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ORIGINAL PAPER

A Preliminary Study of Parent Activation, Parent-Teacher Alliance, Transition Planning Quality, and IEP and Postsecondary Goal Attainment of Students with ASD

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Abstract

The school, student and family factors underlying poor postsecondary outcomes of students with autism spectrum disorder (ASD) are not well understood. The potential impact of school [e.g., transition planning quality (TPQ)], family (e.g., parent activation), and student factors (e.g., adaptive functioning) and their interaction (e.g., parent-teacher alliance) on student outcomes were examined. Student IQ and adaptive behavior, TPQ, and alliance correlated with IEP progress, with postsecondary goal attainment generally and with student participation in training/education, specifically. However, only parent activation and student externalizing behavior correlated with employment. Families and students, rather than school personnel, were the primary persons in charge and in control of the implementation of postsecondary plans and required help across multiple coaching sessions to implement plans fully.

Keywords ASD transition · COMPASS · Parent-teacher alliance · Transition planning quality · Parent activation

Federal education law requires public schools to provide transition services as part of the Individualized Education Program (IEP) for students with disabilities (Individuals with Disabilities Education Act 2004). Transition services are a results-oriented process for achieving measurable post-secondary outcomes and include the services necessary to help reach those outcomes. IEP goals, which are linked to and support the post-secondary outcomes, should be based on personalized strengths and interests of the student.

For students with autism spectrum disorder (ASD), the promise of transition services is failing. Postsecondary outcomes of students with ASD are worse than for students with other disabilities (Certo et al. 2003; Taylor and Seltzer 2011). National surveys indicate youth with ASD have lower rates of employment and report less self-determination and satisfaction compared to youth with other disabilities (Anderson et al. 2014; Wehman et al. 2014). Further, their IEPs fail to integrate critical transition skills and are less likely to have goals related to postsecondary outcomes of employment, college, living independently, or gaining skills to promote independence (Wehman et al. 2014).

For students who obtain employment or postsecondary education, three broad areas have been associated with successful transition planning: school, student, and parent-related variables. School factors include interagency collaboration and program content, such as participation in general education, and opportunities for the development of targeted skills that relate to employment: vocational skills training, self-care/independent living and social skills training, support for transition, job placement services, and college services (Chiang et al. 2013; Migliore et al. 2012; Test et al. 2009). Student factors include gender, race, social skills, intellectual ability, adaptive functioning, self-advocacy and self-determination skills, and completion of high school (Powers et al. 2008; Wehmeyer and Palmer 2003). Specifically, students who are female, White, with higher IQs, fewer autism symptoms, greater adaptive skills, and increased agency are more likely to be employed. Parent and family factors include household income, parental education, family expectations, and parental involvement (Anderson

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et al. 2014; Hedges et al. 2014; Smith and Anderson 2014; Snell-Rood et al. 2019; Southward and Kyzar 2017; Test et al. 2009; Wehman et al. 2014). That is, students who have parents with a bachelor's degree or higher, with higher income and expectations, and who are more involved with school services are more likely to be employed (Chiang et al. 2013). Although some of the above variables are not amenable to change (gender, IQ, race, income), numerous parent, student, and school variables important to transition success can be targeted for intervention (e.g., interagency collaboration, student social skills, parent involvement).

This paper is a secondary analysis of data from an RCT of a consultation intervention for transition-aged youth with ASD. In prior reports, we described the Collaborative Model for Promoting Competence and Success (COMPASS) as an effective, manualized (Ruble et al. 2012a) student-centered consultation intervention for promoting home-school collaboration and improving IEP goal attainment outcomes in young children with ASD and more recently for transition-age youth with ASD. COMPASS has been tested in two randomized controlled trials (RCTs) of young children with ASD, with large effect sizes ($d = 1.5$; 1.4; Ruble et al. 2010; Ruble et al. 2013) and a third RCT for transition youth with a very large effect size ($d = 2.1$; Ruble et al. 2018a).

Foundationally, COMPASS is a student-centered program planning and implementation framework that incorporates the principles of evidence-based practice in psychology (EBPP) to integrate the features of the evidence-based practice, student/family characteristics, preferences, and strengths, and teacher preferences, strengths, and resources (McGrew et al. 2016) to inform and personalize the clinical (educational) decision-making and intervention planning. COMPASS consists of an initial 3 h student-centered planning session during which empirically and ecologically informed autism appropriate personalized goals are identified and carefully delineated using psychometric equivalence tested goal attainment scaling (PET-GAS; Ruble et al. 2012b), along with detailed teaching plans that incorporate evidence-based practices (EBPs) best matched to achieve them, as guided and structured within an EBPP framework. This is followed by a series of four 60–90 min coaching sessions that include evidence-based features of effective coaching (performance feedback; progress monitoring, self-reflection; Ruble et al. 2012a).

COMPASS for transition (COMPASS-T) begins with the initial parent-teacher consultation session, but unlike COMPASS for young children, invites students with ASD to participate in the initial consultation. Prior to the consultation, all participants complete a COMPASS profile that includes questions about the student's self-management, adaptive, communication, social, and learning/work behavior skills as well as sensory preferences and avoidances. When able, students with ASD are asked to complete a first-person version of the COMPASS-T profile questionnaire. The combination of perspectives shared during the discussion of the profile support the identification of social, communication, and work/learning IEP goals, the personal and environmental challenges and supports related to attainment of the goals and the personalized teaching plan for each goal. The initial consultation of COMPASS-T also focuses on post high school goals such as (a) where they will be living, (b) how they would spend their day, (c) how they will move about in the community, (d) budgeting, (e) friendships, and (f) leisure activities. Thus, goals and plans are also created for the accomplishment of post-school goals. After this initial consultation, the consultant meets with the teacher, the student when possible, and the caregiver for four coaching sessions throughout the school year (about every 4 weeks). During the coaching sessions, the team review data on the student's progress toward the IEP and postsecondary goals as well as the strategies to meet the goals. Issues related to implementation of the plans to reach the goals are discussed and problem-solved. See Ruble et al. (2019) for more detail about the adaptation process applied to COMPASS-T.

