Published in final edited form as:

Autism Res. 2020 December ; 13(12): 2164–2176. doi:10.1002/aur.2337.

Student, Educator, and Parent Perspectives of Self-Determination in High School Students with Autism Spectrum Disorder

Brianne Tomaszewski[1,2], **Bonnie Kraemer**[3], **Jessica R. Steinbrenner**[1], **Leann E. Smith DaWalt**[4], **Laura J. Hall**[3], **Kara Hume**[1], **Samuel Odom**[1]

[(1)]Frank Porter Graham Child Development Institute, University of North Carolina at Chapel Hill, Chapel Hill, NC

[(2)]TEACCH Autism Program, UNC-Chapel Hill

[(3)]Special Education, San Diego State University, San Diego, CA

[(4)]University of Wisconsin-Madison Waisman Center, Madison, WI

Abstract

Self-determination refers to an individual being a causal agent in their daily activities, including the ability to express their own needs, interests, and wants, make choices, and set goals. Self-determination is critical during adolescence and has been linked to positive educational outcomes in individuals with disabilities. Few studies have characterized the measurement of self-determination in adolescents with autism spectrum disorder (ASD). The purpose of the current study was to (1) examine the agreement across the American Institutes for Research Self-Determination Scale (AIR-SDS; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994) student, educator, and parent forms for high school students with ASD, and (2) examine student and family predictors of self-determination. Participants included adolescents with ASD (N = 547, Mean Chronological Age = 16.1 years SD = 1.4 years), their parents, and educators. Student reports did not correspond to parent or educator reports, and parent and educator reports were in moderate agreement. Adaptive behavior was a significant predictor of self-determination across reporters, highlighting the significance of adaptive behavior skills during high school. In addition to promoting adaptive behavior, supporting family empowerment, and reducing family burden may help to increase self-determination in high school students with ASD.

Lay Summary

Self-determination refers to the abilities and opportunities for students to make choices, plans, and set goals. The current study examined self-determination from multiple perspectives in a large, diverse sample of high school students with ASD. Students, parents, and their teachers each completed a questionnaire on self-determination and had little to some agreement across reporters. Providing support to families and help for students to increase independent skills may promote self-determination.

Corresponding Author Brianne Tomaszewski, Frank Porter Graham Child Development Institute, TEACCH Autism Program, University of North Carolina at Chapel Hill, Brianne.Tomaszewski@med.unc.edu, Phone: 919-962-8563.

Keywords

Adolescents; Self-Report; Autism Spectrum Disorder; Personal Autonomy; Choice Behavior; Surveys and Questionnaires

Introduction

The Autism and Developing Disabilities Monitoring Network reported a 15% increase in the prevalence of autism spectrum disorder (ASD) in 8-year-old children across the United States from 1 in 68 in 2012 to 1 in 59 in 2018 using health and educational record reviews (Baio et al., 2018). The 2016 National Survey of Children's Health reported a prevalence of 1 in 40 for children ages 3 to 17 using parent report and the highest prevalence rate in 12-17-year-olds (Kogan et al., 2018). These studies provide evidence for a growing population of students with ASD who are entering high school. Approximately 10% of students are receiving services under the educational classification of ASD under the Individuals with Disabilities Education Improvement Act of 2004 (IDEA), which suggests that approximately 290,000 12-21-year-olds received autism services in schools in 2017 (U. S. Department of Education, 2018). The increased prevalence and growing number of high school students highlight the significance of understanding the impact of secondary education programs and services for this population.

Secondary education for students with developmental disabilities refers to the period when youth are in high school (14 to 18 years old) or transition (18 to 22 years old) programs. It is a critical period in the lifespan for individuals with ASD, as it is the last opportunity for them to receive the provisions and entitlements afforded by the Individuals with Disabilities Education Improvement Act (IDEA, 2004). One educational component that has been associated with positive school-based and post-secondary outcomes for individuals with disabilities, including ASD, is self-determination (Shogren, Palmer, Wehmeyer, Williams-Diehm, & Little, 2012; Whemeyer & Palmer, 2003). Specifically, self-determination skills are associated with access to general education (Shogren et al., 2012) independent living skills, employment, and greater access to benefits(Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015; Wehmeyer & Palmer, 2003), and community access (Shogren et al., 2015).

Self-determination refers to the ability of, and opportunity for, students to make their own decisions and advocate for themselves (Wehmeyer, 2015). Promoting self-determination in secondary education for students with ASD has been associated with an increase in quality of life in adulthood (Kim, 2019; White, Flanagan, & Nadig, 2018). Secondary students with ASD must be able to identify the types of supports and accommodations they need and must be able to articulate these needs to receive those services in college or on the job. However, due to the unique communication and social needs of students with ASD, specific educational and environmental components may be necessary to foster self-determined behavior (Wehmeyer, Shogren, Zager, Smith, & Simpson, 2010). Prior research suggests that students with ASD have lower levels of self-determination than students with intellectual disabilities and students with learning disabilities (Chou, Wehmeyer, Palmer, & Lee, 2017a), this may be related to their difficulties in social interactions, a skill associated with self-

determination (e.g., Nota, Ferrari, Soresi, & Wehmeyer, 2007; Pierson, Carter, Lane, & Glaeser, 2008). Few studies have examined self-determination exclusively in high school students with ASD (Chou, Wehmeyer, Shogren, Palmer, & Lee, 2017b). The vast majority of studies on self-determination only include adolescents with ASD as a subgroup (Carter et al., 2013a; Carter et al., 2013b; Shogren, Shaw, Raley, & Wehmeyer, 2018). To promote self-determination in high school students with ASD, we must first understand the perspectives of self-determination in this population from multiple respondents.

Although there are many studies in the literature highlighting discrepancies in respondent ratings (students, educators, parents) on child psychopathology (De Los Reyes et al., 2015;De Los Reyes & Kazdin, 2004; 2005), including studies with children with ASD (Jepsen, Gray, & Taffe, 2012; Kuusikko et al., 2009; Lerner et al., 2012; McMahon & Solomon, 2015; Stratis & Lecavalier, 2015), few studies have examined multi-rater responses related to more adaptive behaviors associated with positive outcomes in adulthood for individuals with ASD. To our knowledge, no studies have examined the role of multiple reporters on self-determination outcomes in autism, and only two studies have examined self-determination from multiple informants in other disabilities. The first study included students with emotional and learning disabilities suggest that students, educators, and parents differ in their ratings of opportunities for students to use self-determination (Carter, Lane, Piereson, & Glaeser, 2006). The second study suggested that teachers and parents differed in their ratings of self-determination abilities in students with developmental and intellectual disabilities (Carter et al., 2009). Self-determination skills involve the skills of the student, and both educational and home environments to provide opportunities for students to use these skills. Understanding multiple stakeholder perspectives of self-determination in this population may be critical to identifying intervention targets.

