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The transition from school to employment for students with autism spectrum disorder

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THE TRANSITION FROM SCHOOL TO EMPLOYMENT FOR STUDENTS WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

Employment is an important occupation for young adults, including those with disabilities such as autism spectrum disorder (ASD). Secure employment is associated with positive self-esteem and higher quality of life for people with ASD. People with ASD, however, have generally poor employment outcomes. The development of effective school supports is needed to prepare youth with ASD for the transition from school to employment. This dissertation represents a mixed methods study to (1) understand how and what school personnel think about when preparing youth with ASD for employment, and (2) explore how the personal and contextual factors (such as youth's functioning and academic performance, family background, and parent participation in the youth's education) predict post-school employment outcomes for students with ASD. To address the first research aim, 20 school personnel were interviewed. Based on the interview data, we developed a conceptual model describing how school personnel provided employment preparation for this population. The model highlights how school personnel view the student's personal and contextual factors as equally important and indivisible for employment success. As school personnel prepare youth for employment, they also consider how to support the youth to create a meaningful life in the community,

including how and where youth will live, remain safe, maintain recreation and exercise routines, and develop social connections. The findings of the first study served as a theoretical basis of the second study and were used to identify contextual factors included in the research aims and to develop a statistical model. To address the second research question, a secondary analysis was conducted with a nationally representative database. By adopting the structural equation modeling (SEM) analysis, we found that school-based transition supports and academic performance were important mediators between parental participation in youth with ASD's education and employment outcomes. The pathways that predicted employment outcomes for youth with ASD were different for youth with different levels of daily functioning skills. This analysis was the first to identify the important role of school supports in post-school employment outcomes for youth with ASD. The findings of these two studies indicate that preparing youth with ASD for the transition to employment is a highly individualized and contextualized process that involves collaborations among school, family, and the community. This research illustrates the importance of environmental factors in employment outcomes for this population. Whereas current interventions and research often focus on youth's vocational skills, it may be equally or more important to consider environmental barriers and supports that may be amenable to change to meet youth's employment needs.

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ADA	The Americans with Disabilities Act
ASD	Autism spectrum disorder
BIC	Bayesian information criterion
CFA	Confirmatory factor analyses
CFI	Comparative fit index
CI	Confidence interval
DOE	Department of Education
DOL	Department of Labor
FPT	Federal Partners in Transition
IDD	Intellectual and developmental disability
IDEA	The Individuals with Disabilities Education Act
IEP	Individualized educational program
IQ	Intelligence quotient
MLMV	Maximum likelihood with missing values
NLTS-2	National Longitudinal Transition Study-2
RMSEA	Root mean square error of approximation
SD	Standard deviation
SEM	Structural equation modeling
SPSS	Statistical Package for the Social Sciences
STEM	Science, technology, engineering, and math
TLI	Tucker-Lewis index
WJ III	Woodcock-Johnson Tests III

Introduction

Background and Significance

Employment is one of the most important occupations in adult life, and holds significant meaning for adults from both an individual and societal perspective. Gaining and maintaining employment generally means being financially independent, contributing to family and society, having a sense of purpose, and being less reliant on social welfare (Howlin, Alcock, & Burkin, 2005; Jacob, Scott, Falkmer, & Falkmer, 2015; Nicholas, Attridge, Zwaigenbaum, & Clarke, 2015). Participating in the workforce is an indicator of social integration for people with disability (Buckup, 2009). For people with autism spectrum disorder (ASD), secure employment is associated with higher self-esteem and adaptive skills, better quality of life, and lower risks of mental health challenges (Hurlbutt & Chalmers, 2004; Mawhood & Howlin, 1999). However, adults with ASD have low employment rates and are generally underemployed (Chiang et al., 2013; Howlin et al., 2005; Jacob et al., 2015; Nicholas et al., 2015; Taylor & Henninger, 2015). These poor vocational outcomes suggest the need to investigate the process of employment preparation which can inform the development of future vocational services.

Companies and employers report that it can be beneficial to hire individuals with ASD for several reasons. Adults with ASD often possess strengths that are valued by employers, such as logical and methodological strengths, computer and programming skills, attention to details, and strong visual memory (Gentry, Lau, Molinelli, Fallen, & Kriner, 2012; Lee & Carter, 2012; Mawhood & Howlin, 1999). Adults with ASD are also reported to have qualities such as reliability, loyalty, persistence, and honesty that are appreciated by employers (Lee & Carter, 2012). In addition, a lower proclivity to engage in social interaction that is a core characteristic of people with ASD sometimes can be viewed as a positive quality in the workplace because people with ASD may avoid socializing in the workplace, resulting in increased productivity (Gentry et al., 2012). Individuals with ASD may have a higher tolerance for repetitive work and maintaining a regular schedule than do other employees. Prior research found most employers rated individuals with ASD to have average or above average job performance compared to other employees (Hagner & Cooney, 2005; Hillier et al., 2007; Unger, 1999). Therefore, with adequate accommodations and support, individuals with ASD have the potential to achieve meaningful employment (Parr & Hunter, 2014).

In the United States, federal legislators have enacted three main federal laws that stipulate the allocation of government resources and financial funds to prepare individuals with disabilities for employment. These laws require the provision of necessary supports and accommodations by schools, work environments, and other public places (Stodden & Mruzek, 2010). First, the Individuals with Disabilities Education Act (IDEA, 2004) states that the purpose of special education is to "prepare [students with disabilities] for further education, employment, and independent living." Mandated by IDEA (2004), high schools are required to provide free and appropriate public education, accommodations in the classroom, and career exploration to facilitate the transition to adulthood for students with disabilities, including those with ASD, beginning no later than age 16 (Carter, Trainor, Cakiroglu, Swedeen, & Owens, 2009; Test, Smith, & Carter, 2014). From ages 16 to 22, school personnel are the main coordinators to integrate transition services for youth with disabilities who remain in school. Once youth with disabilities graduate or reach the age of 22, they are no longer eligible to receive services provided by IDEA (McDonough & Revell, 2010). Second, the Americans with Disabilities Act (ADA, 1990) mandates employment supports and appropriate accommodations in schools, the workplace, transportation, and public buildings to ensure individuals with disabilities have equal access to the environment. Finally, The Rehabilitation Act of 1973 combines federal and state funds and local services to provide youth with disabilities transition services such as job exploration, career consultation, job-based learning opportunities, work experience and internships in the competitive integrated work environment (Federal Partners in Transition [FPT], 2016). In addition, recently, the Department of Education and Department of Labor developed a cross-department workgroup to improve the transition services focused on employment for youth with disabilities (FPT, 2015; 2016). Building upon the federal legislations that addresses reasonable supports for people with disabilities to be successfully employed, states and local governments need to make polices and implementation plans to incorporate resources and provide employment supports at different life stages.

It is noteworthy that adults with ASD have the lowest employment rates compared to peers with language disorders, learning disabilities, and intellectual disabilities (Shattuck et al., 2012). Across countries, states, and decades, the employment rate for adults with ASD has been relatively low, ranging from 5% to 50%, rates which are much lower than the rate of the general population (90- 95%) in the U.S. (Chiang, Cheung, Li, & Tsai, 2013; Department of Labor [DOL], 2017; Taylor & Henninger, 2015; Taylor & Seltzer, 2011; Zarifa, Walters, & Seward, 2015). When employed, individuals with ASD have fewer work hours and lower weekly wages than individuals who have a developmental disorder other than ASD who also receive supports from the intellectual and developmental disability (IDD) service systems (Census Bureau, 2012; Nord, Stancliffe, Nye-Lengerman, & Hewitt, 2016). Overall, adults with ASD are underemployed (Taylor & Henninger, 2015). In fact, 46% of adults with ASD were underemployed and at high risk of being hired as temporary and part-time workers (Baldwin, Costley, & Warren, 2014; Roux et al., 2013). These data suggest that the current system of employment supports may be inadequate, especially as the population of adults with ASD is rising at exponential rates (Lee & Carter, 2012).

Schools play an important role in developing, providing, and coordinating services for high school students who may have difficulty with the transition to employment (Spann, Kohler, & Soenksen, 2003; Wei, Wagner, Christiano, Shattuck, & Yu, 2014). Cameto, Levine, and Wagner (2004) reported that 85% of high school students with ASD had a transition plan and 71% of the students had received instruction to increase their skills necessary for effective future planning. Most schools currently provide school-based career activities for students and facilitate the transition from school to employment by: integrating the training of academic and vocational education; developing connections with vocational school, college, and other education programs; establishing a linkage system with local employers; and creating community service guides (Carter, Trainor, Cakiroglu, Swedeen, & Owens, 2009; Test, Smith, & Carter, 2014).

There are some limitations to the current school-based vocational services. First, school systems only ensure students receive formal services in high school up to the age of 22 or graduation (Henninger & Taylor, 2013). Therefore, providing transition supports to best prepare students with ASD before the school services fade out is very important for students' success in adulthood. Second, the quality and quantity of the services are also of concern to parents of youth with ASD (Dymond, Gilson, & Myran, 2007; Henninger & Taylor, 2013; Wei et al., 2014). Some parents express concern about the continuity and stability of the service delivery system (Kucharczyk et al., 2015). In addition, previous studies did not show what works well to help youth with ASD achieve employment success after high school. More information is needed about the barriers and supports when preparing youth with ASD for employment. To improve the quality, accessibility, and availability of transition services and to develop a service delivery system which meets the needs of students with ASD, we need to understand how school personnel provide services to support these youth to prepare for employment, and how stakeholders, such as school personnel and vocational professionals, perceive the current state of school services.