The purpose of the current study is to increase our understanding of the impact on transition outcomes of two of the three elements of the EBPP framework—student/parent and school characteristics (McGrew et al. 2016). Currently, most research has focused on identifying evidence-based transition practices that form the third EBPP element with little consideration for the impact of the school and student/parent variables on the educational outcomes. Moreover, extant research with respect to parent factors, has tended to focus on static and difficult to change demographic variables such as educational level and income. Few studies have focused on variables that are potentially malleable, such as parent involvement and expectations. Thus, a better understanding of modifiable parent factors may help pinpoint targeted interventions that enhance parent informed variables and thus student outcomes. In particular, we were interested in understanding more about parent involvement when conceptualized as activation. Activation usually refers to having the information, beliefs, skills, knowledge, and motivation to participate in managing one's care (Hibbard et al. 2005). However, for parents of children with disabilities, activation can also refer to activities to support their children as parents often are the core decisionassociation of activation and satisfaction makers (Ruble et al. 2018b; Kucharczyk et al. 2015). The is important because parents who are satisfied with their child's education are more involved (Burke and Hodapp 2014; Zuna 2007), and involvement, in turn, has been associated with positive transition outcomes (Wehman et al. 2014). Moreover, in a study of empowerment, a related construct with activation (Boloor et al. 2019; Taylor et al. 2017), researchers demonstrated that more empowered parents had more knowledge and were more successful in

obtaining community-based services including employment for their child with ASD (Taylor et al. 2017). Thus, parent perceptions of their own activation or empowerment regarding the management of their child's needs is potentially predictive of outcomes for transition age youth.

With respect to student variables, several have been shown to be related to transition outcomes. For example, previous research indicates that for students with ASD, those with comorbid intellectual disability and/or low adaptive skills or problem behaviors experience worse postsecondary outcomes (Chiang et al. 2013). Accordingly, in the current study, we assessed the impact of these variables on transition outcomes.

For school-related variables, we were interested in transition planning quality and alliance between parents and teachers. As Wehman and others (2014) have noted, good transition outcomes require good transition planning (Chiang et al. 2013; Schall et al. 2014; Wehman et al. 2014). However, Cameto and colleagues (2004) found about one quarter of parents of students with ASD felt that the transition planning was not very useful. Despite high levels of parental participation during the transition process, more than 40% of parents reported that IEP goals were determined mostly by the school (Cameto et al. 2004), indicating that parents might not be the core decision makers in the process. Even worse, almost one-third parents did not receive information about post-school services (Cameto et al. 2004).

However, one barrier to the quantitative study of the association between planning quality and transition outcomes has been the lack of valid measures. Existing data on transition planning quality are largely limited to qualitative studies of barriers related to transition planning and implementation (e.g., Snell-Rood et al. 2019). The elements of a high quality transition plan includes many of the program variables described earlier (e.g., goals related to transition service needs; interagency collaboration), as well as encouragement of parent and student input into goal selection and intervention planning, measurable goals that are updated annually, and that are prioritized and based on the needs, interests, and strengths of the student, and understanding of resources (IDEA 2004). Accordingly, we developed a measure to quantify transition planning quality and explore associations between transition planning quality and parent and student variables. Because parents represent a critical constituent and participant in transition planning, we included their perspective as an informant.

In addition to a lack of information concerning the potential impact of transition planning quality on postsecondary outcomes of students with autism, we have little descriptive data on the plans themselves, including the postsecondary goals and intervention plans, and responsible agents. Thus, we collected follow-up information from students receiving the COMPASS-T intervention, such as who was primarily responsible for implementing the plans for achieving postsecondary goals. For example, although there are best practice guidelines within federal law that mandate goals for independent living, vocation, and education (IDEA 2004), details such as who is responsible for ensuring the implementation of plans related to the postsecondary goals are unknown. Finally, transition planning is intended to be an ongoing process and not a one-time event. However, little is known about the frequency or intensity of the support available and needed to implement plans to reach postsecondary goals. For example, when successfully implementing IEP plans, Ruble and colleagues (2010, 2013, 2018a) noted the need for teacher coaching across the school year.

We also were interested in alliance between school and parent because transition requires joint planning and efforts. The character and quality of the collaboration between the parent and the school is potentially predictive of transition success. That is, in addition to the importance of parental involvement during transition (Southward and Kyzar 2017; Wehman et al. 2014), family-school collaboration is another critical factor (Schall et al. 2014). One measure of collaboration is alliance, referring to mutually supportive relationships and agreement about goals and strategies. Alliance has consistently been found to be one of the strongest predictors of psychotherapy success (Norcross and Wampold 2011), but its role in the context of parent-teacher partnership is less understood. With respect to the educational field, qualitatively, focus group studies of critical stakeholders strongly support the idea that differences in expectations of transition planning and outcomes between teachers and parents can interfere with effective transition (Hedges et al. 2014; Snell-Rood et al. 2019). Moreover, quantitatively, good alliance has been related to satisfaction, and parent satisfaction with the parent-school partnership in turn, has been associated with parental involvement in their child's educational program (Burke and Hodapp 2014; Zuna 2007). Increased parental involvement facilitates student's classroom engagement (Hughes and Kwok 2007), achievement (Hughes and Kwok 2007), social emotional and behavioral functioning (Izzo et al. 1999), which are critical to successful learning. However, to date, despite its potential importance, empirical evidence of the impact of parent-teacher alliance on IEP and postsecondary goal attainment is unknown.