Studies have reported several student and school characteristics as significant indicators of self-determination. School setting, frequency of challenging behavior, disability level, age, and free and reduced lunch status have been reported as significant predictors of parent-reports of self-determination in children with ASD and children with intellectual disabilities ages 5 to 18. Parents reported higher levels of self-determination in children spending more time in general education settings, children with fewer challenging behaviors and mild/moderate disabilities, older children, and females (Carter et al., 2013b). The impact of Free and Reduced Lunch and disability and race and ethnicity groups on self-reports of self-determination was examined in a large sample of high school students ages 13-22 (Shogren et al., 2018). Students with ASD who were African American or Black and Hispanic or Latino had the largest discrepancies of scores between students who were receiving free and reduced price lunch versus students who were not. Students who were receiving free and reduced price lunch had lower self-determination scores than students who were not.

Additionally, secondary analysis of the NLTS2 data indicated that student race/ethnicity was related to self-reports of self-determination for individuals with cognitive disabilities, which included students with ASD. African American youth scored significantly higher than White or Hispanic youth on measures of autonomy (Shogren. Kennedy, Dowsett, Villarreal, & Little, 2014). African American youth scored significantly higher than White or Hispanic youth on measures of autonomy (Shogren et al., 2014). Taken together, these findings

support the contribution of individual factors (challenging behavior, disability level), demographic factors (race/ethnicity group, free and reduced lunch), and education setting (inclusion in secondary education) as impacting self-determination in youth with developmental disabilities.

Only one study has included family factors as a predictor of self-determination, but there were no significant findings between family factors and the group with cognitive disabilities, which included students with ASD (Shogren et al., 2018). The family factors considered in this study included parent involvement in school activities, attendance at IEP meetings, ratings of student involvement in chores at home, and their perception of attainment of post-school outcomes. In addition, this study did not exclusively examine family factors for individuals with ASD. Research on family factors in individuals with ASD has reported the significance of the family context. Mothers of children and adolescents with ASD report three times as many stressful events than mothers of children and adolescents without disabilities (Smith et al., 2010). Maternal praise and positivity are associated with adults having more positive trajectories from adolescence to adulthood (Woodman, Smith, Greenberg, & Mailick, 2015; 2016). To our knowledge, no studies have focused on the individual, family, and school factors on multi-informant reports of self-determination in high school students with ASD. The present study aimed to examine the relationships among student, educator, and parent forms of a measure of self-determination, and the extent to which individual, family, and school factors predict self-determination.

Research Questions

1. What are the agreements among student, educator, and parent-reported levels of self-determination?

2. To what extent do student characteristics (adaptive behavior and autism severity), student demographics (biological sex, race/ethnicity), student educational experience (diploma track), and family characteristics (household income, family empowerment, and family burden) predict student, educator, and parent reports of self-determination?

Methods

Participants

Participants included 547 high school students with ASD between the ages of 14-21 (Mean Chronological Age = 16.16 years, SD = 1.44 years). Participants were part of the Center on Secondary Education for Students with Autism Spectrum Disorder, a large randomized controlled trial of a comprehensive treatment model for 60 high school programs located in three states in the US, North Carolina, California, and Wisconsin. High school students, their parents, and educators were recruited at each high school. To be enrolled in the study participants: a) had an educational classification of autism, b) were between 13-22 years old, c) had at least two years of high school remaining at the time of enrollment in the study, and d) did not have an uncorrected vision/hearing impairment.

Participants were 86% male, with approximately 45% of the sample racially or ethnically diverse (non-white and/or Hispanic). Students were enrolled in both standard diploma (56.7%) and modified diploma (43.3%) tracks in their high school. Across the three states, different criteria for obtaining a diploma existed. In California and Wisconsin, students in high school could be in one of two completion pathways: standard diploma or modified diploma. Students seeking a standard diploma completed courses that met state requirements for high-school graduation. Students seeking a modified diploma did not meet requirements for a high-school diploma but could earn certificates of completion. North Carolina has standard and modified diploma pathways, in addition to an Occupational Course of Study (OCS). Students on the OCS path complete a set of academic courses, as well as a prescribed number of hours of work-based learning experiences. Students earn a high school diploma (not a certificate). However, it does not allow for entry directly into a community college or college. For this study, these students were grouped into the modified diploma group. Approximately 27.4% of participants had a Nonverbal IQ score, as measured by the Leiter International Performance Scales- Third Edition (Leiter-3; Roid, Miller, Pomplun, & Koch, 2013), less than 70. There was a range of maternal education and family household incomes represented in the sample (see Table 1 and Table 2 for demographic and participant characteristics).

Procedures

This study obtained approval from the University of North Carolina at Chapel Hill Human Research Protection Program Institutional Review Board (#13-3002) before participants were enrolled. Students and their parents provided informed assent and consent, and educators provided consent. Trained research staff administered a baseline assessment battery in the fall of the student's first year of participation in the study before the start of the intervention. The battery included questionnaires and direct assessments completed by the students, parents, and educators. Educators included case managers, classroom teachers, or autism support teachers with knowledge of the student with ASD and could complete questionnaires on multiple students if applicable.

Measures

AIR Self-Determination Scale.—Self-determination was measured by the AIR Self-Determination Scale (AIR- SDS; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 19941994). The AIR-SDS scale was developed to assess levels of self-determination, defined as an individual's capacity and opportunity to make choices and perform actions to achieve one's goals to match their needs and interests. The AIR-SDS Capacity domain measures abilities, perceptions, and knowledge. Ability refers to the student's actions related to setting goals and making decisions, choices, and plans to meet goals. Perception refers to the student's level of confidence and motivation around their interests, needs, and goals. Knowledge refers to the student's understanding of their needs, interests, abilities, how to set goals, make choices and plans, and evaluate their actions. The Opportunity domains measure opportunities at home and at school, which measures how often the students act upon their capacities in their environments (Wolman et al., 1994; see Table 3 for example items).

The Student form includes six items each for Ability and Perception in the Capacity domain. The Educator form includes six items each for Knowledge, Ability, and Perception in the Capacity domain. The Parent form includes six items for Ability in the Ability domain. All forms include six items each for the Opportunity at School and Opportunity at Home domains. Each question indicates the frequency with which the behavior occurs from Never (1) to Always (5). The items are summed for each domain and then converted to a percentile based on the total number of items in the domains and subscale. In this study, the Capacity, Opportunity at School, and Opportunity at Home domain scores and item-level scores were used for analyses The AIR-SDS has demonstrated high internal consistency (.95) and test re-test reliability (.74) in samples of students with and without disabilities (Wolman et al., 1994). The AIR-SDS has also demonstrated high internal consistency in adolescents with ASD without intellectual disability (.93) (Chou et al., 2017b). In the current study, the AIR-SDS demonstrated high internal consistency across forms and domains (Cronbach's alphas= .83-.96).