Vocational rehabilitation services have long existed for people with disabilities. Most services, however, are provided to individuals with impactful and observable physical or cognitive disabilities; limited resources have been available to people with ASD who have comparatively higher cognitive capacities and physical abilities (Keel, Mesibov, & Woods, 1997; Wilczynski, Trammell, & Clarke, 2013). Weaver (2015) recently conducted a systematic review of the effectiveness of interventions that focus on work, daily activities, education and sleep for people with ASD and identified strategies such as video prompting, video modeling, and the use of mobile and tablet technology as having supportive evidence for improving work performance and independence for individuals with ASD. At the program level, Project SEARCH and programs developed by Division TEACCH, which aim to develop community-based services for individuals with ASD and their families across the life span, have research evidence supporting their effectiveness with youth with ASD (Hume & Odom, 2007; Schall et al., 2015). We do not know, however, how or why these approaches and programs are successful. Most previous research used significance tests or regression modeling to examine the associations between two factors (such as student characteristics and employment outcomes) (Chiang et al., 2013; Migliore, Timmons, Butterworth, & Lugas, 2012; Roux et al., 2013). These basic statistical analyses only examine a few variables. There does not appear to be a theoretical model that incorporates multiple related factors to predict the transition outcomes from high school to employment. Also, although there were some studies investigating the transition services from service providers' perspective for youth with ASD (Kucharczyk et al., 2015), most studies focused on postsecondary education (Dymond, Meadan, & Pickens, 2017), healthcare services (Nicolaidis et al., 2011; Nicolaidis et al., 2015), or transition services in general (Elias, Muskett, & White, 2017). No research has focused on vocational transition services and explored the school-based vocational services by examining the experiences of school personnel who work directly with students with ASD and strive to best support these students.

Therefore, this dissertation adopted a mixed methods approach. We conducted a qualitative study that included interviews of high school personnel who provide direct employment support for youth with ASD to address the research questions followed by a quantitative secondary analysis using a national longitudinal database. The overall research aim of this dissertation was to understand how contextual factors, including school personnel, family and the community, collectively prepare youth with ASD for employment. This research adds to the knowledge on how to provide optimal services to support employment for transition-age youth with ASD.

In the dissertation, we used the sequential mixed methods approach to address the research aims. The findings of the qualitative study were used to inform the model development in the quantitative study (Creswell & Plano Clark, 2017). In turn, the results of quantitative analysis were examined to assess the validity of the qualitative research. We first utilized qualitative research to understand the facilitators and barriers to youth's successful employment. Based on school service provider's experiences, we were able to comprehensively understand the process of helping youth with ASD prepare for employment. Second, we conducted a quantitative secondary analysis using a national database to develop a statistical model which explained the complex relationships between student factors, family-related factors, school services, and employment outcomes. The barriers and supports that were identified in the qualitative research from school personnel's perspective were incorporated into the statistical model in the quantitative analysis. The resulting model built in the quantitative analysis in turn further validated the findings of qualitative study by examining whether or not the barriers and supports predicted youth's employment outcomes.

Study 1- "Success Doesn't Happen in a Traditional Way," Experience of School Personnel who Provide Employment Preparation for Youth with Autism Spectrum Disorder

Introduction

The IDEA identifies gaining and maintaining employment as one primary goal of special education for transition-age youth (IDEA, 2004). Young adults with ASD, however, have poor employment outcomes and are often underemployed compared to peers with other disabilities in the two years after exiting high school (Shattuck, Narendorf, et al., 2012). Because of the low employment rate and the increasing numbers of youth with ASD transitioning to adulthood (Lee & Carter, 2012), more information about what hinders or promotes employment is needed to develop career preparation interventions and to improve employment outcomes after high school for youth with ASD.

High school personnel are expected to assist students with special education needs to prepare for future employment by increasing students' vocational-related skills and providing employment-related experiences (Carter et al., 2010; Carter, Trainor, Ditchman, et al., 2009). Currently, school-based career preparation activities include interventions focused on increasing career awareness, providing job opportunities, accumulating work experience in the early stages, and participating in work-study programs (Test et al., 2014). Other literature, however, indicates that youth with ASD are underserved in vocational support and job-related skill training programs (Taylor & Henninger, 2015; Taylor et al., 2015). Youth with ASD report unmet needs in career consultation, vocational and life skills training (Taylor & Henninger, 2015). There is a large gap between service provision and perceived needs of youth with ASD and their parents (Shattuck, Roux, et al., 2012).

Although vocational rehabilitation has long existed to support individuals with disabilities to prepare for employment, few programs have been designed to meet the specific needs of youth with ASD in the transition process (Keel, Mesibov, & Woods, 1997; Wilczynski, Trammell, & Clarke, 2013). School personnel who have experience working with students with ASD on employment may have valuable knowledge of how to provide services because they know the youth and their families comparatively well, and have evaluated and documented youths' social and emotional behaviors at school. They also understand youths' needs, strengths and future expectations. Research is needed to better understand how professionals work with youth with ASD to create successful employment experiences and their perceptions of the barriers and facilitators to employment success.

In current practice, a variety of educational and professional personnel work with students with ASD at school to support vocational development. In high schools, these personnel include, but are not limited to, special education teachers, vocational counselors, employment service specialists, and transition coordinators. These professionals often assume the role of assisting transition-age youth to identify work opportunities which match students' interests and strengths and help students establish realistic career expectations (Spencer, Dupree, & Hartmann, 1997). Understanding what works well will inform the development of employment-based supports and programs for youth with ASD.

To better understand how school personnel provide services to meet youths' needs and what factors they consider when designing services, programs or interventions for employment preparation, we interviewed school personnel about their experiences working with youth with ASD on employment; we were particularly interested in their successful experiences. The research questions were: (a) How do school personnel help youth with ASD obtain successful employment experiences that may lead to positive employment outcomes after high school? (b) What barriers and facilitators do school personnel perceive when preparing youth with ASD for employment? (c) From school personnel's' perspectives, what factors are important to consider when supporting youth with ASD in employment preparation?

Methods

Participants

We recruited 20 school personnel who have experience preparing transition-age youth with ASD for employment. High school personnel who had at least one experience of providing vocation-related services for students with ASD were qualified to participate in the study. Participants were recruited through emails to school personnel who participated in previous studies and to school personnel, such as special education teachers, transition coordinators, or vocational specialist, throughout Massachusetts. This research was reviewed and approved by the review board at Boston University- Charles River Campus. Participants received a $25 gift card for their participation, to be used to purchase school supplies. Table 1-1 shows the background information of the participants and their schools. Most participants were female and greater than 50 years old. On average, participants had 18 years of work experience on employment preparation for students with disabilities (*SD* = 10.40 years) and had worked with 61 students with ASD (*SD* = 45.46) throughout their career. Most participants were special education teachers or special education administrators. Participants represented 11 public schools and two private schools from diverse communities in Massachusetts. Based on public data from the Massachusetts Department of Elementary and Secondary Education, eight public schools (62%) included more than 20% students from economically disadvantaged backgrounds and five schools (39%) included more than 30% of students from a racial minority background (Massachusetts Department of Elementary and Secondary Education, 2018).

Procedures

The research team for this analysis included one professor with a clinical psychology background, one professor and one Ph.D. student with an occupational therapy background, and one graduate research assistant studying occupational therapy. The primary author conducted 19 semi-structured interviews with 20 participants between February and May 2018. Interviews took 1-2 hours to complete. Two school personnel who participated in a joint one interview. Following a semi-structured interview guide (see Table 1-2), the interviewer prompted participants to describe their successful and challenging experiences of helping students with ASD prepare for employment, to identify the factors they considered when identifying work opportunities for students with ASD, and to share how they worked with others to support youth with ASD on employment. The first author wrote field notes about her observations and reflections of the interview process after each interview and shared her reflections with two other authors. The interviews were audio-recorded and transcribed verbatim by the graduate student research assistant.

Theoretical Basis of the Analysis

The researchers used an occupational therapy transactional perspective as a framework to review the data and to inform the analysis process (Cutchin, 2004; Cutchin, Dickie, & Humphry, 2017; Dewey & Bentley, 1949; Dickie, Cutchin, & Humphry, 2006). Influenced by the work of John Dewey (Dewey & Bentley, 1949), the transactional perspective provides a framework to focus on the inextricable relationships among people, their environments, and people's meaningful activities and how environment and personal characteristics collectively influence people's performance in desired activities. From this perspective, the student's employment experience can be understood as the outcome of the interactions between person and environment. The process of preparing for and maintaining employment is viewed as fluid and continuously evolving based on an ever-changing environment. After initial review of the data, we determined that a transactional perspective would help us understand school personnel's experiences of providing employment preparation because preparing youth for employment is not only about the youths' individual characteristics but also includes multidisciplinary collaborations and considerations of complicated relations among the school, family, and community.

Data Analysis

We conducted thematic analysis based on the interview transcripts (Braun & Clarke, 2006), using NVivo Software (version 12) to code and categorize the codes, and to develop conceptual themes. Before generating the first level of coding, the first author listened to the audio recordings to become familiar with the data and each interview as a whole. This initial step led to several observations. The first author noted that when the school personnel described their experiences preparing students with ASD for employment, they holistically considered the youth in the context of their community. Most school personnel described gaining employment as part of helping youth participate in society and develop a meaningful life after high school. They thought about youth as situated in the context of community both at the current time and the future.

In the first level of analysis, we developed a coding dictionary to answer the three research questions. The coding dictionary was organized into five broad categories: (a) Success stories, challenging stories, and mixed stories; (b) strategies school personnel used to support students; (c) contextual supports or barriers including family, school system, community, policy, and culture; (d) factors school personnel considered when supporting students, including strengths, challenges, and other factors; (e) meaningful outcomes or goals after transition to adulthood, including employment, social participation, and community engagement. The first author and a graduate research assistant independently conducted the initial coding by labeling text according to the five broad categories. They met weekly to compare individual codings and discuss inconsistencies in the coding. Then they refined the operational definitions for the initial codes. The other authors then reviewed the codings to provide suggestions and resolve discrepancies.

In the second level analysis, the first author focused on the *success* and *challenging stories* and conducted detailed descriptive open coding to understand *school personnel's experiences* of working with youth with ASD on employment preparation. The success stories were coded when school personnel shared their experiences of working with youth with ASD, including challenges school personnel encountered when supporting youth with ASD to prepare for employment, the strategies, resources or intervention they utilized, the values they held, the contextual characteristics of the youth, and the indicators of success that represented desirable employment outcomes. The purpose of this second level of analysis was to understand school personnel's subjective experiences of preparing students for employment, including their values, attitudes, and actions to provide services.