Based on the above, we expected that student characteristics associated with educational success (higher IQ and adaptive skill and fewer externalizing behaviors), parent involvement (activation), transition planning quality (TPQ) and parent-school collaboration (alliance) would all be related to better overall IEP and postsecondary goal attainment, as rated by both parents and teachers. In addition, we wanted to explore how each of these variables differentially related to type of postsecondary outcome (i.e., employment, training/college, residential, budgeting, transportation, leisure, and

friendships). Also, we wanted to understand how well and by whom the plans for achievement of postsecondary goals for COMPASS-T group participants were executed. Accordingly, we identified who was responsible for implementation of postsecondary intervention plans as well as progress made toward implementation of the plans over the school year. We had four primary research questions: Do student IQ, adaptive and externalizing behaviors, parent activation, transition planning quality, and parent-teacher alliance correlate with IEP and postsecondary goal attainment of students with ASD in general and by domain of postsecondary outcomes (residential, vocational, etc.)? For postsecondary goals, who was responsible for implementation of the plans? How did progress of implementation of plans to achieve postsecondary goals change over time during the final year of school?

Method

Participants

Twenty special education teachers and 20 students with ASD and their parents were recruited. All students received special services under the educational category of autism (IDEA 2004) and met the Diagnostic and Statistical Manual (DSM) criteria for either DSM-IV-TR or 5 for Autistic Disorder/Autism Spectrum Disorder (American Psychiatric Association [APA] 2004; APA 2013) as confirmed by the Autism Diagnostic Observation Schedule—second edition (ADOS-2; Lord et al. 2012). Students' ages ranged between 17 and 20 years, with a mean of 18.2 years ($SD = 1.1$). Forty percent ($n = 8$) of the students were taught in general education full time; 20% ($n = 4$) in general and special education; and 40% in ($n = 8$) special education full time. Ninety percent of the students were male, 70% were White, 15% Black, 5% Asian, and 10% multi-racial. Autism severity was assessed using the standard or high-functioning versions of the Childhood Autism Rating Scale, Second Edition (CARS-2; Schopler et al. 2010). Cognitive level was evaluated using the Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman and Kaufman 2004). Adaptive behavior was assessed with the teacher and parent rating forms of the Vineland Adaptive Behavior Scales, Second Edition (VABS-II; Sparrow et al. 2005). Lastly, the composite score from the Behavior Assessment System for Children Second Edition (BASC-2; Reynolds and Kamphaus 2004) for externalizing and internalizing behaviors was assessed. See Table 1 for sample descriptive statistics. No differences between the control and COMPASS-T group for student characteristics such as age, gender, adaptive skills, IQ, services received, hours of services received, autism severity; teacher factors of years of teaching, number of students taught, and family factor of income was observed and reported in (Ruble et al. 2018a).

Table 1 Mean scores of child variables

Variable	M	SD
Child age (years)	18.20	1.11
CARS (ST)	37.83	11.41
CARS (HF)	28.25	3.05
PR Vineland	66.44	14.62
TR Vineland	71.80	14.42
KBIT-2 IQ	75.65	27.08
PR BASC Ext	48.05	6.63
PR BASC Int	52.47	8.43
TR BASC Ext	51.20	6.83
TR BASC Int	52.40	8.62

CARS childhood autism rating scale, *ST* standard version, *HF* high functioning version, *Vineland* vineland adaptive behavior scales, *TR* teacher report, *PR* parent report, *BASC* behavior assessment scale for children, *Ext* externalizing behavior, *Int* internalizing behavior

Thirty-five percent ($n = 7$) of the students with ASD lived with both parents; 45% ($n = 9$) lived with their mother; 10% ($n = 2$) lived with their father; 5% ($n = 1$) lived with another caretaker; and the living situation for 5% ($n = 1$) was not reported. For parents or caregivers, the mean number of years of schooling for mothers was 14.7 years (range 12–19 years; 5 missing) and for fathers was 15.0 years (range 12–19; 6 missing). Also, 35% of mothers and 30% of fathers had a 4-year college degree or higher. Fifteen percent of families had incomes less than $10,000; 10% between $10,000 and $25,000; 35% between $25,000 and $49,999; 25% between $50,000 and $100,000; and 15% more than $100,000.

All teachers were certified educators; 10% had a BA, 85% had an MA, and 5% had a doctorate. The mean number of years of experience teaching in special education was 12.3, and the mean number of students with autism taught was 35. All but three of the teachers were female. The study was IRB approved.

Sampling

The study took place in public schools located in one Midwestern and one South Central state. After obtaining permission at the district level, the researchers contacted teachers directly via email or phone. Teachers had to be the primary teacher of record/case manager of the IEP for a student with ASD meeting the eligibility criteria. Once a teacher agreed to be in the study, one student with ASD was randomly selected from each teacher's class or caseload. Students were eligible if they had a medical and educational diagnosis of autism/ASD and were in their final year of school. Parents had to be comfortable speaking English. Teachers were then

asked to share a letter with the student's parent or caregiver about the study. Parents were asked to contact the researchers directly or provide permission to their child's teacher for the teacher to forward contact information to the researchers. Following a baseline Time 1 assessment, teacher–child dyads were randomized into groups by a research team member not directly involved with the study; 11 were randomized into the experimental condition by a researcher independent of the intervention team. The control group teachers ($n=9$) received online training on three evidence-based practices of their choosing from the National Technical Assistance Center on Transition website (National Technical Assistance Center on Transitin, n.d.). Of the parent/caregiver respondents, 85% ($n=17$) were mothers; 10% were fathers ($n=2$), and 5% was a great aunt who had guardianship ($n=1$).