Demographics and student information forms.—The family filled out a demographic form with information on biological sex, race/ethnicity, household income, and co-occurring diagnoses. Research staff filled out a student information form for educational placement, whether a student was in a standard diploma track to receive a high school diploma (0) or a modified diploma track (1). Race/Ethnicity was coded as (0) White/ NonHispanic or (1) NonWhite and/or Hispanic. Income was coded as (0) >$40,0000 or (1) < $40,0000.

Vineland Adaptive Behavior Scales.—Adaptive behavior was measured by the Vineland Adaptive Behavior Scales- 2nd edition Teacher Report Form (Vineland-II TRF; Sparrow, Cicchetti, & Balla, 2006). The Vineland-II TRF is a standardized assessment of adaptive behavior in a school-based setting for students from ages 3-22 that teachers and school personnel complete. The Vineland-II TRF assesses adaptive behavior across Communication, Daily Living Skills, and Socialization. Educators rate the student as performing the adaptive behavior skills as usually (2), sometimes (1), or never (0). In the present study, the Adaptive Behavior Composite standard score was used in analyses. The Adaptive Behavior Composite is a composite score of Communication, Daily Living Skills, and Socialization domains.

Social Responsiveness Scale.—Educators completed the Social Responsiveness Scale-2nd edition (SRS-2; Constantino & Gruber, 2012) as a measure of autism symptoms. The SRS-2 is a standardized assessment of autism symptoms. Educators completed the School-Age Form that includes 65-items for students ages 4-18. Educators rate the student's behavior from Not True (1) to Almost Always True (4) with higher scores indicating increased autism symptom severity. The total raw score reflects a sum of item responses. *T*-Scores were used in this analysis. The SRS-2 is a widely used measure in individuals with ASD and has demonstrated reliability and validity, as well as sensitivity for screening in children and adults (Bolte et al., 2008; Chan, Smith, Hong, Greenberg, & Mailick, 2017; Dukevot, van der Ende, Verhulst, & Greaves-Lord, 2015; Moul, Cauchi, Hawes, Brennan, & Dadds, 2015).

Zarit Burden Interview.—Parents or caregivers completed the Zarit Burden Interview (Zarit, Orr, & Zarit, 1985) as a measure of the level of family burden. Parents rate their feelings towards their child as “Not At All,” “Somewhat,” or “Extremely” across 30 items, such as “I am afraid of what the future holds for my son/daughter” or “I feel pleased about my interactions with my son/daughter.” Higher scores indicate greater levels of the family burden with negative items reversed scored. The sum of items was used in the current analysis. The Zarit Burden Interview has demonstrated reliability in use with caregivers of adolescents and adults with ASD in previous studies (Kring, Greenberg, & Seltzer, 2011; Taylor & Seltzer, 2011).

Family Empowerment Scale.—Parents or caregivers completed the Family Empowerment Scale (Koren, DeChillo, & Friesen, 1992) as a measure of a family’s empowerment, as well as how it is expressed, such as “I feel my family life is under control” and “I tell professionals what I think about services being provided to my child.” Parents rate situations across 34 statements on a 5-point-scale from “Not True at All” to “Very True.” Higher scores indicate greater levels of family empowerment. The sum of the items was used in the current analyses. The Family Empowerment Scale has demonstrated high reliability in studies of caregivers of children with ASD (Burke, Magana, Garcia, & Mellow, 2016; Minjarez, Mercier, Williams, & Hardan, 2012; Weiss, MacMullin, & Lunsky, 2015).

Data Analysis Plan

All analyses were performed in SPSS Version 25 and MPlus Version 8 (Muthén & Muthén, 2017). There was a variable amount of missing data across reporters. Students were missing 10.6% of responses in the Capacity and Opportunity at School domains, and 11.3% in the Opportunity at Home domain. Educators were missing 6.2% of responses in the Capacity and Opportunity at School domains, and 14% in the Opportunity at School domain. Parents were missing 21% of responses in the Capacity and Opportunity at Home domains, and 24% in the Opportunity at School domain. Patterns of missingness were examined among individuals with data and individuals with missing data. Students with missingness on the AIR-SDS had lower nonverbal IQs and adaptive behavior, were older, had higher autism severity, and more were on the modified diploma track but did not differ by biological sex, income, maternal education, or race/ethnicity. Teachers with missingness had students with higher IQs, and parents with missingness did not significantly differ on any student, teacher, or parent variable, although parent-reported variables were often missing as well. Therefore, we examined the patterns of parent missingness with a school-level SES variable, the % of students enrolled in free and reduced lunch. Parents with missingness were from schools that had a higher % of students enrolled in free and reduced lunch. Thus, data were assumed to be missing at random (MAR) or that missingness was related to only the observed data (Enders & Baralidi, 2018). Multiple imputations were performed given that the use of listwise deletion methods is not recommended in MAR due to bias in the estimators (Enders & Baralidi, 2018). The imputation phase creates multiple datasets using observed values to define possible estimated values of the missing variables. The number of datasets imputed was 24 based on the recommendation to impute at least one data set per the greatest percent missingness (Li, Stuart, & Allison, 2015; White, Royston, & Wood, 2011). Subsequent

analyses are performed across the datasets and estimates and standard errors are pooled (Enders & Baraldi, 2018).

A multivariate analysis of covariance (MANCOVA) was performed using the imputed datasets to examine the differences across the Capacity and Opportunity domains for the three reporters (Student, educator, and parent) controlling for adaptive behavior, age, autism severity, and % free and reduced lunch. Adaptive behavior was strongly correlated with IQ (r=.62), so IQ was not included. Correlations were examined among domain scores to determine the agreement among reporters using the imputed datasets. In the Capacity domain, correlations were examined for the items that were included in both reporter measures. For example, parent form correlations only included the Ability subscale for the students and educators.

Multilevel Confirmatory Factor Analyses (CFAs) were performed to confirm the hypothesized factor structure of the AIR-SDS student, parent, and educator forms (See Figure 1). All models were conducted using the robust weight least-square estimator (WLSMV) to account for the categorical responses on the AIR- SDS. Models account for missing data using the full available information implemented in Mplus for WLSMV (Asparouhov & Muthén, 2010). Model fit was evaluated using: (a) Chi-Square test statistic/ degree of freedom ratio (χ^2/ν), (b) root mean square error of approximation (RMSEA), (c) Comparative Fit Index (CFI), and (d) Tucker Lewis Index (TLI). Smaller chi-square/degree of freedom ratios indicate an acceptable model fit. Values of RMSEA of .08 and .06 represent acceptable, and excellent fit and values greater than .95 for CFI and TLI respectively reflect excellent fit (Chen, 2007; Hu & Bentler, 1999; Schermelleh-Engel, K., & Moosbrugger, 2003).

Structural equation models (SEMs) were performed on the best fitting measurement models to examine the extent to which individual characteristics (adaptive behavior and autism severity), demographic characteristics (biological sex, household income, race/ethnicity), family characteristics (family empowerment and family burden), and educational setting (diploma track) predict self-determination. Adaptive behavior, autism severity, family burden, and family empowerment were centered at the sample mean to aid in the interpretation of parameters. In addition, models were performed with four dichotomous variables (biological sex, income, race/ethnicity, and diploma track). In the models, Male, Income >$40,000, White and Non-Hispanic, and Standard Diploma tracks were the reference groups.

