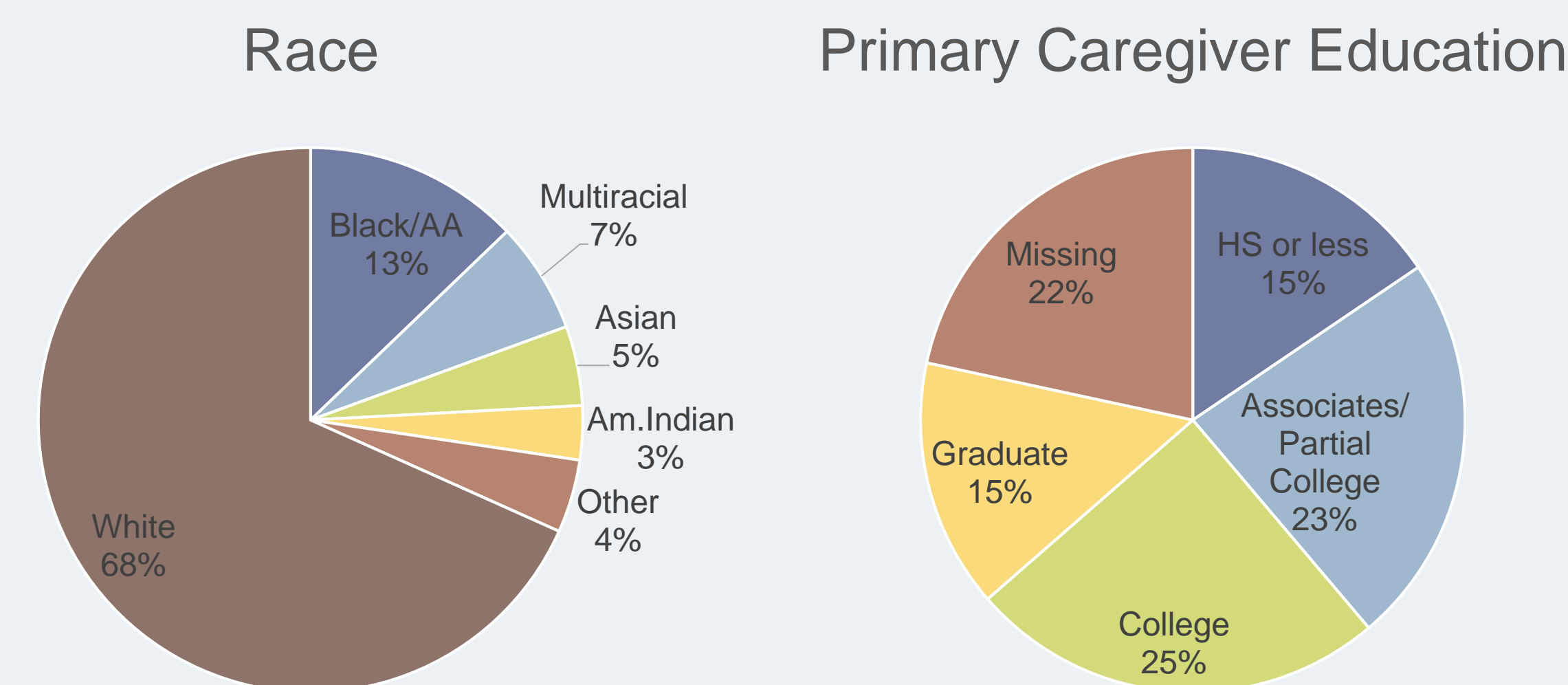
Methods

Student Sample

- 545 total students
- Recruited from 60 schools in 3 states (CA, NC, WI)
- Educational label of autism (primary or secondary)
- Receiving IDEA services with an IEP

Student Demographics

- Age: 13-21 years (mean=16.2)
- Gender: 86% male
- Ethnicity: 20% Hispanic



Assessments

- Completed during fall semester of study entry
- Include direct assessments, parent report, & teacher report

Measure	N	Mean (SD)	Range	Notes
Leiter International Performance Scales-3	490	85.8 (27.2)	30-141	Nonverbal IQ
Vineland Adaptive Behavior Composite	460	75.8 (16.7)	20-131	Everyday skills for daily demands in life
Woodcock-Johnson-III Passage Comprehension	500	66.5 (32.5)	1-137	Reading comprehension
Woodcock-Johnson-III Academic Knowledge	500	69.1 (30.4)	1-131	Social studies, science, and humanities