In the third level of analysis, the first author used the transactional theoretical framework to create axial codes that summarized the salient themes across the data. Based on the transactional perspective, we viewed employment as influenced by multifaceted transactions among school personnel and youth with ASD, situated in ecological contexts such as school, family, community, and culture. Through weekly meetings, the authors together repeatedly examined the axial codings and reviewed the exemplars derived from the transcripts to determine if data reflected the evolving theoretical framework. The analytical categories were refined, if needed.

In the fourth level analysis, the first author developed a visual representation of the codes to explain school personnel's experience. The evolving visual representation of the data analyses served as a mechanism to consider the relationships between the evolving categories. The authors met regularly to revise the visual representation by reviewing the stories once again. After the visual representation was refined, we shared the visual representation of the analysis, a brief summary of the findings and exemplars with interview participants as a way to validate, verify, and strengthen the trustworthiness of the analyses. We then incorporated participants' suggestions into the findings and reexamined the data based on their recommendations.

Findings

To address the research questions, we developed a conceptual model to describe how school personnel helped youth with ASD obtain positive employment experiences, the barriers they perceived when providing employment support, the strategies they used, and the factors they considered when supporting students' employment. All the participants are described using pseudonyms.

The conceptual model (see Figure 1-1) shows the multifaceted and dynamic transactional relationships across multiple contextual factors that school personnel incorporate with their personal values as they consider the strategies which may help students with ASD achieve desired employment outcomes. School personnel simultaneously and collectively consider aspects of the *youth with ASD*, the *school system*, *family*, *community* and their own *values and teaching principles*. The content in the dotted rectangles depicts the contextual factors in the transactional model that are flexible and permeable; boundaries of the factors are ever-changing. The dotted lines connecting the rectangles represent the inextricable relationships between the contextual and personal factors. The solid lines between different factors highlight the transition process between contextual systems. With youth with ASD as the central focus of the model, the goal of improving employment outcomes is collectively influenced by multiple transactions between youths' personal characteristics and contextual factors. From school personnel's perspectives, employment success can be achieved by matching youth with ASD within appropriate contexts, including *school system*, *family*, *community* and the *school personnel's own values*.

The model in Figure 1-1 also illustrates school personnel's considerations of how to support youth with ASD to prepare for work. When thinking about how to best assist youth given the contextual limitations, school personnel considered contextual supports and barriers along with youths' characteristics and school personnel's values as a transactional whole.

Factors School Personnel Consider When Preparing Youth with ASD for Employment

School personnel described their reasoning process, focused on the intertwined myriad of personal and contextual factors as they considered how to support youth to obtain and maintain work in the community. We organized the strengths and challenges related to personal and contextual factors school personnel described into four categories: (1) youth with ASD, (2) school system, (3) family, and (4) community.

Characteristics of youth with ASD. School personnel working with youth with ASD described challenges of youth who (a) lacked motivation for employment preparation or to work, (b) had difficulty setting practical career goals, and (c) had emotional challenges, such as anxiety and anger. One strength was mentioned - youth with ASD had potential for improvement.

School personnel identified the student's *lack of motivation* as an important issue when they tried to help youth with ASD prepare for employment. Lily, a speech language pathologist at a suburban public school, stated, "There just comes a point where there's only so much you can do. They [students with ASD] are young adults. You can set things up. You can help them with the application. You can help them with their resume. But if they're not going to follow through..." School personnel described how students' lack of motivation was related to their prior unsuccessful experiences. For example, Ava, a transition coordinator from a suburban private school that served primarily youth on the autism spectrum, said, "We do get a fair number of students who come to us with some level of depression. I think it's just the nature of having been unsuccessful in educational environments for years and years and years. After a while, I can imagine you start to feel like it's you and something is wrong with you, so I think that can really affect a student's motivation."

School personnel also noted that students were often *unable to set practical career goals*. They viewed many youths with ASD as having unrealistic career goals. Emma, a special education teacher at a suburban public school, said, "I don't want to tell them [students with ASD] that they can't be a doctor or a lawyer or an astrophysicist, but at the same time helping them to understand themselves and what they can do." School personnel proposed several possible reasons to explain youths' difficulty setting appropriate employment goals, including having limited life experience, lacking a comprehensive picture of the future, and having difficulty thinking about the future. As Sophia, a transition coordinator at a suburban public school, shared,

> We have a student here who said she wanted to make pizzas. It occurred to me that she only said she wanted to make pizzas because her mom takes her out for pizza every Friday night, so it's what she's familiar with. So these students saying this job or career because it's only what they know, like a student says, "I want to be this because my dad is this, or my mom is this, or my brother." They don't have exposure.

School personnel also identified *emotional challenges*, such as anxiety, depression and anger, as a major barrier for youth with ASD when pursuing employment. An adjustment counselor voiced her concerns about a student's anxiety that may prevent him from navigating adulthood. Other school personnel described how youth with ASD often were unaware of their negative emotions. Emotional challenges sometimes interfered with employment experiences. Ruby, a special education teacher at a suburban public school, illustrated this point: "He's [a student with ASD] doing well enough. He could be better but he has some anxiety. Sometimes you thought it was the autism, but sometimes it was anxiety, so you weren't sure where his social awkwardness was coming from necessarily. He's had some evaluations recently and it's definitely the anxiety that plays a bigger role."

Characteristics of school system. School personnel identified barriers or challenges they experienced from the school system when they tried to create appropriate employment preparation experiences for youth with ASD. Three primary challenges were described: (a) school administrators hold negative attitudes toward special education and are reluctant to provide necessary accommodations for special education students, (b) school personnel’s colleagues do not provide appropriate support, and (c) schools do not provide relevant services and supports due to limited resources and funding limitations. School personnel did note that a strength at the school level was that schools gave school personnel freedom when designing a transition program.

The primary challenge identified by school personnel was that *school administrators hold negative attitudes toward special education and are reluctant to provide necessary accommodations for youth with special needs*. Sophia, a transition coordinator at a suburban public school, reflected on how she negotiated with the school district for an educational diagnosis for a student in order to provide relevant support for that student. She shared,

> Nick ended up being homeless. A church family helped him get connected to an agency, who thankfully got involved because they had to get an attorney. The school district was refusing to accept that he was diagnosed with autism and that he needed an IEP. Because of my reputation, the community people connected with me. I worked with an agency without the school knowing for a little while. Sometimes I come in the back door with some of these success stories. It’s a success because it doesn't happen the traditional way.

School personnel sometimes encountered barriers when they worked with their colleagues at schools. Frequently, participants shared that other school personnel working with youth with ASD did not know how to support these youth. As Ruby, a special education teacher at a suburban public school, noted,

> At one point I sat and met with Andrew's private [swimming] coach to talk about strategies so that he would know how to [give instructions and teach Andrew]. I actually had to coach the coach.

School personnel also talked about *schools not providing relevant services and supports due to limited resources and funding*. Having a heavy caseload was a barrier to providing adequate employment support to students. The paucity of trained staff to support youths' special needs at schools was another barrier that resulted in students' needs being unrecognized. For example, Grace, an occupational therapist working at a private specialized high school for youth with ASD, shared her frustration when she could only send students without behavioral issues for employment evaluations and job training due to the shortage of school staff to support community participation. In addition, transportation is a barrier when school personnel wanted to take students out to the community to explore potential work opportunities.

Characteristics of the family. Based on the data, we identified three categories of parent behaviors: (a) parents who advocated for services for their youth, (b) parents who gave youth the opportunity to try, and (c) parents who expected youth to be independent. Sophia, a transition coordinator at a suburban public school, expressed gratitude because she had worked with families who advocated for their child and said "My kid is going to work. My kid's going to do this." Cathy, an inclusion facilitator at a suburban public school, attributed the youths' success to his parents when the parents frequently gave the youth opportunities to make decisions, expected the youth to be independent and pursue a career, and supported the youth to try things out by himself.

Frequently, however, school personnel lamented the challenges they faced when working with youths' families. School personnel were challenged by: (a) parents who are passive to youths' education, (b) parents who over-protect their youth, (c) parents who have different expectations from school personnel, (d) parents who reject special education, and (e) other family issues. Some school personnel felt frustrated when parents hesitated to imagine their child's success. Some parents were passive when thinking about transition and expected schools to do everything for their youth. Melissa, an assistive technology specialist at an urban public school who is also a mother of a young adult with ASD, described a mother of a girl with ASD, "you expect that people are going to be looking at the next step, but her [the mother's] idea was school's going to be done and she [youth with ASD] is going to stay home."

School personnel described *parents who over-protected their youth* and do not want to fade support. Stella, a special education coordinator at a suburban public school, shared:

> I think it's a family protecting their child. They don't want them to have to face the difficulties of being at work, on their own, by themselves, with no one there to look out for them, so they back away from some of that help.

Some participants attributed parents' overprotection to the family's cultural background. School personnel spoke about families who may have different expectations for their children or hold different views about disabilities than they do. As Melissa, an assistive technology specialist and a mother at an urban public school, asserted,

> Part of it was cultural. They [the family of youth with ASD] came from a different culture where they didn't necessarily look at somebody with disabilities in the same way that we try to address here. They look at them as somebody to take care of. They didn't look them as a person that had ability. That was a little bit challenging.

Another challenge was that *parents have different expectations from school personnel*. Participants described how parents expected youth to pass standardized tests and enter post-secondary education. Parents did not appreciate students spending their school time on employment preparation even if their youth did not appear interested in or capable of post-secondary education. School personnel thought that some parents' expectations for their youths' future career, such as being a doctor or having an administrative job, were too high. Sometimes the gap between parents' and school personnel's expectations was large. As Ava, a transition coordinator from a suburban private school that served primarily youth on the autism spectrum, noted, "It got to a point where there wasn't even a middle for us to meet in."