Results

Reporter Agreement

Correlations were examined among student, educator, and parent means of ability and opportunity across multiple imputed datasets, and Bonferroni corrections were made for multiple comparisons (see Table 4). The student ability means were not significantly correlated with the educator or parent ability means. The educator and parent ability levels were moderately positively correlated. The student opportunities at school and opportunities at home means were not significantly correlated with the educator or parent means. The

educator and parent opportunities at school means were not significantly correlated. The educator and parent opportunities at home means were positively weakly correlated.

MANCOVAs were conducted across multiple imputation datasets to examine whether the levels of self-determination differed across reporters controlling for adaptive behavior, autism severity, age, and school percentage of students enrolled in free or reduced lunch. There was a significant overall effect of Reporter across Ability, Opportunities at Home, and Opportunities at School domains, F (6,3266) = 150.36, $p < .001$, $\eta_p^2 = .22$. Univariate analysis indicated significant reporter effects for each scale. Students reported higher ability mean scores (M=3.60) than educators (M=2.62) and parents (M=2.52). Educators and parents did not significantly differ. The student-reported opportunities at home mean (3.74) did not significantly differ from educators (M= 3.67) or parents (3.81). Parents reported significantly higher opportunities at home means than educators. Students (M= 3.48) and parents (M=3.57) reported lower opportunities at school means than teachers (M=3.86), but not significantly different opportunities between students and parents. See Table 5 for univariate MANCOVA parameter estimates.

Predictors of Self-Determination

Multi-level confirmatory factor analysis was performed initially to determine whether the AIR-SDS forms represented the hypothesized factor structure. Structural equation models were then performed with the best fitting measurement models to examine the extent to which biological sex, race/ethnicity, family income, diploma track, autism severity, adaptive behavior, family empowerment, and family burden predicted the constructs of self-determination for each reporter (see Figure 1). For the student form, the hypothesized factor structure had acceptable fit indices, $\chi^2/v = 3.33$, $p < .001$, RMSEA=.07 (90% CI [.06, .07]), CFI=.93, TLI=.92. All of the standardized factor loadings were large (> .58). Adaptive behavior was significantly and positively associated with the capacity domain ($\beta = .27$, $p = .01$) and the opportunity at home domain ($\beta = .27$, $p = .003$). Students in the modified diploma track rated themselves as having higher capacity than students in the standard diploma track ($\beta = .15$, $p = .01$). Family empowerment was associated with opportunity at school domain ($\beta = .11$, $p = .04$).

For the educator form, the hypothesized factor structure had acceptable fit indices, $\chi^2/v = 4.50$, $p < .001$, RMSEA=.08 (90% CI [.08, .09]), CFI=.95, TLI=.95. All of the standardized factor loadings were large (> .68). Adaptive behavior was significantly and positively associated with capacity ($\beta = .51$, $p < .001$), opportunities at school ($\beta = .32$, $p < .001$), and opportunities at home ($\beta = .31$, $p < .001$). Autism symptoms were significantly and negatively correlated with capacity ($\beta = -.22$, $p < .001$). Teachers rated female students as significantly higher capacity than males ($\beta = .07$, $p = .049$). Teachers rated students with incomes <$40,000 as having fewer opportunities at home ($\beta = -.37$, $p = .006$). Family burden was significantly and negatively correlated with opportunities at school ($\beta = -.13$, $p = .002$). Family empowerment was significantly and negatively associated with capacity ($\beta = -.08$, $p = .03$). Teachers rated students in the modified diploma track as having lower capacity than students on the standard diploma track ($\beta = -.13$, $p = .006$).

For the parent form, the model with the hypothesized factor structure approached acceptable model fit, $\chi^2/v = 6.43$, $p < .001$, RMSEA=.11 (90% CI [.10, .12]), CFI=.93, TLI=.92. Modification indices suggested that one of the opportunity items in each of the school and home domains loaded onto both capacity and opportunity factors, ("At home [and At School], my child has learned how to make plans to meet his or her own goals and to feel good about them"). The model fit values ranged from acceptable to excellent fit, $\chi^2/v = 3.06$, $p < .001$, RMSEA=.07 (90% CI [.06, .07]), CFI=.97, TLI=.97. Adaptive behavior was significantly and positively associated with the capacity ($\beta = .33$, $p < .001$) and opportunities at home ($\beta = .18$, $p = .02$). Parents rated students who identified as NonWhite or NonHispanic as having higher capacity than students who identified as White ($\beta = .15$, $p = .001$). Family empowerment was significantly and positively associated with capacity ($\beta = .11$, $p = .03$), opportunities at home ($\beta = .37$, $p < .001$), and opportunities at school ($\beta = .25$, $p < .001$). Family burden was significantly and negatively correlated with capacity ($\beta = -.12$, $p = .04$) and opportunities at home ($\beta = -.10$, $p = .04$). Parents rated students in the modified diploma track as having less capacity ($\beta = -.10$, $p = .04$) and fewer opportunities at home ($\beta = -.17$, $p = .003$) than students on the standard diploma track.

Post-hoc analyses were conducted to analyze the models with a parent-report measure of autism severity rather than the SRS using the Social Communication Questionnaire (SCQ; Constantino, 2002) to test the impact of reporter of autism symptom severity. The same models were tested for each reporter replacing the SRS T-score with the SCQ Lifetime summary score. For the student report, SCQ was not a significant predictor. For educator report, SCQ was a significant predictor of capacity ($\beta = -.10$, $p = .01$). For the parent report, SCQ was a significant predictor of capacity ($\beta = -.21$, $p < .001$), which was similar to the SRS parameter for educator report ($\beta = -.22$).

Discussion

Self-determination is critical during high school as students prepare for the transition into post-secondary education and employment in adulthood. Despite the significance of self-determination, few studies have examined self-determination in large, diverse samples of high school students with ASD. To date, the research has reported on self-report or parent report of self-determination in this population, but no studies have considered multiple perspectives of self-determination comparing self, educator, and parent reports. Importantly, this study also identified individual (adaptive behavior, autism severity, diploma type), demographic (race/ethnicity, family income), and family characteristics (family empowerment, family burden) as predictors of self-determination.

Reporter Agreement

There were no statistically significant correlations between students and educators and students and parents for the capacity domain. Students reported higher levels of capacity than parents and educators. This finding is consistent with a study examining reporter differences in students with emotional disturbance and students with learning disabilities that reported divergence between students with emotional disturbance reports of capacity from educators (Carter et al., 2006).