Educational Outcomes, Parent and School Variables

To assess correlates of progress on IEP and postsecondary goal attainment, measures of postsecondary goal attainment, domain of goal attainment, transition planning quality, parent activation, and parent-teacher alliance were administered and collected. Also, the COMPASS-T consultant obtained data on who had primary responsibility for the implementation of postsecondary plans.

IEP Goal Progress—Parent and Teacher Ratings

Parents and teachers assessed IEP goal progress with a Likert-type scale questionnaire. Parents and teachers were asked to think of where the student was at the beginning of the school year with the specific skill (goal) and rate how much progress had been made to date using a five-point scale (1 '*none at all*' to 5 '*a great deal*') for each of the three monitored IEP goals. Because COMPASS-T prioritized the development of goals that represent the pivotal areas of instruction for students with autism—social, communication, and learning/work behavior skills, similar goal domains were selected for the control group students for end of the year progress. For the control group, the number of goals ranged from two to three. For the COMPASS-T group, the three goals identified during the consultation were evaluated. Informants' judgments of goal progress were internally consistent across the three goals (alpha) for the parent measure ($\alpha=.81$) and the teacher measure ($\alpha=.69$). Given the internal consistency (alpha) in attainment across goals, the overall mean rating was used in analysis.

IEP Goal Progress-Psychometrically Equivalence Tested Goal Attainment Scaling (PET-GAS)

PET-GAS was used to evaluate IEP progress by an independent evaluator unaware of experimental condition. PET-GAS uses an idiographic approach because each student had different goals, baseline skill levels associated with the goals, and teaching plans. PET-GAS incorporates several procedures to ensure high quality, comparable, and objective goal attainment assessment (Ruble et al. 2012b). Each goal attainment scale used a five-point rating scale: $-2=$*student's present levels of performance*, $-1=$*progress*, $0=$*expected level of outcome by the end of the school year*, $+1=$*somewhat more than expected*, $+2=$*much more than expected*. Half-scores were allowed when raters observed skill levels between two benchmarks. A score of zero represented improvement consistent with the actual description of the written IEP objective. PET-GAS pre- and post-treatment ratings were based on video demonstrations, work samples, and/or data collected by the teacher. Two coders independently coded 65% of the goals at baseline and three coders independently rated 35% at final evaluation. Interrater agreement (two-way random) as measured using the sample ICC for single measures was .94 at baseline and .86 at final evaluation. The primary rater scores were used for analyses.

Postsecondary Goal Progress

Consultants, parents and teachers assessed postsecondary goal progress using a Likert-type three-point scale to assess how much progress the student made in each of the following goals: (a) taking classes or receiving other types of training; (b) being employed or working; (c) living independently or with support; (d) using public transportation or obtaining a driver's license; (e) making financial decisions with or without support; (f) participating in recreational or leisure skills; and (g) making friends. The internal consistency (alpha) across goals for the parent measure was .91 and for the teacher measure was .78. Given the consistency in progress across goals, the overall mean was used in the initial data analysis. The parents and teachers completed the scale at the end of the school year. For the COMPASS-T group only, the consultant completed the scale during each coaching session. The individual items were examined to answer the third research question.

Transition Planning Quality (TPQ)

TPQ was assessed using a 30-item four-point Likert parent report scale (1 '*strongly disagree*' to 4 '*strongly agree*'). The TPQ was developed for this study to capture the quality of the transition planning process based on best-practices for transitioning youth (IDEA 2004; Landmark et al. 2010), Indicator 13 (IDEA 2004), and focus group results collected from more than 40 stakeholders (e.g., policy makers, parents, teachers; Snell-Rood et al. 2019). Example items are "My child's post-high school goals are based on my child's interests and strengths; My child's school provides me with

sufficient information and opportunities to meet so that I understand and am able to participate in my child's transition; I am involved in the decision-making process for my child's education." The internal consistency of the TPQ was .98. The overall mean score was used for analysis.

Parent Activation

Parent activation was assessed with the 13-item Parent Activation Measure for Developmental Disabilities (PAM-DD; Ruble et al. (2018b) with permission from Insignia). Activation refers to one's ability to self-manage a chronic condition; in this case, we assessed parents and caregiver's beliefs, skills, knowledge, and motivation related to the management of their child with ASD (Hibbard et al. 2005). The PAM-DD assesses four states of activation: (a) belief of the importance of managing ASD; (b) the confidence and knowledge necessary to take action regarding the care of their child with ASD; (c) taking action to maintain or improve their child's issues related to ASD; and (d) ability to persist in the face of challenges in the care of their child with ASD. The PAM is based on hierarchical developmental states. It is thought that the first level of belief is followed by the second level of confidence, which is then followed by action, and concludes with persistence. Parents of children with ASD with higher PAM-DD scores report greater ability to manage their child's issues and lower ratings of parent stress (Ruble et al. 2018b). Items on the PAM-DD are ordered using Guttman scaling. The internal consistency (alpha) of the PAM-DD in the current sample was .75. The ratings based on the Guttman scoring provided by Insignia were used for analysis.

Parent and Teacher Alliance (PTA)

PTA was assessed with an adapted version of the Parenting Alliance Inventory (PAI; Abidin and Brunner, 1995). The original 20-item PAI assessed the degree to which a parent believes that they have a helpful working relationship with the child's other parent. We adapted the PAI to focus on a helpful working relationship with the child's teacher. Ratings were obtained using a five-point Likert-type scale (1 '*strongly disagree*' and 5 '*strongly agree*'). Example items included "My child's teacher treats me as a partner in the development of my child's education plan" and "My child's teacher and I communicate well about my child." The internal consistency (alpha) of the PTA in the current sample was .93. The overall mean score was used for analysis.