Furthermore, *some parents rejected special education and other related services*. Pamela, a vocational specialist from a suburban private school, recalled her past experience: "they [parents of youth with ASD] don't want us to test them. I had one parent who didn't even want me to do the vocational evaluation or anything with them." Other parents refused career support resources, such as a referral to state vocational rehabilitation services. Multiple reasons were proffered. First, parents did not want their youth to face difficulty in the community. Second, parents' primary focus of education and expectation was not consistent with the school personnel's philosophy. Third, some parents did not accept their youths' disability and felt hesitant to have autism identified as a disability. Participants admitted that they did not feel surprised when they heard there were parents who have not disclosed the disability of autism to students. These parents expected their children to learn like other students without disability diagnoses and support from special education. School personnel expressed their helplessness when the parents refused the diagnosis, IEP, and other services.

Moreover, *other family issues and crises* may interfere with the family's ability to provide necessary support to fulfill youths' needs. Highlighted by a director of special education from a rural public school, there were many students who were raised by their grandparents or were from foster care in their small town. He noted that there was sometimes a lack of communication between parents and grandparents and hence the grandparents did not know how to provide needed help for their grandchild with ASD.

Characteristics of the community. School personnel described community-level barriers, including concerns about (a) uncertain adult resources, (b) community environments that are unsuitable for individuals with ASD to work in, (c) unsupportive people in the community who do not understand autism or do not provide accommodations, and (d) difficulties in matching youth with appropriate work opportunities. School personnel felt grateful if they had a supportive community.

Of all the success stories told by participants, one of the most important elements was *developing a good relationship with the supportive community* in which the youth lived. Participants suggested that having supportive people in workplaces was essential. School personnel acknowledged that the responsibility of supporting youth with ASD should be shared with community agencies and people in the workplace. They emphasized the importance of having people in the community who are accountable for the youths' job performance. Furthermore, when helping youth with ASD prepare for employment, they viewed creating a meaningful life in the community as a whole rather than considering employment apart from other aspects of adult life, such as community participation, independent living, and maintaining daily routines. In addition to securing a job, school personnel considered how and where youth would live, navigate within their community, keep safe, maintain recreation and exercise routines, and develop social connections. As Ruby, a special education teacher at a suburban public school, shared:

> His family chose this community for him to live in. They feel safe, and he feels safe. He's working in the community. He sees people all the time that he knows and has grown up with. That's an important piece. I could've found him a job in [two other towns]. It would've not been a challenge but also would've not been in this community.

A primary concern expressed by school personnel in relation to the community was the *uncertainty of the service provision in the community*, including state and federal financial support. Government policies and funds have played a crucial role in vocational service provision. Lily, a speech language pathologist at a suburban public school, illustrated this point:

> You're not sure that they [the adult agencies] are going to follow through. You

> hope they are but as state budgets go up and down, it’s always the first group they [the government] cut from. They [people with ASD] are the people with the greatest need… It’s hard. There are times where I've run into parents and students. They've shared what they've had to come up with after they've left here because those supports maybe fell through.

Additionally, participants commented on how policies influenced their approach and decision of what to provide to youth with ASD. For example, the mandate for students to pass a statewide standardized test forced teachers to focus on academics and spend more time on exam preparation.

School personnel also discussed the challenge of an *unsuitable community environment.* Community safety was a primary concern for families. As noted by a special education teacher from an urban area, shooting events happened at subways and buses in the community, and led the families to be afraid to let their youth work and take public transportation in town. Other participants commented on the work environment where there were certain barriers for youth with ASD. For example, James, a special education teacher from a suburban public school, indicated that large corporations may pose challenges for youth with ASD because their supervisors may not be able to make their own decisions and flexibly accommodate to the youths’ special needs as an independent business owner might be able to do.

Data across school personnel also revealed that they encountered challenges when *people in the community did not understand autism or did not provide accommodations*. Mia, a speech language pathologist from an urban public school, summarized the need for people in the community to better understand autism in saying:

> I think employers don't really understand autism. When they think of autism, they think of behaviors and aggression or screaming or whatever. They don't understand that it really varies at different levels and it's a spectrum.

Furthermore, participants identified *matching youth with ASD with appropriate employment opportunity* as a major challenge when helping youth with employment. School personnel identified limited community resources and available companies to cooperate with as barriers. Some school personnel expressed a challenge of wanting to provide youth opportunities in the community but also maintaining a good reputation and relationship with employers in the community. With the limited employment opportunities in the community, participants encountered challenges as they tried to match youth with a job that was aligned with their interests and strengths. As Kate, a special education administrator from a suburban public school, reflected, "Michael worked at a pharmacy last summer. It was painful. It was awful to see him because he was out in the front and stocking shelves. If a customer came up to him and said, 'Where's Vaseline?' It took him a long time. It's not going to be customer service. It is not going to be a strong suit for kiddos with autism."

School Personnel's Values and Teaching Principles

School personnel's values and beliefs related to successful employment and how to provide effective support also influence their approach to preparing youth with ASD for employment. During the interviews, participants described what they learned from their prior experiences, defined the meaning of what they did for youth, and shared their beliefs about important elements for youths' success. We organized the relevant codes into two categories (a) Important considerations for youth with ASD to achieve career success, and (b) What is it like when providing support for youth on employment.

Important considerations for youth with ASD to achieve career success. In this category, we coded participant's narratives when they specifically identified something as "*important,*" "*the determinant of employment success,*" or "*more [important] than anything else*." We found participants highlighted the following four factors which contribute to employment success: (a) empowering youth, (b) good social skills, (c) supportive environment, and (d) cooperative parents. School personnel believed it was important for youth to have *self-confidence* and *believe in themselves*. In addition, although school personnel did not emphasize *social skills* when they described the characteristics of youth with ASD, they still acknowledged social competence as an important factor for success. As described by Ruby, a special education teacher at a suburban public school, "It's when they don't have as many social and or communication skills that makes it even more of a challenge." *Supportive environment* and *cooperative parents* were recognized as two contextual factors which are "*important to consider*." Here, school personnel identified the importance of transactions between school, community, and family as the unique factor to achieve employment success, which was different from other types of transition success, such as postsecondary education or independent living. Ruby provided an example of how a supportive community contributes to success:

> Even though the name of the supermarket has changed a lot over the years, it's still the same community of people who are working there who are [from this town], who make sure that he's [youth with ASD who worked in the supermarket] still there, that they're still there. So even though the store has changed five different times, to five different names, the base group is still there. So that the [name of town] community is still part of this supermarket. *That's really important!*

What is it like when providing support for youth on employment. In the interviews, school personnel described their experience of working with youth with ASD using the following keywords: (a) being creative, (b) knowing the youth, (c) facilitating youths' learning through experiences, (d) working with the community, and (e) teamwork. School personnel talked about the need to *be creative* in order to prepare youth for employment. As Stella, a special education coordinator at a suburban public school, reflected, "It's a success because it doesn't happen the traditional way." Being creative enabled school personnel to flexibly utilize environmental assets and think about the possible ways to facilitate youths' success. To provide appropriate support which meets youths' individual needs, *knowing the youth* was another critical precursor, including, but not limited to, understanding youths' interests, strengths, disability, and expected needs in the community. Participants also highlighted the role of experiential learning when motivating youth, helping youth find their passion, and increasing the possibility of employment success after high school.

Moreover, school personnel reiterated the importance of *cooperation with the* *community* and *teamwork*. School personnel spent much time on community communication and cooperation, including being familiar with the community and available community resources, contacting community agencies and potential employers, developing relationships with people in the community, communicating with employers to ask for potential jobs or internship opportunities for youth, negotiating with employers and supervisors for accommodations and work modification, bridging youth and potential jobs, regularly checking in with employers, and problem solving with employers. These comments were not only from vocational counselors, but also from other professionals, such as special education teachers, occupational therapists, speech language pathologists, transition coordinators, program managers, and autism specialists. The variety of school personnel with different professional backgrounds implied that most school personnel had to spend their time on community communication and teamwork when supporting youth on employment.

Strategies School Personnel Utilized to Support Youth in Employment

The strategies school personnel used when helping youth with ASD prepare for employment are categorized as (a) strategies for youth, (b) strategies for families, and (c) strategies for the community. Although participants identified many school-level challenges, they did not share school-level strategies. The list of strategies described by school personnel is shown in Table 1-3.

Participants' Feedback from Member Check

To validate the findings and the conceptual model derived from the analysis, we sent a brief summary of the findings to all the participants and invited them to provide feedback on the conceptual model. Two participants had left their prior position and could not be located. Of the emails that were sent, half of the participants (n = 9) responded. Most school personnel responded that the findings reflected their experiences of working with youth with ASD on employment preparation. Three participants provided additional comments on the findings. One participant suggested that "community" should have a more prominent position in the model. He commented that employment preparation relied upon the incorporation of home-based services and community services. The participant also emphasized the role of community in helping youth obtain positive employment experience. In contrast, another participant suggested that we provide more emphasis on the "family" and highlighted the importance of early involvement of parents in transition planning, including planning for transportation for youth after high school, applying for adult services, and considering guardianship and supported decision-making.

Another participant suggested that we highlight the emotional support needs of youth with ASD after high school. She reported that many students with ASD had experienced severe depression and anxiety when they left high school. She thought that some of the challenge was that they went from familiar and structured environments to work or college environments, where they needed to develop new routines and did not have the same level of support. She observed that youth with ASD often had to quit their job or drop out of college due to emotional challenges. She stressed the importance of helping youth with ASD connect with emotional supports to ensure that there was continuity of therapeutic services after high school. In addition, this participant stated that she did have strategies focused at the school level (the model based on the initial interviews did not identify any). She reported that the school she works at has been very supportive to special education. For example, the administrator of special education at her school encouraged general education teachers to read the students' IEPs at the beginning of each semester and to refer to the IEP when needed.

Discussion

Although school personnel are the primary service providers who prepare youth with ASD for the transition from high school to employment, limited attention has focused on school personnel's experiences of *how* they work with youth with ASD on career development. In this study, we present school personnel's perspectives of how they work to best support youth with ASD on employment. We developed a conceptual model to describe the transactional relationships between environmental and individual factors that shape the youths' employment outcomes. In addition, school personnel identified the facilitators and barriers they experience when they work with youth with ASD to prepare for them for employment. This information increases our understanding of what to consider when providing vocational services to transition-age youth with ASD. The conceptual model and the strategies described in this study provide useful information for educators, community agencies, researchers, and potential employers to improve the services or accommodations to meet the needs of both youth with ASD and the employers.