Correlations were not significant between those groups for the opportunity domain. This finding indicates that students did not rate their opportunities being similar at home or school, suggesting that the perception of their experiences differed. Students reported significantly fewer opportunities at school than educators. Educators and parents play a critical role in providing opportunities in the environment for the student to act upon their capacity. If their perspective differs, it may indicate that the student, educator, and/or parent may not be taking part in aligning the capacity and opportunity to create an environment of success for self-determination for the student. Understanding the differences in the perceptions can also highlight where environmental changes are needed to provide more opportunities or align the opportunities better with the abilities of the student. The opportunities domain for parents and educators involves the reporter rating how they perceive they are giving the student opportunities to be self-determined, so it may be anticipated that they tend to rate themselves higher than other reporters would. This finding was statistically significant for the opportunities at school domain, suggesting that educators view themselves as giving more opportunities in the context of the school than students or parents. Educators may also report that they are giving the opportunity, but students may not use the opportunity. For example, educators may report that they are always available to give feedback on assignments or homework, but the student does not seek out feedback. This finding is consistent as reported in students with emotional disturbance and students with learning disabilities in which educators rated opportunities at school higher than students and parents (Carter et al., 2006). The AIR-SDS has a section of the assessment where students, parents, and educators provide a goal on which the student is currently working. Future work may consider examining the reported goals as it could give further insights into the differences among perspectives and experiences of students, parents, and educators.

Parents and educators had higher and statistically significant correlations compared to students. This finding is consistent with previous research indicating informant discrepancies between parents and youth with ASD in reporting on social skills and other aspects of social functioning (e.g., Lerner et al., 2012; McMahon & Solomon, 2015; Stratis & Lecavalier, 2015). There were moderate correlations among the capacity domain, suggesting that parents and educators rated the abilities of the students similarly. The correlations were weak for the opportunity, which we would expect, given that both the parents and educators are not present to observe the opportunities at school and opportunities at home, respectively. It could also reflect limited communication between home and school or differing perceptions about the level of opportunities provided in the opposite setting. These findings highlight the importance of incorporating multiple perspectives when developing goals for transition, communication between home and school, as well as educational planning in high school programs, and high school program interventions targeting contexts in the home and school.

Predictors of Self-Determination

Adaptive behavior was a significant predictor of self-determination across all reporters controlling for other individual, demographic, and family factors. This is the first study, to our knowledge, to examine the relationship between adaptive behavior and multi-informant reports of self-determination. Adaptive behavior, and specifically, daily living skills, are

associated with optimal outcomes in adults with ASD, including employment status and independent living situations (Smith, Maenner, & Seltzer, 2012). The current study suggests a strong relationship between adaptive behavior and self-determination. When considering self-determination difficulties in this population, it may also be important to consider adaptive behavior levels. Future studies should examine longitudinal relationships between adaptive behavior and self-determination.

The present study suggests that increased autism symptom severity as measured by the SRS-2, which measures social responsiveness, was negatively associated with educator-reported capacity controlling for other individual, demographic, and family factors. It is important to note that this finding was only significant for educators, and educators were the reporters of social skills. The current study also had a parent-report measure of lifelong symptoms using the SCQ. Post-hoc analyses were conducted to examine the impact of reporter of social skills using SCQ in place of the SRS as the predictor of autism severity. SCQ was a significant predictor of capacity for educator and parent reports but not student reports of self-determination. This post-hoc finding highlights the significance of examining multiple perspectives and consideration of reporters when interpreting results. These findings support the relationship between social skills and self-determination but highlight that these are only significant for educator and parent perceptions of self-determination. Future studies should also seek to consider the incorporation of self-reports of social skills to examine the relationship between social skills and self-determination from a student perspective.

In this sample, parents whose students were NonWhite or Hispanic reported higher levels of family empowerment (B= .15, $p < .001$). Given that greater levels of parent-reported family empowerment were associated with greater parent reports of capacity, this may explain these findings. An unexpected finding was that greater levels of parent-reported family empowerment was associated with lower levels of educator reported capacity. However, teachers rated students with family incomes <$40,000 as having fewer opportunities at home than their peers with family incomes >$40,000. These differences in predictors highlight the discrepancies between perspectives of educators and parents, despite their moderate correlations. Future longitudinal studies may seek out to explore the mechanisms of family empowerment and self-determination and the role of environmental contexts. There may be additional community or school characteristics that are supporting family empowerment in families from diverse backgrounds, such as services and supports available for families, as well as resources in the community. These findings warrant replication and further exploration as we might expect that these families do not have access to the same amount of resources, as families identifying as Nonwhite or Hispanic reported lower family incomes than families identifying as White (B = .06, $p <.001$). The Family Empowerment Scale psychometric sample included a predominately White population (Koren et al., 1992). Future research should consider culturally sensitive measures to understand better how family empowerment is perceived in diverse populations when considering the role of family empowerment in student self-determination. The parent-reported family burden was identified as an additional family factor that plays a role in teacher and parent reports of self-determination controlling for individual and demographic factors. Interventions that focus on

helping families feel empowered and reduce family burden may play a role in increasing both student capacity and opportunity.

Finally, diploma track was a significant predictor of capacity. Teachers and parents reported higher levels of capacity in students in the standard diploma track than students in the modified diploma track. Students in the standard diploma track reported lower levels of capacity than students in the modified diploma track controlling for individual and family factors. Parent and educator ratings may align capacity with IQ as students in the modified diploma track have significantly lower IQs (M= 67.39, SD = 23.39) than students on the standard diploma track (M= 98.30, SD = 22.04). Self-determination is a complex construct that may be difficult for some students to understand and rate themselves accurately, which also highlights the need for educating students about self-determination.

This study is not without its limitations. These students are from three geographic areas in the United States that do not generalize to all geographic areas in the United States. There was a variable amount of missing data across reporters. Many parents did not complete the opportunities at the school domain, and many teachers did not complete the opportunities at home domain. Student report data was missing from a higher proportion of students in the modified diploma track who had lower adaptive behavior and higher autism severity. Future studies should consider adapting assessments for these students to help gain an understanding of their perceptions of self-determination to develop interventions that target their specific needs.

Educational Implications

Information from multiple stakeholders can provide important implications for developing targeted interventions and supports for the students. To aid in the interpretation of students' concept of self-determination, educators and parents may consider communicating clear definitions and providing concrete examples while providing visual supports (Wehmeyer et al., 2010). Adapting and extending currently available self-determination curriculum and intervention approaches to high school students with ASD may be relevant depending upon the needs of the students. For example, a recent study in young adults with ASD without intellectual disability explicitly taught skills surrounding self-determination, including goal setting, problem-solving, and planning for goals. Participants in the treatment group showed improvements in their self-determination performance (Oswald et al., 2018). Another intervention approach that may apply to students with an intellectual disability or more support needs is the Self-Determined Learning Model of Instruction which can be implemented by educators to promote goal attainment and development of self-determination skills (Raley et al., 2020; Shogren et al., 2019; Wehmeyer et al., 2012). The use of these intervention approaches should take into consideration the social communication abilities of students with autism as well as the consideration of both the role and perception of students, educators, and parents when selecting and planning self-determination supports.