Data Analysis Plan

Using the combined sample, we calculated Pearson Correlations controlling for group assignment to examine the concurrent associations between the student variables, parent-teacher alliance, transition planning quality, parent activation and IEP and postsecondary goals and outcomes using SPSS 24 (IBM Corp. Release 2017). Using a subsample of COMPASS-T participants only, we used Friedman's multiple comparison test to understand the progress in implementation of transition plans over time. This was conducted with the COMPASS-T group only because data were not available from the control group.

Results

Table 1 lists the means and standard deviations for the student variables. The overall adaptive behavior scale was about two standard deviations below the mean as reported by parents ($M = 66.44$; $SD = 14.62$) and in the low to moderately low range as reported by teachers ($M = 71.80$; $SD = 14.42$). Consistent with the adaptive behavior scores, IQ was in the below average range, with an overall mean of 75.65 ($SD = 27.08$). The mean composite T-score for externalizing and internalizing behaviors based on parent report was 48.05 ($SD = 6.63$) and 52.47 ($SD = 8.43$) and for teacher report was 51.20 ($SD = 6.83$) and 52.40 ($SD = 8.62$) respectively, all within the average range.

Analysis Based on the Combined Sample

The first and second research questions examined variables associated with *parent and teacher report of overall postsecondary and IEP goal progress and by domain of postsecondary outcomes (residential, vocational,* etc.*)*. We report each separately.

Correlates of Postsecondary Progress

Table 2 shows the results. Teacher and parent report were not correlated ($r = .23$, $p > .05$). With respect to parent report, the significant correlates of postsecondary progress rank ordered by size of correlation were parent report of IEP progress ($r = .73$), IQ ($r = .68$), teacher alliance ($r = .56$), student adaptive behavior (both teacher [$r = .57$] and parent [$r = .53$] report), transition planning quality ($r = .48$), parent activation ($r = .44$), internalizing behavior (both parent [$r = .42$] and teacher [$r = .37$] report), and, at a trend level ($p < .10$), parent report of externalizing behavior ($r = -.33$), and PET-GAS ($r = .33$). With respect to teacher report, the significant correlates were parent activation ($r = .58$), externalizing behavior ($r = -.58$), PET-GAS ($r = .47$), parent alliance ($r = .45$), teacher report of

Table 2 Partial correlations of parent and teacher report of progress and parent report of transition quality, activation, alliance, and child variables

	PR postsecondary progress	PR IEP progress	TR postsecondary progress	TR IEP progress
PR IEP progress	.70***			
TR postsecondary progress	.23	.13		
TR IEP progress	.08	.55**	.42*	
PET-GAS	.33^	.31^	.47*	.48*
Transition planning quality	.48*	.47*	.25	.02
Parent activation	.44*	.22	.58**	.12
PR alliance	.56**	.51*	.45*	.14
TR alliance	.18	.36^	.13	.34^
IQ	.68***	.41*	.03	−.14
PR externalizing behavior	−.33^	−.19	−.19	.11
PR internalizing behavior	.42*	.31	.17	0.04
TR externalizing behavior	−.07	−.13	−.58**	−.18
TR internalizing behavior	.37*	.08	.02	.07
PR adaptive behavior	.53*	.29	.43*	.19
TR adaptive behavior	.57**	.16	.39*	−.11

Based on one-tailed test; PR = parent report; TR = teacher report

^$p < .l$; *$p < .05$; **$p < .01$; ***$p < .001$

IEP progress ($r = .42$) and adaptive behavior (both teacher [$r = .39$] and parent [$r = .43$] report).

Correlates of IEP Progress

Parent and teacher report of IEP progress were correlated ($r = .55$, $p < .01$). With respect to parent report of IEP progress, the significant correlates rank ordered by size of correlation were parent report of alliance ($r = .51$), transition planning quality ($r = .47$), IQ ($r = .41$), and PET-GAS ($r = .31$) at a trend level ($p < .10$).Teacher report of IEP progress correlated with PET-GAS ($r = .48$) and alliance ($r = .34$) at a trend level ($p < .10$).

For the question about correlates with specific postsecondary outcomes (i.e., education/training, etc.), Table 3 provides the results. *Continued education/training following school* was significantly correlated with parent activation, transition planning quality, and parent-teacher alliance as reported by parents ($r = .44$, $p < .10$; $r = .48$, $p < .05$; $r = .56$, $p < .05$) respectively, as well as with youth adaptive behavior skills by parent and teacher report ($r = .53$; $p < .05$; $r = .57$, $p < .05$, respectively). However, attainment of *employment goals* was only correlated with parent activation ($r = .47$, $p < .05$) and externalizing behavior ($r = -.56$, $p < .05$). *Living situation goals* ($r = .49$, $p < .05$; $r = .44$, $p < .10$) and *making financial decisions goals* ($r = .46$, $p < .10$; $r = .49$, $p < .05$) were both correlated with transition planning quality and parent-teacher alliance. In addition, goals related to *budgeting* correlated with youth IQ ($r = .67$, $p < .01$), parent report of eternalizing behavior ($r = -.51$, $p < .05$), and parent and teacher report of adaptive skills ($r = .59$, $p < .05$; $r = .61$, $p < .01$, respectively). However, none of the student variables correlated with *living situation*, and only parent-reported externalizing behavior correlated with goals related to *transportation or driving* ($r = -.52$, $p < .05$). *Making friends* was correlated with transition planning quality ($r = .45$, $p < .05$) and with IQ ($r = .58$, $p < .01$).