Notably, school personnel's narratives about the process of providing vocational supports strongly corresponded with the transactional perspective, which offers a relational way to consider the individual, the environment, and meaningful activities as a whole (Cutchin et al., 2017). The transactional perspective was developed to redirect the focus on an individual or the dualism of individual and context to a more holistic view of relations among the individual, environment, and meaningful activities in daily lives. Through the transactional perspective, individual and context can be understood as defined and constructed as a whole (Sullivan, 2001). In the interviews, school personnel depicted youths' characteristics and actions within the community where youth were situated. School personnel emphasized the transactional connections between youth with ASD and the resources of school, family, and community. One participant's feedback from the member check reinforced this holistic perspective. Mason, a director of Student Services from a suburban public school said,

> The community needs to step up with home-based services, work opportunities, and community events that welcome students with disabilities. I think the model needs to be clear how schools, families and community need to be explicit in what the community role can be.

In addition, school personnel also considered helping youth find a job as an inextricable part of preparing youth for the transition to adulthood and being a member of the community. Although previous studies have noted the necessity of helping youth with ASD to connect with the community and the importance of strengthening social relationships (Anderson, Sosnowy, Kuo, & Shattuck, 2018; Koffer Miller, Mathew, Nonnemacher, & Shea, 2018; Krieger et al., 2018), this is the first study to illustrate how environmental barriers and facilitators influence service provision and school personnel's perspective of the youths’ employment outcomes.

Previous studies have emphasized youths’ autism-related difficulties in social interaction and behaviors which impact employment. Cheak-Zamora and colleagues reported that parents were concerned about their youths’ lack of motivation or impractical career goals which may not meet their strengths and abilities (Cheak-Zamora, Teti, & First, 2015). In addition, Gray and colleagues identified behavioral and mental health challenges as another important factor that affects the likelihood of community participation for youth with ASD (Gray et al., 2014). Compared to their peers with other developmental disabilities, individuals with ASD have higher risks of co-occurring psychiatric challenges, such as anxiety, depression, bipolar disorder, or schizophrenia (Bennett, Miller, Stollon, Prasad, & Blum, 2018). Emotional challenges may become more problematic during the period of transitioning to adulthood due to the lack of appropriate supportive services (Cheak-Zamora et al., 2015).

Rather than focusing on changing students’ autism-related characteristics the school personnel in this study appeared to accept the students for who they are and emphasized the need to empower youth by increasing their self-efficacy, self-determination and self-advocacy (Elias et al., 2017; Hodgetts, Richards, & Park, 2018; Lee & Carter, 2012; Wilczynski et al., 2013). The strength-based approach, which focuses on increasing youths’ self-determination, represented school personnel’s core idea of helping youth with ASD to be successful in employment.

Recent research has begun to address the importance of the environment for youths’ employment outcomes, including but not limited to physical, social, and cultural environments. For example, school personnel expressed concern that people at school and in the community lacked a comprehensive understanding of autism. Previous research using focus groups with stakeholders, including young adults with ASD, parents, educators, administrators, related service providers and community members, has also identified environmental challenges, such as teachers failing to provide consistent supports, staff at school not having enough skills and knowledge, and school personnel who were not aware of youths' core autistic characteristics (Kucharczyk et al., 2015). Krieger and colleagues also found that attitudes and acceptance of others have a large impact on youths' participation, including the employment context (Krieger et al., 2018). That is, when employers view individuals with ASD as less efficient at work than coworkers who are typically developing, individuals with ASD have fewer opportunities to participate in the work activities than do other colleagues (Krieger et al., 2018). This study adds to the previous findings by focusing on the multifaceted transactions between different contextual factors and youth with ASD. School personnel described the dynamic transactions between contextual and personal characteristics and perceived all of these characteristics together as a whole.

Parents' attitudes toward their child's transition to adulthood are also a critical contextual factor that might influence youths' post-school outcomes in employment. For example, Kirby (2016) identified that parents' expectations for their child's future mediated the predictive relationships between family background, functional performance, and the youths' adult outcomes. In addition, parents' beliefs about their child with ASD's readiness to be independent and their reluctance to fade supports may interfere with youths' opportunities to gain necessary work experiences during the transition to adulthood (Cheak-Zamora et al., 2015). Our findings are congruent with previous research that documents the important role of parents. This research adds to that description of the importance of parents in transition planning and implementation, including developing youths' career identity, helping them to set career or educational goals, encouraging youth to pursue early work or volunteer experiences and providing emotional support (Lee & Carter, 2012).

Although recent research has begun to address the importance of the environment for youths' employment outcomes, most vocational interventions still focus on developing the individual's personal work and social skills (Bonete, Calero, & Fernandez-Parra, 2015; Hume & Odom, 2007; Mechling, Gast, & Seid, 2009; Strickland, Coles, & Southern, 2013). For example, some researchers emphasized improving job interview skills for individuals with ASD (Morgan, Leatzow, Clark, & Siller, 2014; Smith et al., 2015; Smith et al., 2014). There have also been many research teams trying to improve individuals' specific vocational skills by using video-modeling (Allen, Burke, Howard, Wallace, & Bowen, 2012; Burke et al., 2013; English et al., 2017; Kellems & Morningstar, 2012; Laarhoven, Winiarski, Blood, & Chan, 2012; Mackey & Nelson, 2015). Most interventions have not focused on how to help individuals adapt these learned skills into actual work contexts or how to provide environmental supports. There is little attention to the dynamic transactions between individuals and work environment, that is, collectively considering all the elements together as a whole to achieve employment success.

Although there is no evidence to conclude that the findings are specific to youth with ASD compared to youth with other disabilities, it is well understood that youth with ASD tend to have difficulty in adapting to unexpected contextual changes. School personnel placed a great emphasis on the environment when they shared the success and challenging stories of working with youth with ASD on employment. This finding reinforces the fragility and tenuous nature of these youth's employment success as potentially unique to the experience of youth with ASD. From the school personnel's narratives, youth with ASD can only successfully maintain their employment when all the contextual factors are aligned. This dependency on environmental supports aligns well with the transactional theoretical framework to illustrate the special consideration for youth with ASD in employment preparation. Environmental and personal characteristics should be incorporated collectively as a whole to achieve employment success for youth with ASD.

This study identified important factors which were perceived as determinants to youth employment success: empowering youth, having a supportive environment, and perceiving cooperation from parents. Rather than attempting to change individual's behavior, skills, or work-related abilities, school personnel provide strength-based transition supports, which increase youths' self-efficacy and self-determination. The findings correspond with Lee and Carter (2012)'s guidelines for transition services: providing individualized and strength-based services and obtaining positive work experiences at an early stage. Youth with ASD who have higher self-determination, such as abilities in decision-making, self-awareness, setting goals, problem solving, self-advocacy and emotional regulation, generally achieve more positive adult outcomes (Hodgetts et al., 2018; Lee & Carter, 2012). In addition, collaborations between formal or non-formal support systems are important to facilitate employment success for youth with ASD (Lee & Carter, 2012). Future research for program development should take transactions and the relationships between individual and context into consideration to improve the effectiveness of the service provision.

It is notable that school personnel did not mention removing or minimizing contextual barriers in school settings. They mostly shared that their school was not helpful in providing appropriate supports and reasonable accommodations. Rather than addressing the barriers they experienced in the school settings, they tended to accept the given situation and flexibly modified their approach to help the youth in preparing for the transition to employment. This result may suggest school personnel do not know how to modify the school system to meet youth with ASD's transition needs or they may perceive it would take too much time and not benefit them to change the school environment. The finding may not reflect all participants' experiences due to the large variation in terms of resources and attitudes toward accommodations between different school districts. Future research may identify strategies school personnel can use to advocate for school supports and resources.

A primary limitation of this research is that data collection occurred exclusively in one state. Therefore, the results may not be applicable to other states with different service delivery systems. We did include school personnel with different job positions from a variety of school settings in communities that have a range of socioeconomic and ethnic compositions. Future research may broaden the research scale to investigate the potential differences in school personnel's perspective of employment-related school-based service provision in different states.

We also found that school personnel spoke about transition services broadly, and did not focus exclusively on employment preparation in the interview. Although all the interview questions specifically queried employment and career exploration, school personnel often gave answers that appeared not to be specific to employment support, and included topics such as independent living and social participation. These comments are illustrative of the inextricability of helping youth prepare for employment and transitioning to adulthood due to the school personnel's perception of work-life as a whole. The manner in which school personnel collectively considered employment preparation and other aspects of transition to adulthood coincides with the transactional perspective, which we used to capture the salient themes that appeared in the interviews in this research. Despite these limitations, this research adds to the current knowledge by describing how school personnel considered gaining employment and being situated in the community as a unified entity. School personnel valued supporting students in their employment role and creating a meaningful life in the community as equally important and indivisible. The proposed conceptual model may help school personnel consider the range of transactional factors that may impact employment preparation. The transactional perspective provides us with a theoretical view of the individual and context as *part of each other*, rather than what we typically see as *separate from each other* (Cutchin et al., 2017). With this lens, future researchers and special educators may turn their focus from thinking about the individual, environment, and employment as separate entities to focusing on the transactional relations between youth and the surrounding world. Further qualitative and quantitative research is needed to test the conceptual model by investigating the dynamic process and interactions between individual and contexts.

The findings also have implications for future program development by re-directing the focus on individual characteristics to the transactional relationship between individual and environment. By considering youths' needs and contexts together, we may be able to achieve better long-term employment outcomes: youth with ASD can successfully maintain their job in the community where they live. Future research can benefit by having a systematic model to examine the process of employment preparation, the barriers and facilitators to consider, and strategies to use to optimize the employment outcomes for youth with ASD. Future researchers may examine the conceptual model by testing the relationships between the factors that we identified in this research and youths' employment outcomes. By empowering youth, developing supportive environments, and working cooperatively with parents on employment success, educators and other service providers may be able to develop strategies or programs which can better meet the needs of youth with ASD so they successfully transition from school to employment.