Data Analysis

- Descriptive statistics of social-communication measures to examine profiles
- Latent Profile Analysis to examine subgroups
 - Fit with series of models beginning with single class and adding additional classes until model fit was unimproved for 2 stages
- Correlations to examine relationships of language and social skills with other skills and behaviors

Results: Language & Social Profiles (Aim 1)

- Descriptive statistics of measures related to language, communication, and social characteristics

Measure	N	Mean (SD)	Range	Notes
Social Responsiveness Scale-2 (SRS-2)	510	70.4 (12.3)	39-110	Measure of autism symptoms
Vineland – Receptive Communication	460	11.9 (3.4)	2-17	Comprehension, listening and attending
Vineland-Expressive Communication	460	11.1 (3.0)	2-18	Word/sentence use, form and function
Vineland-Interpersonal Relationships	460	9.9 (3.0)	3-19	Interactions with others, emotions, relationships

Conclusions (Aim 1)

- High school students on the autism spectrum exhibit a very wide array of language skills, social skills, and autism symptomatology
- Overall, language and social skills are below expected ranges, even in high school

Results: Relationships of Language/Social Profiles to Other Skills/Behaviors (Aim 3)

Cognitive, Adaptive & Academic Skills

Measure	Rec.Comm.	Exp.Comm.	Inter.Rel.	SRS-2
Nonverbal IQ (Leiter-3)	0.51 n=416	0.59 n=416	0.38 n=416	-0.28 n=461
Adaptive Behavior (Vineland)	0.84 n=460	0.89 n=460	0.82 n=460	-0.62 n=455
Daily Living Skills (Vineland)	0.78 n=460	0.80 n=460	0.66 n=460	-0.54 n=455
Passage Comprehension (WJ-III)	0.62 n=426	0.71 n=426	0.49 n=426	-0.35 n=468
Academic Knowledge (WJ-III)	0.60 n=420	0.72 n=420	0.50 n=420	-0.35 n=462

- Communication characteristics are strongly correlated with non-verbal IQ and adaptive functioning; social characteristics are moderately correlated with non-verbal IQ and strongly correlated with adaptive functioning
- Communication characteristics are strongly correlated with academic performance; social characteristics are moderately correlated with academic performance

Conclusions (Aim 3)

- Ongoing intervention to support communication skills may be important for academic and adaptive outcomes
- Social characteristics are not as strongly linked to academic skills; however, it is important to consider how social skills would impact classroom academic performance.

Results: Examining Subgroups (Aim 2)

- Model based estimates of the key measures

Measure	Group 1	Group 2	Group 3
Social Responsiveness Scale-2 (SRS-2)	80.67	68.36	56.82
Vineland – Receptive Communication	8.68	12.51	15.96
Vineland-Expressive Communication	7.84	11.79	15.48
Vineland-Interpersonal Relationships	7.14	10.11	14.62

- Model fit improved significantly through the third class (p=0.0005), but not the fourth (p=0.32) or fifth class (p=0.29) based on the adjusted Lo-Mendell Rubin test

Conclusions (Aim 2)

- The 3 factor solution appears to be three groups along a continuum, rather than groups with differing language and social profiles
- Exploring LPA for other characteristics may be helpful in tailoring intervention programs

Social Participation

Measure	Rec.Comm.	Exp.Comm.	Inter.Rel.	SRS-2
Social Behavior Ratings-Teacher	0.36 n=312	0.42 n=312	0.53 n=312	-0.54 n=335
Social Behavior Ratings-Parent	0.24 n=313	0.25 n=313	0.27 n=313	-0.24 n=342
# of peers w/ interactions-Teacher	0.06 ns n=312	0.13 n=312	0.26 n=312	-0.20 n=335
Social Participation-Parent	0.24 n=312	0.32 n=312	0.34 n=312	-0.25 n=335
In person activities	0.08 ns n=312	0.09 ns n=312	0.17 n=312	-0.14 n=341
Technology-based activities	0.31 n=314	0.42 n=314	0.40 n=314	-0.30 n=343

- Communication characteristics are moderately correlated with *technology-based*, but not *in-person* social participation
- Social characteristics are weakly to moderately correlated with social behavior ratings

Conclusions (Aim 3)

- Peer/social participation is more strongly associated with social characteristics than communication characteristics
- Technology may be a powerful tool for social participation, particularly for individuals with higher language abilities