To answer the last two research questions *of who was responsible for implementation of the plans for achieving postsecondary goals and how did progress of implementation of plans to achieve postsecondary goals change over time,* only data from the COMPASS-T group was available and used for analysis. Descriptive analysis of the person(s) charged with the implementation of the postsecondary goal plans revealed that students and their parents were the persons primarily responsible for the COMPASS-T-generated transition plans (see Fig. 1). For plans related to work or school, transportation, leisure, and friends, the student was the most frequently identified implementer followed by parents. Parents were the primary individual charged with overseeing plans for goals related to where the student would live and finances or budgeting. Teachers were least frequently identified as the implementer of any of the post-secondary plans (i.e., for work/school, living, transportation, budgeting, leisure, and friendships).

The fourth question explored how postsecondary goal progress in implementing transition plans changes over time. Figure 2 shows the mean scores for consultant-rated progress assessed at each coaching session. Progress from baseline in plan implementation was noted across all domains. However, a slight reduction was observed for plans related to

Table 3 Partial correlations of parent variables and parent report of postsecondary outcomes by domain

	Taking classes or receiving other types of training	Being employed or working	Living independently or with support	Using public transportation or obtaining a driver's license	Making financial decisions with or without support	Participating in recreational or leisure skills	Making friends
Transition planning quality	.48*	.26	.49*	.37	.46^	.23	.47*
Parent activation	.44^	.47*	.30	.17	.39	.36	.28
PR alliance	.56*	.30	.44^	.39	.49*	.37	.37
TR alliance	.18	.00	.21	.16	.34	.43^	.41^
IQ	.71***	.33	.33	.35	.67**	.27	.58**
PR externalizing behavior	− .34	− .56*	− .29	− .52*	− .51*	− .40^	− .21
PR internalizing behavior	.44^	.24	.44^	.18	.21	.18	.31
TR externalizing behavior	− .07	− .37^	− .16	− .20	− .39^	− .32	− .13
TR internalizing behavior	.37	.21	.17	.04	− .12	.22	.10
PR adaptive behavior	.53*	.25	.05	.26	.59*	.27	.44^
TR adaptive behavior	.57*	.14	.21	.30	.61**	.14	.28

Based on two-tailed test; italicized variables are considered malleable

^$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$

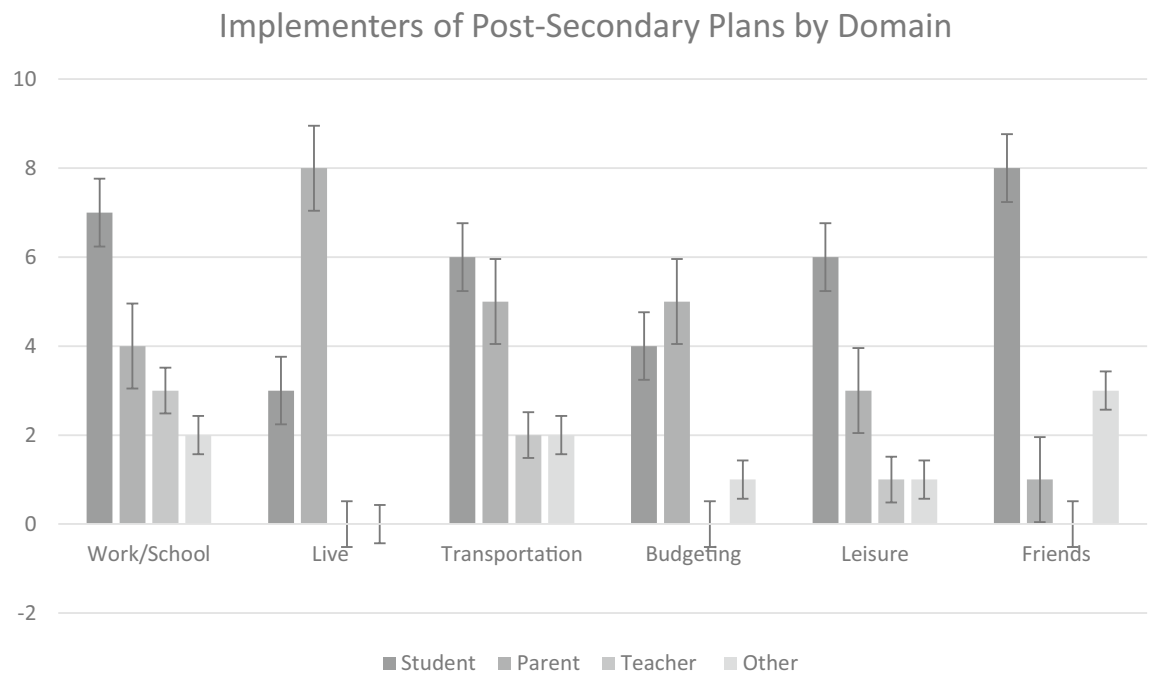

Fig. 1 Progress toward postsecondary goals by domain based on three-point scale (1'no progress'; 2 'some progress'; 3 'plan fully implemented')