Table 1-1. *Characteristics of Participants and Schools*

	%	*n*
School Personnel (*N* = 20)		
Gender (% Female)	85.0	17
Age		
30-39	15.0	3
40-49	30.0	6
$\geq$ 50	55.0	11
Position		
Special education teacher	25.0	6
Special education administrator [a]	20.8	5
Autism specialist	12.5	3
Transition coordinator	8.3	2
Vocational counselor	4.2	1
Other related service provider [b]	29.2	7
Schools (*N* = 13)		
Community type		
Urban	15.0	3
Suburban	75.0	15
Rural	10.0	2
School type		
Public or collaborative	90.0	18
Private or independent	10.0	2

[a] Includes school personnel who self-identified as director of student services, special education administrator or coordinator, transition program manager or principal of a collaborative school. [b] Includes school personnel who self-identified as speech language pathologist, occupational therapist, bridge liaison, school adjustment counselor, assistive technology specialist or inclusion facilitator.

Table 1-2. *Examples of Questions in the Semi-Structured Interview Guide.*

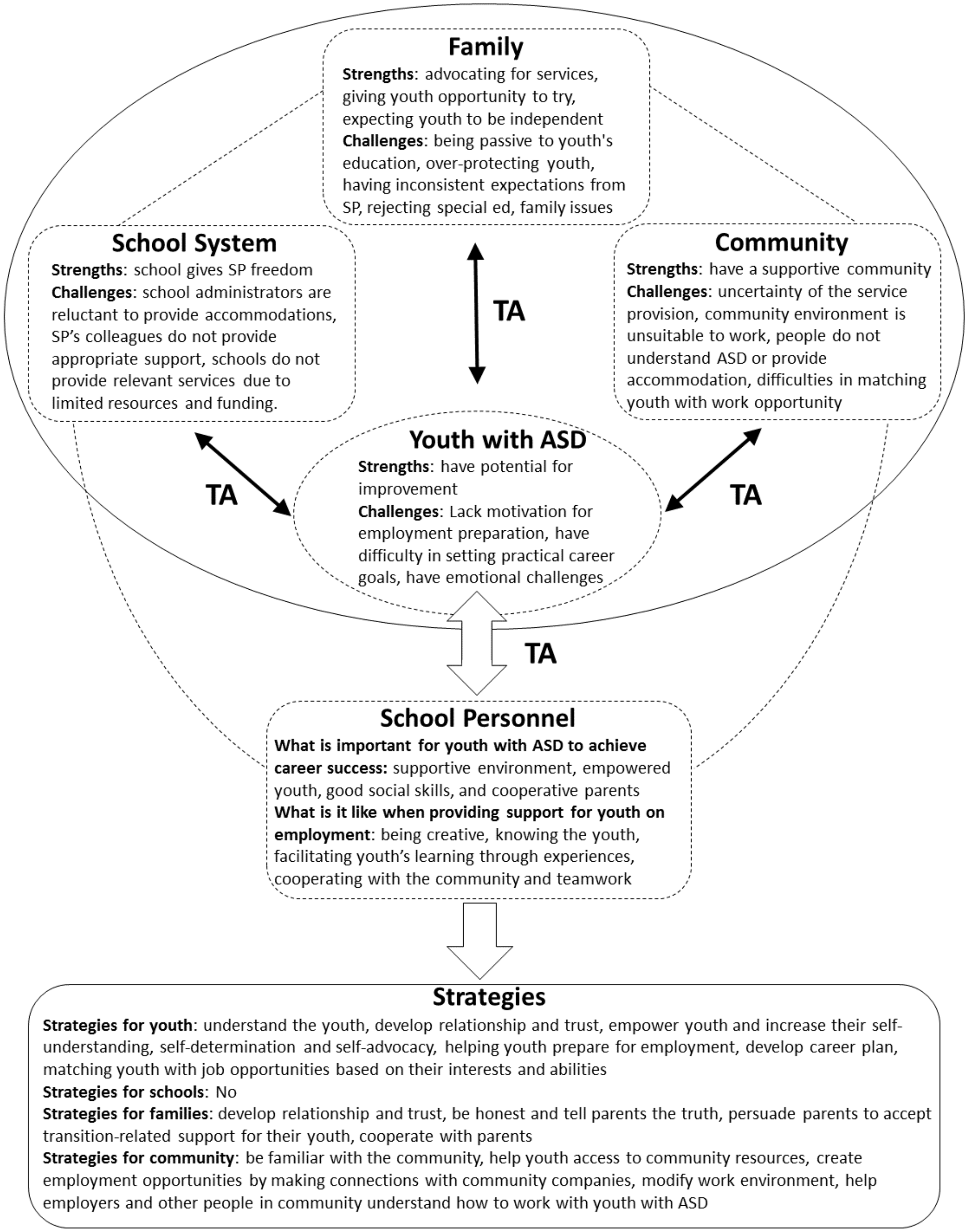
Examples of the interview questions	**Corresponding Research Questions**
Warm-up questions	
1. First, please tell me a little bit about your school setting.	
2. What is your role within the school to help students prepare for employment?	
School personnel's experiences of preparing youth for the transition from school to employment	
1. Tell me about a successful experience you had helping a student with ASD to develop their career goals.	RQ 1
2. What strategies or approaches have you used to help students with ASD develop career goals?	RQ 1
3. Please share an example when you successfully helped one student develop a plan of action based on their career goals.	RQ 1
4. What do you think contributed to his/her success in employment?	RQ 3
5. If you have experienced challenges in working with students with ASD on employment, please tell me about these challenging experiences.	RQ 2
6. What are the barriers when supporting students with ASD to prepare for employment?	RQ 2
7. Among the challenges you experienced, what types of challenges are specific to students with ASD?	RQ 2 & RQ 3
8. What factors do you consider when identifying work opportunities for students with ASD? Please describe a time when you had to consider a range of factors.	RQ 3
9. How do you determine what types of employment experiences are appropriate to the student?	RQ 1 & RQ 3
Closing questions	
What would you wish you could do but are not currently able to do to help prepare students with ASD for employment?	

Table 1-3. *Strategies Identified by School Personnel to Prepare Students with ASD for Employment.*

(1) Strategies for Youth
• Help youth understand what employment is and increase their motivation to work. • Conduct vocational evaluation to understand youths' interests and abilities. • Be honest to youth about their dreams and help develop practical career goals. • Assist youth to create a resume that reflects their strengths and needs. • Teach interview skills and give youth opportunities to practice. • Match youth with a job opportunity based on their interests and abilities. • Provide youth vocational-related experiences at or outside of school. • Help youth understand their own needs, strengths, and interests. • Empower youth through providing opportunities to make their own decisions. • Teach youth how to advocate for needed accommodations in different contexts. • Develop relationships and trust with youth. • Increase youths' social skills, life skills, and vocational-related skills. • Teach youth how to manage their emotions. • Develop a career plan with youth and other stakeholders.
(2) Strategies for Families
• Develop relationships and trust with parents. • Be honest to parents of what youth can do based on their performance at school. • Persuade parents to accept special education and transition-related support. • Cooperate with parents and provide employment support to youth.
(3) Strategies for the Community
• Teach employers and people in community how to work with youth with ASD. • Become familiar with the community and develop connections with companies. • Modify the work environment and advocate for reasonable accommodations. • Find or create employment opportunities with community companies.

Figure 1-1.

The conceptual model representing school personnel's (SP) experience of preparing youth with ASD for employment.



Study 2- Predictive Factors of Employment Outcomes for Transition-Age Youth with Autism Spectrum Disorder

Introduction

Secure employment is associated with a sense of purpose, financial independence and quality of life, and serves as an important indicator of adult success for both the general population and for people with autism spectrum disorder (ASD) (Hurlbutt & Chalmers, 2004; Mawhood & Howlin, 1999). Adults with ASD, however, have the lowest employment rates compared to peers with language disorders, learning disabilities, and intellectual disabilities (Shattuck, Narendorf, et al., 2012). Youth with ASD frequently encounter difficulties in the transition from school to the work force (Shattuck et al., 2012). There is a great need to provide employment supports for youth with ASD during the transition from school to employment, especially given the increasing numbers of youth with ASD and the poor employment outcomes of this population (U.S. Department of Education [DOE], 2015). Students with ASD comprise a growing population of special education students and will need vocational transition supports to optimize their employment outcomes. The most recent prevalence rates indicate that 1 in 59 children are diagnosed with ASD (Baio et al., 2018). The exponentially rising rate of transition-age youth with ASD and their relatively low employment rates indicate that there is a need to examine and develop effective employment-related transition services for this population. (Roux, Shattuck, Rast, Rava, & Anderson, 2015; U.S. Department of Education [DOE], 2015).

Current School-Based Employment Preparation

Because of their different needs, there is variability in the types and amounts of special education school services received by high-school students with ASD. These students have varied abilities and future goals; some have limited time available during the school day because their attention is focused on academic preparation. For example, parents and youth with ASD reported that schools often overemphasize academic performance, which may leave less time for youth to develop other skills necessary to achieve transition success, such as social skills, executive functioning skills, and daily living skills (Anderson & Butt, 2018). In addition, youth on the autism spectrum who are preparing to graduate from high school with a regular diploma tend to receive fewer supports for employment preparation, with only one-third of students receiving related services in their last year before graduation (Taylor & Henninger, 2015; Taylor, Henninger, & Mailick, 2015).

Previous studies have focused on the personal characteristics of youth with ASD and emphasized the need to individualize transition services for this population (Palmen, Didden, & Korzilius, 2010). Lee and Carter (2012) also identified personalized and strength-based services as one of the critical indicators of high-quality transition supports. There is a need to individualize services to meet the diverse needs of youth with ASD who have different intellectual and functional abilities, disability levels, and social-communication skills. For employment preparation, professionals should help youth with ASD build vocational-related knowledge and skills (Wilczynski, Trammell, & Clarke, 2013). In addition, these supports and resources should be based on the match between the youth and their future employers (Wilczynski, Trammell, & Clarke, 2013).