The current study provides support for the importance of using multi-informant reports of self-determination in high school students with ASD. Given the importance of the home and school context for the student’s development of self-determination, the student, parent, and

educator perspectives all play a key role in the examination and promotion of self-determination.

Acknowledgments

The work reported here was supported by the Institute of Education Sciences, U.S. Department of Education [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. Thank you to the many schools, staff members, adolescents on the autism spectrum, and their families who made this study possible. Thanks also to the CSESA research team working across three universities, which includes the authors and other key CSESA Investigators: Kate Szidon and Christopher Brum. B.T. was supported by the US National Institutes of Health through Grant T32HD040127 and the Department of Defense through grant W81XWH1910825.

References

Asparouhov T & Muthén B (2010). Weighted least squares estimation with missing data. Technical appendix. Los Angeles: Muthén & Muthén.

Baio J, Wiggins L, Christensen DL, Maenner MJ, Daniels J, Warren Z, Kurzius-Spencer M, … Dowling NF (2018). Prevalence of Autism Spectrum Disorder among children aged 8 years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. Morbidity and Mortality Weekly Report Surveillance Summaries,67(6):1–23. 10.15585/mmwr.ss6706a1External.

Bölte S, Poustka F, & Constantino JN (2008). Assessing autistic traits: cross-cultural validation of the social responsiveness scale (SRS). Autism Research, 1(6), 354–356. 10.1002/aur.49 [PubMed: 19360690]

Burke MM, Magaña S, Garcia M et al. (2016) Brief report: The feasibility and effectiveness of an advocacy program for latino families of children with autism spectrum disorder. Journal of Autism and Developmental Disorders, 46, 2532–2538. 10.1007/s10803-016-2765-x [PubMed: 26944592]

Carter EW, Lane KL, Cooney M, Weir K, Moss CK, & Machalicek W (2013a). Parent assessments of self-determination importance and performance for students with autism or intellectual disability. American Journal on Intellectual and Developmental Disabilities, 118, 16–31. 10.1352/1944-7558-118.1.16 [PubMed: 23301900]

Carter EW, Lane KL, Cooney M, Weir K, Moss CK, & Machalicek W (2013b). Self-determination among transition-age youth with autism or intellectual disability: Parent Perspectives. Research and Practice for Persons with Severe Disabilities, 38, 129–138. 10.1177/154079691303800301

Carter EW, Lane KL, Pierson MR, & Glaeser B (2006). Self-determination skills and opportunities of transition-age youth with emotional disturbance and learning disabilities. Exceptional Children, 72, 333–346. 10.1177/001440290607200305

Carter EW, Owens L, Trainor AA, Sun Y, & Swedeen B (2009). Self-determination skills and opportunities of adolescents with severe intellectual and developmental Disabilities. American Journal on Intellectual and Developmental Disabilities, 114, 179–192. 10.1352/1944-7558-114.3.179 [PubMed: 19374465]

Chan W, Smith LE, Hong J, Greenberg JS and Mailick MR (2017), Validating the social responsiveness scale for adults with autism. Autism Research, 10, 1663–1671. 10.1002/aur.1813 [PubMed: 28639377]

Chen FF (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. Structural Equation Modeling: A Multidisciplinary Journal, 14, 464–504. 10.1080/10705510701301834

Chou Y-C, Wehmeyer ML, Palmer SB, & Lee J (2017a). Comparisons of self-determination among students with autism, intellectual disability, and learning disabilities: A multivariate analysis. Focus on Autism and Other Developmental Disabilities, 32, 124–132. 10.1177/1088357615625059

Chou Y-C, Wehmeyer ML, Shogren KA, Palmer SB, & Lee J (2017b). Autism and self-determination: Factor analysis of two measures of self-determination. Focus on Autism and Other Developmental Disabilities, 32, 163–175. 10.1177/1088357615611391

Constantino JN, & Gruber CP (2012). Social Responsiveness Scale, Second Edition (SRS-2). Torrance, CA: Western Psychological Services.

De Los Reyes A, Augenstein TM, Wang M, Thomas SA, Drabick D, Burgers DE, & Rabinowitz J (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. Psychological bulletin, 141(4), 858–900. 10.1037/a0038498 [PubMed: 25915035]

De Los Reyes A, & Kazdin A (2004). Measuring informant discrepancies in clinical child research. Psychological Assessment, 16, 330–334. 10.1037/1040-3590.16.3.330 [PubMed: 15456389]

De Los Reyes A, & Kazdin A (2005). Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. Psychological Bulletin, 131(4), 483–509. 10.1037/0033-2909.131.4.483 [PubMed: 16060799]

Duvekot J, van der Ende J, Verhulst FC, & Greaves-Lord K The Screening Accuracy of the Parent and Teacher-Reported Social Responsiveness Scale (SRS): Comparison with the 3Di and ADOS. J Autism Dev Disord 45, 1658–1672 (2015). 10.1007/s10803-014-2323-3 [PubMed: 25428292]

Enders CK, & Baraldi AN (2018). Missing data handling methods In Irwing P, Booth T, & Hughes DJ (Eds). The Wiley Handbook of Psychometric Testing: A Multidisciplinary Reference on Survey, Scale and Test Development, First Edition (pp. 139–185). Hoboken, NJ: John Wiley & Sons. Ltd 10.1002/9781118489772.ch6

George D, & Mallery P (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Hu LT, & Bentler PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6, 1–55. 10.1080/10705519909540118

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).

Jepsen MI, Gray KM, & Taffe JR (2012). Agreement in multi-informant assessment of behaviour and emotional problems and social functioning in adolescents with Autistic and Asperger's Disorder. Research in Autism Spectrum Disorders, 6, 1091–1098. 10.1016/j.rasd.2012.02.008

Kim SY (2019). The experiences of adults with autism spectrum disorder: Self-determination and quality of life. Research in Autism Spectrum Disorders, 60, 1–15. 10.1016/j.rasd.2018.12.002

Kogan MD, Vladutiu CJ, Schieve LA, Ghandour RM, Blumberg SJ, Zablotsky B, Perrin JM, & Lu MC (2018). The prevalence of parent-reported autism spectrum disorder among US children. Pediatrics, 142(6), e20174161 10.1542/peds.2017-4161 [PubMed: 30478241]

Koren P, DeChillo N, & Friesen B(1992). Measuring empowerment in families whose children have emotional disabilities: A brief questionnaire. Rehabilitation Psychology, 37, 305–321. 10.1037//0090-5550.37.4.305

Kring SR, Greenberg JS, & Seltzer MM (2010). The Impact of Health Problems on Behavior Problems in Adolescents and Adults With Autism Spectrum Disorders: Implications for Maternal Burden. Social work in mental health, 8(1), 54–71. 10.1080/15332980902932441 [PubMed: 20657702]

Lerner MD, Calhoun CD, Mikami AY, & De Los Reyes A (2012) Understanding parent–child social informant discrepancy in youth with high functioning autism spectrum disorders. Journal of Autism and Developmental Disorders, 42, 2680–2692 10.1007/s10803-012-1525-9 [PubMed: 22456819]