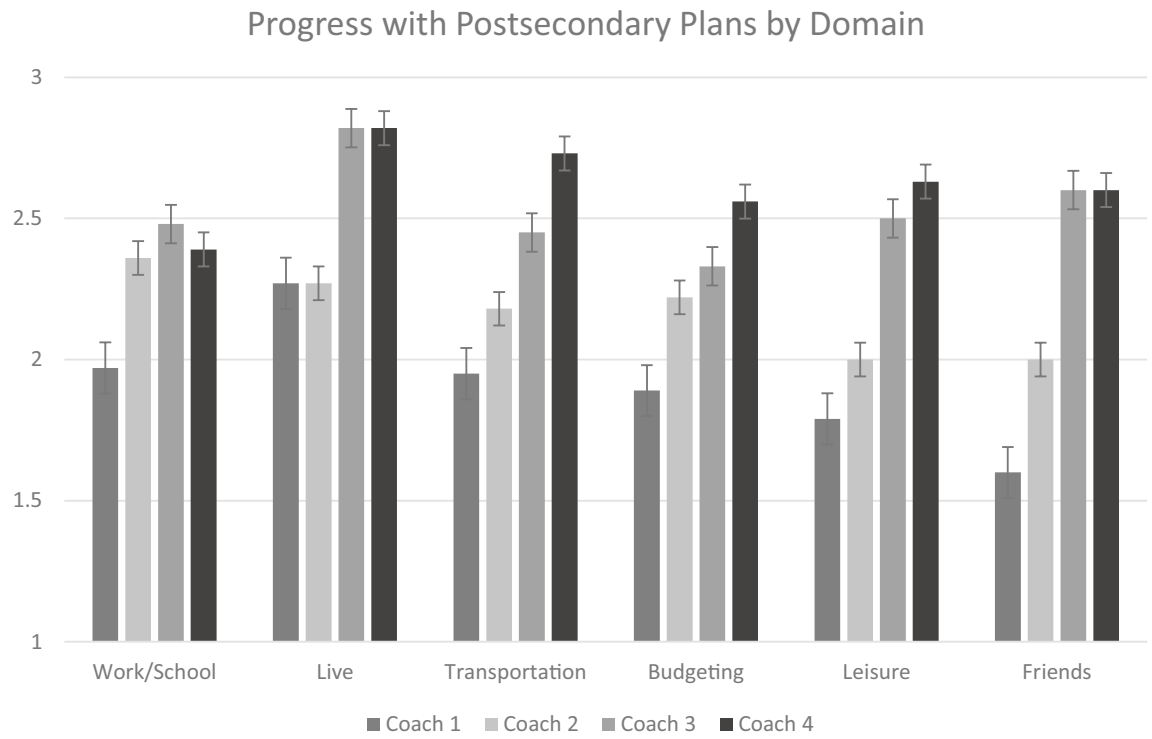

Fig. 2 Frequency reporting of primary person responsible for the implementation of plans for achieving postsecondary goals

Table 4 Mean ranks and Chi square analysis of post-secondary progress over coaching sessions by domain

Domain	Coaching session				Friedman's test Chi square
	1	2	3	4	
Work/day activity	1.73	2.59	2.95	2.73	9.65*
Live	1.86	2.59	2.77	2.77	12.75**
Transportation	1.81	2.14	2.68	3.27	13.68**
Financial/budgeting	1.94	2.39	2.61	3.06	7.8*
Leisure	1.69	2.06	3.06	3.19	13.70**
Social	1.50	2.10	3.20	3.20	10.36**

*$p < .05$; **$p < .01$; ***$p < .001$

work or school for the last two coaching sessions. Similarly, there was a leveling of progress between coaching three and four for living arrangements and for developing friendships.

Table 4 shows changes in adherence to implementation of plans for attainment of postsecondary goals over the four coaching sessions for the COMPASS-T group for each domain. Significant differences in mean ranks were observed for all domains over time ($\chi^2 = 7.8–13.68$, $p < .05$). Specifically, parent/student adherence increased over time for each domain. However, similar to what was found above for progress, there was a leveling off or slight reduction in adherence noted for four of the six domains (work, living situation, leisure, social) between coaching sessions three and four.

Discussion

Reducing the disparities in outcomes for students with ASD after high school is a priority for families, educators, researchers, public schools, and federal agencies (Interagency Autism Coordinating Committee 2012). This preliminary analysis of a small sample suggests important correlates of postsecondary goal achievement and sheds light on new variables associated with good as well as poor outcomes not previously reported. Prior research summarized by Wehman et al. (2014) identified school-related predictors of postsecondary success as career awareness, community experiences, inclusion in general education, interagency collaboration, occupational courses, paid work experiences, in addition to parent and student-related predictors of parental involvement, self-advocacy and self-determination, self-care/independent living, social skills, and student support for the transition program.

Identification of Malleable Factors Associated with Positive Postsecondary Outcomes

In the current study, new parent- and school-related variables associated with positive postsecondary outcomes were identified. Positive post school goal attainment outcomes as reported by parents confirmed prior research and also extended findings to new areas not yet reported (i.e., transition planning quality, parent-teacher alliance, and parent activation). As reported by parents, higher transition planning quality and greater parent-teacher alliance were related to greater progress toward IEP and postsecondary goals. The importance of transition planning quality and parent-teacher alliance is that these areas can be changed and are controlled at least in part by school/teacher actions. Thus, quality of transition planning and alliance may represent underlying features necessary for positive student outcomes. Interventions designed to improve transition planning quality and parent-teacher alliance can help promote these two areas of potential change and improvement. Further, the findings help operationalize at least three of the five features of Kohler et al. (2016) transition planning rubric: family engagement (activation), program structure (transition planning quality), and interagency collaboration (alliance). Of additional interest, teacher report of postsecondary outcomes also correlated with parent activation, highlighting the importance of parents who are both involved and informed as well as persistent.