Factors that Predict Employment Outcomes for Youth with ASD

There is a high likelihood that the determinants of employment outcomes are complex. Prior research has identified many individual and contextual predictors of employment outcomes for youth with ASD (e.g. Chiang et al., 2013; Kirby, 2016; Lee & Carter, 2012; Roux et al., 2013; Shattuck, Narendorf, et al., 2012). Prior research on this topic, however, utilized simple regression models, which can only examine the direct associations between the predictors and employment outcomes. To develop a comprehensive understanding of how to support transition-age youth with ASD, we need to better understand the complex relationships between numerous factors (e.g. individual characteristics and contextual supports and barriers) identified in the prior research and employment outcomes of interest. To understand how employment preparation relates to service provision, individual factors, and contextual characteristics, this study examined whether school supports predicted employment outcomes given family background and youth characteristics, and identified the relationships among these factors.

Vocational-related services. Schools currently provide career supports for students with disabilities to prepare them for the transition from school to employment by: integrating the training of academic and vocational education; developing connections with vocational schools, colleges, and other education programs; establishing a linkage system with local employers; and creating community service guides (Carter, Trainor, Cakiroglu, et al., 2009; Test et al., 2014). Provision of in-school vocational services predicts success in competitive employment for youth with ASD or intellectual disability

(Chen, Sung, & Pi, 2015; Chiang, Cheung, Li, & Tsai, 2013; Kaya, Hanley-Maxwell, Chan, & Tansey, 2018; Park & Bouck, 2018; Schaller & Yang, 2005). In addition, work experience during or after high school positively predicts participation in employment for youth with ASD (Carter et al., 2010; Carter, Trainor, Ditchman, Swedeen, & Owens, 2009).

Family background. The research literature indicates that several family-related factors predict employment outcomes for youth with ASD, including race, family income, and parental education level (Chiang et al., 2013; Roux et al., 2013; Shattuck, Narendorf, et al., 2012). For example, research using data from the National Longitudinal Transition Study-2 (NLTS-2) indicated that higher household income significantly predicted positive employment outcomes for youth with disabilities (Sima, Wehman, Chan, West, & Leucking, 2014). Chiang et al. (2013), analyzing NLTS-2 data, found that youth with ASD who were from high-income families and whose parents had a bachelor degree or higher were more likely to gain and maintain employment after school.

Parent participation in special education activities. Parental involvement in their youth's education and future planning appears to be related to students' employment outcomes after school. For example, using NLTS-2 data, Chiang et al. (2013) found that higher levels of parent participation in the student's individualized educational program (IEP) meetings was associated with students' participation in employment. Two additional analyses using NLTS-2 data also identified family as an important factor. Wei, Wagner, Christiano, Shattuck, and Yu (2014) reported that parents' acceptance of special education and attitudes toward transition services were associated with how students with

ASD search, advocate, and acquire services at school. Kirby (2016) reported that parent expectations of youths' transition outcomes was a mediator between family background, students' functional performance and transition outcomes for individuals with ASD.

Self-determination. Self-determination has become a topic of interest for individuals with ASD (Wehman et al., 2015). Prior studies have recognized self-determination and self-advocacy skills as strong predictors for long-term employment because high levels of self-determination improve students' work skills and attitudes toward employment (Lee & Carter, 2012). Research, however, indicates that school personnel find it difficult to improve student's self-sufficiency and challenging to create a balance between providing supportive services and helping youth learn to be independent (Elias, Muskett, & White, 2017).

Academic performance. There is no research investigating the relationship between youth's academic performance and employment outcomes for students with ASD. However, it seems logical that for some youth on the autism spectrum, and for some jobs, academic skills and preparation might predict employment outcomes. Prior research has shown a predictive relation between post-secondary education and employment outcomes for youth with ASD, such as employment rate, work hours and salary level (Kaya et al., 2018; Migliore, Timmons, Butterworth, & Lugas, 2012; Sung, Sanchez, Kuo, Wang, & Leahy, 2015). Young adults with ASD are more likely to obtain competitive employment if they have attended post-secondary education (Holwerda, van der Klink, Groothoff, & Brouwer, 2012).

Daily functioning skills. Functional performance, such as social skills, self-care skills, and communication abilities, have been identified as positive predictors for successful employment for individuals with ASD (Bouck & Joshi, 2015; Chiang et al., 2013; Eismann et al., 2017; Roux et al., 2013; Shattuck, Narendorf, et al., 2012; Wehman et al., 2015). Dell'Armo and Tasse (2018) found youths’ adaptive behavior played a more important role than parents’ expectations in predicting transition outcomes for youth with intellectual disability. Previous research also indicated that individuals with ASD are less likely to obtain paid employment or post-secondary education if they do not have adequate daily living skills in the areas of communication, self-care and community living (Gray et al., 2014).

No prior research has investigated the complex relationships between multiple factors and employment outcomes in youth with ASD. To develop a theoretical framework which can explain the complex relationships between factors related to employment outcomes, we conducted structural equation modeling (SEM) to develop a model which could potentially explain the direct and indirect associations between multiple factors and employment outcomes for this population. By conducting SEM analysis, we were able to examine multiple latent variables, represented by multiple indicators. Additionally, SEM analysis enabled us to develop a statistical model that explained the complex relationships between predictors, mediators, and dependent variables.

We chose to use the NLTS-2 data set to examine the predictors of employment for youth with ASD. The SEM approach has been used to analyze the NLTS-2 dataset with different populations with disabilities or for different research purposes, but no study has specifically focused on employment preparation for youth with ASD. Using SEM analysis in the sample of youth with ASD, Kirby (2016) found *parents' expectations* mediated the association between *family background*, *youth's functional performance* and youth's *transition outcomes*, which included independent living, employment, and social participation. Dell'Armo and Tasse (2018) conduced SEM analysis using the same factors as Kirby (2016) in the population of youth with intellectual disabilities (ID) but found *functional performance* played a more significant role than *parents' expectations* when predicting transition outcomes. Two additional studies used SEM to examine the relationship between self-determination and youth's academic achievement in the populations of youth with ID and learning disabilities (Gaumer Erickson, Noonan, Zheng, & Brussow, 2015; Zheng, Gaumer Erickson, Kingston, & Noonan, 2014). However, none of these analyeses included variables related to school services or focused on employment outcomes specifically. Furthermore, most studies were completed with samples that did not include youth with ASD (Dell'Armo & Tasse, 2018; Gaumer Erickson et al., 2015; Zheng, et al., 2014). Accordingly, there is a need to identify a model specifically to describe the employment preparation for youth with ASD.

The Current Study

Prior research has identified student factors and family-related factors that predict post-school employment outcomes for youth with ASD (Chen et al., 2015; Chiang et al., 2013; Kirby, 2016; Roux et al., 2013; Shattuck, Narendorf, et al., 2012; Sung et al., 2015; Test et al., 2014; Wei et al., 2014). These factors (such as students' gender, level of disability, race, and parents' education and income), however, are generally not malleable to intervention at the individual level in the short period of time of the transition to adulthood. School-based transition supports, such as transition planning and vocational-related preparation, are potentially malleable and may also predict students' employment outcomes. In this study, we examined whether school-based transition supports predicted employment outcomes given student factors and family-related factors.

This study was a secondary analysis of data from the NLTS-2 to identify the role of school-based transition supports in predicting employment outcomes for youth with ASD. The goal of this research was to explore how student factors, parent participation in special education, and school-based transition supports predicted student employment outcomes. The research questions were:

(1) To what extent do family background, parent participation in special education (including parents' role in transition planning and parents' expectations toward youth's employment outcomes), student factors (including self-determination, daily functioning skills, academic performance), and school-based transition supports predict employment outcomes for students with ASD?

(2) Do school-based transition supports mediate the associations between independent variables (family background, parent participation in special education, student's self-determination, daily functioning skills, and academic performance) and employment outcomes of students with ASD?

Structural equation modeling (SEM) was conducted to address the research aims and questions and to develop a model that accounted for the associations between latent variables and students' employment outcomes. This study contributes to the research literature in two primary ways. First, by using the SEM analysis, we were able to examine the relationships, including direct and indirect associations, between numerous factors and employment outcomes for youth with ASD. Second, this study focused on examining whether malleable factors, such as school services, predicted employment outcomes.

An ecological systems perspective guided the identification of factors and the initial SEM model (Bronfenbrenner, 1979). In addition, the conceptual model developed in Study 1 and a literature review also guided the analysis. Bronfenbrenner (1979) identified multi-level environmental systems which could potentially influence an individual's growth and development, labeled as the microsystem (e.g. family, school, and health services), the exosystem (e.g. community), the macrosystem (e.g. cultural attitudes and values), and the mesosystem (the interconnected relationships between different systems). Accordingly, in Study 1, we found that surrounding environments, including school, family and community, are important for youth with ASD's employment success. Therefore, we included parent participation, family background and school-based transition supports as three contextual factors that have the potential to affect youths' employment outcomes. Finally, as determined in prior research, there are several student factors, family-related factors, and vocational services that predict youths' employment outcomes, which we also included in the analysis.

Methods

Data Source and Sample

Data were retrieved from the National Longitudinal Transition Study-2 (NLTS-2; Institute of Education Sciences, n.d.; Newman et al., 2011). The NLTS-2 study was a longitudinal prospective study which included five waves of data collection from 2001 to 2009. The NLTS-2 contains data from a nationally representative sample of high school students with disabilities who were in the process of transitioning to adulthood. The original sample included youth who were 13–16 years old and receiving special education services, who were randomly selected at Wave 1 and completed the study when they were 21–25 years old. In total, 11,000 students in the U.S. were recruited for data collection. The study was designed to understand broad factors related to youth transition to adulthood, such as youth and family characteristics, educational environments, services, academic performance, and adult outcomes. This dataset includes information about service provision, interventions, and academic support, which allows for the identification of the types of services or supports that may best support students' outcomes. Conducting analysis across different waves will help inform about the predictive relationship between high school factors and employment outcomes after transition. Also, the dataset provides a large enough sample to conduct complex analysis, such as SEM, to investigate the relationships among multiple factors and transition outcomes.