Li P, Stuart EA, & Allison DB (2015) Multiple imputation: a flexible tool for handling missing data. Journal of the American Medical Association, 314, 1966–1967. 10.1001/jama.2015.15281 [PubMed: 26547468]

McMahon CM, & Solomon M (2015) Brief report: parent-adolescent informant discrepancies of social skill importance and social skill engagement for higher-functioning adolescents with autism spectrum disorder. Journal of Autism and Developmental Disorders 45, 3396–3403. 10.1007/s10803-015-2494-6 [PubMed: 26077952]

Minjarez MB, Mercier EM, Williams SE, & Hardan AY (2013). Impact of pivotal response training group therapy on stress and empowerment in parents of children with autism. Journal of Positive Behavior Interventions, 15(2), 71–78. 10.1177/1098300712449055

Moul C, Cauchi A, Hawes DJ, Brennan J, & Dadds MR (2015) Differentiating autism spectrum disorder and overlapping psychopathology with a brief version of the Social Responsiveness Scale.

Child Psychiatry & Human Development, 46, 108–117. 10.1007/s10578-014-0456-4 [PubMed: 24604214]

Muthén LK & Muthén BO (1998-2017). Mplus User's Guide. Eighth Edition. Los Angeles, CA: Muthén & Muthén

Nota L, Ferrari L, Soresi S, & Wehmeyer ML (2007). Self-determination, social abilities, and the quality of life of people with intellectual disability. Journal of Intellectual Disability Research, 51, 850–865. 10.1111/j.1365-2788.2006.00939.x [PubMed: 17910537]

Pierson MR, Carter EW, Lane KL, & Glaeser BC (2008). Factors influencing the self-determination of transition-age youth with high-incidence disabilities. Career Development for Exceptional Individuals, 31, 115–125. 10.1177/0885728808317659

Raley SK, Burke KM, Hagiwara M, Shrogen KA, Wehmeyer ML, & Kurth JA (2020). The Self-Determined Learning Model of Instruction and students with extensive support needs in inclusive Settings. Intellectual and Developmental Disabilities, 58(1), 82–90. 10.1352/1934-9556-58.1.82 [PubMed: 32011220]

Roid GH, Miller LJ, Pomplun M, & Koch C (2013). *Leiter International Performance Scale- Third Edition* (Leiter-3). Wood Dale, IL: Stoelting Co.

Schermelleh-Engel K, & Moosbrugger H (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. Methods of Psychological Research Online, 8, 23–74. https://doi.org/10.1.1.509.4258

Shogren KA, Burke KM, Antosh A, Wehmeyer ML, LaPlante T, Shaw LA, & Raley S (2019). Impact of the Self-Determined Learning Model of Instruction on self-determination and goal attainment in adolescents with intellectual disability. Journal of Disability Policy Studies, 30(1), 22–34. 10.1177/1044207318792178

Shogren KA, Kennedy W, Dowsett C, Villarreal MG, & Little TD (2014). Exploring essential characteristics of self-determination for diverse students using data from NLTS2. Career Development and Transition for Exceptional Individuals, 37(3), 168–176. 10.1177/2165143413486927

Shogren KA, Palmer S, Wehmeyer ML, Williams-Diehm K, & Little T (2012). Effect of intervention with the Self-Determined Learning Model of Instruction on access and goal attainment. Remedial and Special Education, 33, 320–330. 10.1177/0741932511410072 [PubMed: 24771963]

Shogren KA, Shaw LA, Raley SK, & Wehmeyer ML (2018). Exploring the effect of disability, race-ethnicity, and socioeconomic status on scores on the self-determination inventory: student report. Exceptional Children, 85, 10–27. 10.1177/0014402918782150

Shogren KA, Wehmeyer ML, & Lane KL (2016). Embedding interventions to promote self-determination within multitiered systems of supports. Exceptionality, 24, 213–224. 10.1080/09362835.2015.1064421

Shogren KA, Wehmeyer ML, Palmer SB, Rifenbark GG, &Little TD (2015). Relationships between self-determinationand postschool outcomes for youth with disabilities. The Jour-nal of Special Education, 48(4), 256–267. 10.1177/0022466913489733.

Smith LE, Hong J, Seltzer MM, Greenberg JS, Almeida DM, & Bishop SL (2010). Daily experiences among mothers of adolescents and adults with autism spectrum disorder. Journal of Autism and Developmental Disorders, 40, 167–178. 10.1007/s10803-009-0844-y [PubMed: 19655239]

Smith LE, Maenner MJ, & Seltzer MM (2012). Developmental trajectories in adolescents and adults with autism: The case of daily living skills. Journal of American Academy of Child & Adolescent Psychiatry, 51, 622–631. 10.1016/j.jaac.2012.03.001

Sparrow SS, Cicchetti DV, & Balla DA (2006). Vineland Adaptive Behavior Scales, Second edition Teacher Rating Form. Bloomington, MN: Pearson.

Stratis EA, & Lecavalier L (2015) Informant agreement for youth with autism spectrum disorder or intellectual disability: a meta-analysis. Journal of Autism and Developmental Disorders, 45, 1026–1041. 10.1007/s10803-014-2258-8. [PubMed: 25253177]

Taylor JL, & Seltzer MM (2011). Changes in the mother-child relationship during the transition to adulthood for youth with autism spectrum disorders. Journal of Autism and Developmental Disorders, 41(10), 1397–1410. 10.1007/s10803-010-1166-9 [PubMed: 21184158]

U. S. Department of Education. (2018). Individuals with Disabilities Education Act (IDEA) Section 618 Data Products: State Level Data Files. Retrieved from https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html#bcc

Wehmeyer M (2015). Framing the future: Self-Determination. Remedial and Special Education, 36, 20–23. 10.1177/0741932514551281

Wehmeyer ML, & Palmer SB (2003). Adult outcomes for students with cognitive disabilities three years after high school: The impact of self-determination. Education and Training in Developmental Disabilities, 38, 131–144. Retrieved from www.jstor.org/stable/23879591.

Wehmeyer ML, Shogren KA, Palmer SB, Williams-Diehm KL, Little T, & Boulton A (2012). Impact of the Self-Determined Learning Model of Instruction on Self-Determination: A Randomized-Trial Control Group Study. Exceptional children, 78(2), 135–153. 10.1177/001440291207800201 [PubMed: 25253899]

Wehmeyer ML, Shogren KA, Zager D, Smith T, & Simpson R (2010). Research-based principles and practices for educating students with autism: Self-Determination and social interaction. Education and Training in Autism and Developmental Disabilities, 45(4), 475–486.