Predictors of Postsecondary Progress by Domains

Analysis of progress toward individual postsecondary goal domains revealed additional information. A general conclusion was that the variables associated with postsecondary progress varied by domain, a finding further buttressed by the fact that different individuals were primarily responsible for implementing plans within each domain. For one of the key postsecondary outcomes—employment, neither IQ nor adaptive behavior nor any of the school variables correlated with progress on plans for employment, a finding that was unexpected given previous research on the association between autism severity, IQ, and employment. However, parent activation and externalizing behavior were related to employment. This suggests a critical role of the parent in supporting the student in obtaining employment and also the potential negative impact of externalizing behaviors for hiring and maintaining employment. This is consistent with the emerging literature that shows that behavioral problems are associated with poorer employment outcomes (Ballaban-Gil et al. 1996; Hendricks and Wehman 2009; Taylor and Seltzer 2011). But internalizing behaviors may also be important because parent report of internalizing behavior correlated at a trend level with taking classes or living independently. The lack of correlations between post-school employment and school variables also suggests a relatively weaker role of the school in this area despite the strong emphasis on obtaining employment in federal guidance for transition planning (IDEA 2004). In contrast to the findings for employment, greater independence in living situations and in making financial decisions was more strongly related to school factors, specifically, having a high-quality transition plan, and strong parent-teacher alliance. This suggests the importance of the school working together with the parent in helping to create the skills and conditions necessary to support independence in these areas.

The findings also revealed some areas with little impact by the school or parent. For example, none of the correlations between school or parent variables and transportation skills or recreation/making friends were significant. These may be areas with relatively little emphasis in transition planning implementation, despite their general inclusion as goals. For example, Cameto and colleagues (2004) reported that of all the transition plans they analyzed, more than half (57%) contained goals targeting social skills development. However, despite the efforts for goal setting and planning, only 66% of students with autism had an IEP that specified a course of study to meet those transition goals, highlighting a lack of detailed documentation of the means to achieve transition goals (Cameto et al. 2004).

Also of interest is the relatively strong impact of student variables on post-secondary outcomes. Student variables recorded the largest correlations with five of the seven postsecondary domains: taking classes/training, making financial decisions and making friends (all positively related to IQ), and being employed and ability to use transportation (negatively related to externalizing behavior). These findings serve to emphasize the potential limiting impact of relatively immutable student variables (IQ) on transition outcomes while also highlighting the importance of identifying and intervening with malleable school or parent factors. Together the findings above illuminate areas of postsecondary outcomes that can be impacted by parent involvement through school resources as well as those areas that appear to fall more squarely on the parent and student, independent of school.

Role of Parents and Students in Postsecondary Plans

The finding that parents and students with ASD are the most frequently identified persons responsible for the implementation of plans related to postsecondary outcomes has not been reported in the literature to our knowledge. This finding is important because research indicates that compared to peers, youth with ASD are less likely to participate in their own transition planning (Wehman et al. 2014). Further, they report lower self-determination, including the ability

to feel confident in making their own decisions (Wehman et al. 2014). In addition, they are less likely to have transition goals of postsecondary education, employment, or living independently. When plans for postsecondary goals fall mainly on parents and students to implement, the lack of participation in planning as well as a lowered sense of agency related to identifying goals, developing plans, and implementing plans may help explain the disproportionate negative postsecondary outcomes of students with ASD. Underlying difficulties in ASD include executive function impairments that may worsen with age (Rosenthal et al. 2013), problem solving skills (Pugliese and White 2014), social communication skills (APA 2013), and initiation skills Hume et al. (2009; 2014). To expect students with ASD to implement plans for postsecondary goals without adequate supports may help highlight the issues underlying the poor outcomes. Of interest, there is now promising research on interventions designed to improve parent and student knowledge and skills for obtaining services (DaWalt et al. 2018). In a pilot study, DaWalt et al. (2018) tested an 8-week program called Transitioning Together using a randomized waitlist control to reduce family distress and improve adolescent social functioning. The results included increased problem solving for parents and improved social interactions for youth—key areas related to positive postsecondary outcomes. In another study, Taylor et al. (2017) tested a 12-week intervention called the Volunteer Advocacy Project—Transitioning using a randomized controlled design to teach parents to advocate for adult disability services. Results indicated increased knowledge about the adult service system, advocating for services, and feelings of empowerment.

At the point of transition planning and exiting high school, parents of students with ASD generally experience a number of challenges, for instance, they are older, and experience more physical and mental health issues (see Greenberg et al. 1993; Ha et al. 2008). In addition, they often experience financial hardship (Parish et al. 2015) because the costs of long-term caring for a child with ASD are high. These common life experiences may add to the family stress during the transition period.

The finding that plans for postsecondary goals take time to implement is also informative. In this study, students in their final year of school and their parents required a school year to make significant progress over time with implementation of postsecondary plans. These findings support the need for ongoing coaching and support provided directly to parents and students for plan development, implementation, and problem solving. The data also indicate that a one-time meeting to share information about community resources on employment, living, etc. is not sufficient—a finding also reported by stakeholders (Snell-Rood et al. 2019); families and students require multiple sessions to implement plans for postsecondary goal accomplishment.

Limitations and Future Directions

This is a small study that has several limitations. For example, the TPQ and alliance measures were adapted or created for the study and although they demonstrated adequate reliability, require further testing to establish psychometric validity. Similarly, the parent and teacher reports of progress were single item measures and may not adequately capture all aspects of progress. The small sample size also limits our ability to generalize to other samples and may have reduced our ability to detect significant associations between variables. However, although the sample size limits the reliability of findings in the current study, the fact that we were able to obtain significant findings highlights the potential size of the underlying effects and suggests the need for further research.

Our findings suggest future directions and new areas of research for intervention. Transition planning that integrates both home and school goals, plans, and implementation strategies is necessary. Interventions that target and support families and students should be developed to promote the accomplishment of postsecondary goals. These strategies include approaches that improve home-school alliance and transition planning quality.

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Compliance with Ethical Standards

Ethical Approval All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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