



Developmental Characteristics and Profiles of High School Students on the Autism Spectrum

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Background

- Recent estimates of prevalence estimates for ASD are 1 in 68 individuals (CDC, 2014) so there are increasing numbers of students on the autism spectrum in high schools
- 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://csefa.fpg.unc.edu/>

Research Questions

- What are the language and social profiles of high school students on the autism spectrum?
- How do language and social profiles relate to (a) cognitive and adaptive functioning, (b) academic skills, and (c) social behaviors?

References

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

CDC (2014) Prevalence of autism spectrum disorders among children aged 8 years: autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *MMWR Surveillance Summaries* 63(2): 1–22.

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., Stierling, 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.

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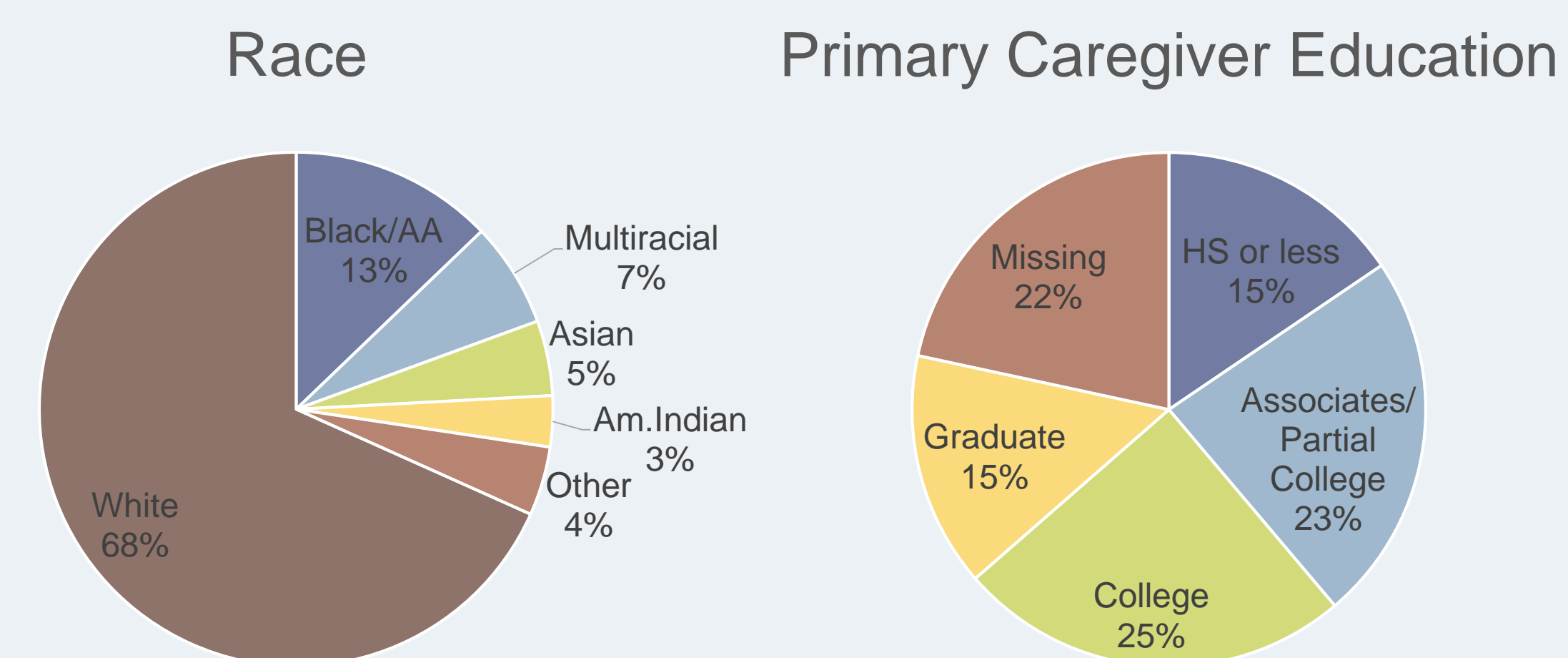
Methods

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

- Used descriptive statistics of social-communication measures to examine profiles
- Used correlations to examine relationships of language and social skills with other skills and behaviors

Results(Q1): Language & Social Profiles

- 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 & Clinical Implications (Q1)

- 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
- High school students continue to exhibit deficits that warrant speech-language pathology services

Results (Q2): Relationships of Language and Social Profiles to Other Skills and Behaviors

Cognition and Adaptive Functioning

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

- 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

Conclusions & Clinical Implications (Q2)

- Receptive communication, expressive communication, interpersonal relationship, adaptive behavior and daily living skills are all drawn from the same measure (Vineland) so the very strong relationships may reflect that
- Although these relationships are correlational and not causal, ongoing intervention during high school related to communication skills may be important for adaptive outcomes, which are critical for success and independence in adulthood

Academic Skills

Measure	Rec.Comm.	Exp.Comm.	Inter.Rel.	SRS-2
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 academic performance
- Social characteristics are moderately correlated with academic performance

Conclusions & Clinical Implications (Q2)

- Communication characteristics are strongly tied to academic skills. Although these relationships are correlational and not causal, ongoing intervention to support communication skills may be important for academic 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 (e.g., group work).

Social Behaviors

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 & Clinical Implications (Q2)

- Social characteristics are more strongly associated with peer/social participation than communication characteristics
- Technology may be a powerful tool for social participation, particularly for individuals with higher language abilities
- SLPs can play an important role in supporting social participation for individuals with ASD of all language abilities