Weiss JA, MacMullin JA & Lunsky Y (2015) Empowerment and parent gain as mediators and moderators of distress in mothers of children with Autism Spectrum Disorders. Journal of Child and Family Studies, 24, 2038–2045. 10.1007/s10826-014-0004-7

White K, Flanagan TD, & Nadig A (2018) Examining the relationship between self-determination and quality of life in young adults with autism spectrum disorder. Journal of Developmental and Physical Disabilities, 30, 735–754. 10.1007/s10882-018-9616-y

White IR, Royston P, & Wood AM (2011) Multiple imputation using changed equations: issues and guidance for practice. Statistics in Medicine, 30, 377–399. 10.1002/sim.4067 [PubMed: 21225900]

Wolman J, Campeau P, Dubois P, Mithaug D, & Stolarski V (1994). AIR Self-Determination Scale and user guide. Palo Alto, CA: American Institute for Research.(PDF) Measuring Self-Determination: Examining the Relationship Between The Arc's Self-Determination Scale and the AIR Self-Determination Scale. Available from: https://www.researchgate.net/publication/235664268_Measuring_Self-Determination_Examining_the_Relationship_Between_The_Arc's_Self-Determination_Scale_and_the_AIR_Self-Determination_Scale [accessed Feb 24 2020].

Woodman AC, Smith LE, Greenberg JS, & Mailick MR (2015). Change in autism symptoms and maladaptive behaviors in adolescence and adulthood: The role of positive family processes. Journal of Autism and Developmental Disorders, 45, 111–126. 10.1007/s10803-014-2199-2. [PubMed: 25070471]

Woodman AC, Smith LE, Greenberg JS, & Mailick MR (2016). Contextual factors predict patterns of change in functioning over 10 years among adolescents and adults with autism spectrum disorders. Journal of Autism and Developmental Disorders, 46, 176–189. 10.1007/s10803-015-2561-z [PubMed: 26319253]

Zarit SH, Orr NK, & Zarit JM (1985). The hidden victims of Alzheimer's disease: Families under stress. New York: New York University Press.

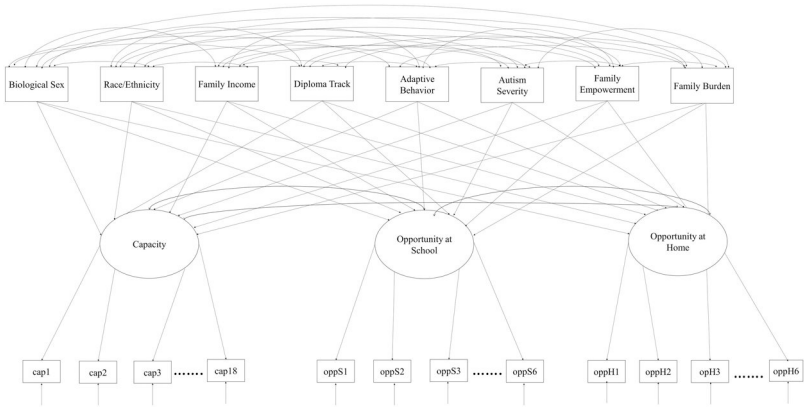

Figure 1.

Hypothesized structural equation model for the AIR- Self-Determination Scale. Note for the Student and Parent Forms, there are 12 and 6 capacity items, respectively

Table 1.

Demographic characteristics

Characteristic	%
Biological sex (% Male)	86.3
Diploma type (% Standard)	56.7
Race	
White	67.2
Black/African American	13.6
Multi	7.4
Asian	4.6
Alaskan Native/Pacific Islander	2.8
Other	4.4
Ethnicity (% Nonhispanic)	79.8
Co-Occurring Diagnoses	
Anxiety	20.3
ADD/ADHD	29.0
Learning Disability	13.5
Obsessive Compulsive Disorder	7.8
Depression	6.5
Maternal Education	
6^{th}-8^{th}	1.3
Part HS	3.5
HS/GED	15.5
Associate/Tech	30.1
Bachelor	30.8
Master/Higher	18.8
Family Household Income	
<20,000	8.1
20,000-39,000	15.7
40,000-59,000	14.1
60,000-79,000	14.3
80,000-99,000	12.6
> 99,000	35.2

Table 2.

Participant Characteristics

Characteristic	N	M(SD) or %	Range
Age	541	16.16(1.44)	14-21
NVIQ	500	85.61(27.17)	30-141
% < 70 or parent-report of Intellectual Disability	537	27.4	
Autism Severity			
SRS	511	70.39(12.25)	39-110
SCQ	421	20.81(7.62)	0-37
Adaptive Behavior Composite	465	75.73(16.69)	20-131
Family Empowerment	402	130.15(18.72)	69-170
Family Burden	397	32.36(8.53)	18-65

Table 3.

AIR Self-Determination Scale Example Items

AIR-SDS Domain	Student	Educator	Parent
Capacity			
Ability	If my plan doesn't work, I try another one to meet my goals.	Student expresses own interests, needs, and abilities.	My child begins to work on plans to meet his or her goals as soon as possible.
Perception	I believe that I can set goals to get what I want.	Student feels confident about using feedback to evaluate results of own work.	N/A
Knowledge	N/A	Student knows own abilities and limitations.	N/A
Opportunity at Home	People at home let me know that I can set my own goals to get what I want or need.	Student has opportunities at home to learn about making choices and plans, to make them, and to feel good about them.	At home, people listen when my child talks about what (s)he wants and is good at.
Opportunity at School	I have someone at school who can tell me if I am meeting my goals.	Student has opportunities at school to initiate actions to meet expectations and goals.	At school, my child is allowed to act on his or her plans right away.

Table 4.

Correlations among Self-Determination Means

	1	2	3	4	5	6	7	8
1. Student Ability								
2. Student Opportunity at Home	.52***							
3. Student Opportunity at School	.59***	.60***						
4. Educator Ability	.12	.18***	.08					
5. Educator Opportunity at Home	.07	.05	−.03	.36***				
6. Educator Opportunity at School	.08	.04	.01	.36***	.64***			
7. Parent Ability	.10	.09	.09	.37***	.09	.14***		
8. Parent Opportunity at Home	.07	.05	.07	.27***	.18***	.17***	.51***	
9. Parent Opportunity at School	.04	−.05	.09	.10	.07	.07	.31***	.56***

*** Bonferroni correction of $p<.006$

Table 5.

Univariate parameter estimates of multivariate analysis of covariance (MANOVA) testing differences in average self-determination scores across student, educator, and parent reports.

	Ability				Opportunities at Home				Opportunities at School			
	B	SE	t	p	B	SE	t	p	B	SE	t	p
Student vs. Educator	.97	.05	20.7	<.001	.08	.05	1.48	.14	−.38	.05	7.27	<.001
Student vs. Parent	1.94	.05	29.5	<.001	−.06	.05	1.19	.23	−.09	.06	1.62	.11
Educator vs. Parent	−.06	.05	1.28	.20	.14	.05	2.62	.01	.29	.06	5.29	<.001

Note. This analysis includes adaptive behavior, autism severity, age, and school percentage of students on free and reduced lunch as covariates.