This analysis specifically focused on participants whose primary educational disability classification was autism as reported by district rosters of students who were receiving special education. Students were included in the analysis if their disability condition was identified as autism, as reported by school personnel, or if their medical diagnosis was autism, as reported by parents. An initial sample of 920 students with autism were included. Next, because the dependent variable was employment outcome after graduation, students who did not participate in Wave 5 (n = 290; 31.52%) and students who had not yet left high school at Wave 5 (n = 60; 6.52%) were excluded. The final sample included 570 participants with ASD in the analysis. The demographic characteristics of the 570 participants are summarized in Table 2-1. The average age of the participants at Wave 1 was 15 years old.

Variables of Interest

In order to build the measurement models for creating latent variables of interest, observed variables were identified from the NLTS-2 dataset at Wave 1, Wave 2 and Wave 5. Predictor variables were retrieved from the parent and youth surveys, the school program surveys, student assessments, and the teacher survey at Wave 1 and Wave 2. Information about employment outcomes was retrieved from parent and youth surveys at Wave 5. The observed variables that were considered to construct the eight latent variables of interest are described below. Certain observed variables, however, were not included in the final model in order to improve the fit of the measurement model. The latent variables of interest and the observed variables which represent the latent variables that were included in the final model are listed in Table 2-2.

Family background. *Student race/ethnicity*, *household income*, and *mother or female legal guardian's education level* reported at Wave 1 were included to represent the latent variable of family background. These three variables were used as indicators of *family characteristics* (Chiang et. al., 2013; Kirby, 2016).

Parent participation in special education. Three variables were created to represent parent expectation for their youths' employment and their role in the student's education and transition planning: *Parents' role in future planning*, *parent participation in school activities*, and *parents' expectations for their student's future work status*. *Parents' role in future planning* was measured by aggregating four dichotomized items from the parent survey at Wave 2 (whether the parent attended the IEP meeting; whether the parent set post-graduation goals with teachers; whether the parent attended general school meetings; whether the parent attended parent/teacher conferences). The first two items (attending IEP meeting and setting goals) were used in Chiang and colleagues' study as the indicator of *parent participation* (Chiang, et al., 2013). The variable *parent participation in school activities* was created by summing parents' participation in the following five activities: programs for families of youth with disabilities at the school, school or class events, volunteering at the school, attending school support groups for families, and attending back-to-school night. Some of the items were used in Wei and colleague's study to represent the variable of *parents' involvement in school* (Wei et al., 2014). One item measured *parents' expectations for the student's future employment,* which queried the likelihood that their youth would eventually get a paid job. This item for parents' expectation for future employment was identified and used in previous studies as one of the indicators of parents' expectations for youths' general transition outcomes (Chiang, et al., 2013; Kirby, 2016; Wagner, et al., 2016).

Academic performance. Academic performance was measured through administration of the short version of Woodcock-Johnson Tests III (WJ III) (Woodcock, McGrew, & Mather, 2001) during the youth assessment at Wave 2. Six observed variables, which represented the standardized scores in the six domains of the WJ III, were included: *calculation, applied problems, science, reading comprehension*, *vocabulary*, and *social science*.

Daily functioning skills. Eight 4-point self-care items from Wave 1 were included to represent the student's daily functioning skills (Kirby, 2016; Roux et al., 2013). The eight items were from the parent survey, in which parents rated the level of their child's ability to complete certain tasks, such as telling time on a clock with hands, getting to places outside the home, and using public transportation to get around town.

Self-determination. Students' level of self-determination was measured using 26 dichotomized items from the Arc Self-Determination Scale (Wehmeyer, 1995) in the youth assessment at Wave 2. Based on the instrument instructions, three summary scores of self-determination were created: *autonomy*, *self-realization*, and *psychological empowerment*. However, the internal consistency of the Arc Self-Determination Scale tested in this sample of youth with ASD was much lower than the internal consistency reported by the scale guidelines (Wehmeyer, 1995). For youth with ASD who were included in the analysis, the Cronbach's alphas (α) were: .79 for the whole scale, .77 for *autonomy*, .65 for s*elf-realization*, and .16 for *psychological empowerment*. In addition, a measure of *self-efficacy* from Wave 2 was included. Youth were asked if they felt proud of themselves (Y/N, where Y= 1 and N= 0), whether they were a nice person (Y/N), and whether they felt useful and important (Y/N). These three dichotomous items were summed to represent *self-efficacy*.

School-based transition supports. Three variables were created to measure the provision of school-based transition supports: *transition planning, vocational-related support,* and *students' work experiences at the high school* using items from the school program survey and parent/youth surveys at Wave 2. *Transition planning* was measured by aggregating five dichotomous items asking if the school provided adequate support to prepare for transition, such as whether or not the school developed a transition plan for youth (Y/N), if school teachers provided instructions for youth focused on transition planning (Y/N), and if the school identified the youths' service needs in the IEP and in the transition process (Y/N). These items were used in a study by Shogren and colleagues (Shogren & Plotner 2012) to represent the variable of *transition planning services*. *Vocational-related support* was measured by summing 15 dichotomous variables related to employment support, such as whether the youth received classes related to job readiness or prevocational training, job shadowing and work exploration, participated in an internship, specific job skills training, instruction in looking for jobs, or had a job coach. Most of the items that related to vocational instruction were identified in a previous study to represent *in-school services* (Park & Bouck, 2018). Finally, the variable of *students' work experiences* was measured by aggregating three dichotomized questions from the youth and parent surveys: youth did volunteer or community service when they were in high school, youth worked during the summer or during the school year, and youth participated in a school-sponsored work activity. The final item was used in Chiang and colleagues' study (2013).

Employment outcomes. The students' employment outcome was measured with four variables: *youths' employment status, weekly wages, length of job retention*, and *job satisfaction*. A four-point indicator of *employment status* was developed. Scores included: 1 = no past work experience and no current paid job; 2 = had past work experience but no current paid job, 3 = currently has a part-time job, and 4 = currently has a full-time job. If the youth had missing data for the variables of *weekly wages* and *length of job retention* due to not being employed, the wages and retention time were coded zero. Most prior research has used student's work experience (e.g. whether or not youth has ever worked for pay) (Bouck, et al., 2015; Roux, et al., 2013; Wagner, et al., 2016), current work status (e.g. whether or not youth currently has a paid job) (Bouck, et al., 2015; Roux, et al., 2013), and the possession of a full-time job (e.g. have youth had full-time employment) (Bouck, et al., 2015; Eismann, et al., 2017). This study incorporated these three items and created an aggregated variable to represent student's work status. In addition, we added the other three indicators (*weekly wages, length of job retention*, and *job satisfaction*) to incorporate the different aspects of employment outcomes.

Graduation year. A latent variable with a single indicator was created to control for the time since the youth left high school. This indicator was developed using items from Wave 1 to Wave 5, which identified the year when the student graduated, received a diploma or certificate, or dropped out of high school. A few students were reported as never having attended school. Previous studies have used *age* as one of the predictors of transition outcomes (Roux et al., 2013; Shattuck et al., 2012). In this research, we used *graduation year* as the covariate since the number of years since the youth left high school is potentially correlated with the likelihood of work experience.

Data Analysis

As a first step, descriptive analyses and examination of distributions of the variables were conducted using the Statistical Package for the Social Sciences, version 24 (SPSS; IBM, 2016). At the next step, structural equation modeling (SEM) was undertaken using Stata (StataCorp, 2017). The maximum likelihood with missing values (MLMV) approach was used to estimate the level of fit for measurement and structural models. This approach uses all information from cases with missing values and avoids listwise deletion. The estimated correlation coefficients of parameters in the measurement and structural models were standardized in order to compare the magnitude of correlations.

To assess the model fit, we used several fit indices, including Chi-square (χ^2), root mean square error of approximation (RMSEA), 90% confidence interval (90% CI) of RMSEA, Tucker-Lewis index (TLI), comparative fit index (CFI), and Bayesian information criterion (BIC). We report the Chi-square significance test as is common in most research. The Chi-square significance test, however, is not a desirable indicator of model fit because it is sensitive to sample size and tends to be significant when the sample size is larger than 400 (Acock, 2013). To determine a good fit of the model, we focused on: (1) RMSEA < .05 with lower bound of 90% CI of RMSEA < .05 and upper bound < .10, (2) TLI > 0.95, and (3) CFI > .95 (Acock, 2013). We also assessed the normality and the multivariate linearity of the generated predicted latent variable scores, but no adjustments were necessary.

Results

Group Differences between Participants Included and Excluded in the Analysis

Because there were a number of participants (*n* = 290; 31.52%) who were excluded in the analysis due to loss of follow-up at Wave 5, group comparisons were conducted to investigate if there were differences between students who did not participate at Wave 5 and students who were included in the analysis. Chi-square and independent sample t-tests revealed that students with ASD who participated in Wave 5 data collection were more likely to be White than African-American or Hispanic (χ^2 (6) = 21.85, $p = .001$), were from higher income families (χ^2 (3) = 28.74, $p < .001$), had mothers with higher levels of education (χ^2 (3) = 26.79, p < .001), had higher daily functioning skills ($t(665) = 2.21$, $p = .027$), and had more work experience at high school ($t(655) = 3.443$, $p = .001$) compared to students who did not participate at Wave 5. There were no significant differences on age, gender, self-determination, school-based transition supports, vocational-related support, parents' expectations and their role in transition planning.

Model Estimation

Confirmatory factor analyses (CFA) for the measurement model. CFA using the SEM framework was conducted to examine the measurement models between the observed variables and the latent variables of interest. Modification indices and Pearson correlations were used to determine how to improve the fit of the measurement models. All changes were theoretically-based and conceptually acceptable. The following modifications made to improve the fit of measurement models: (a) **family background** - the variable of *student's race/ethnicity* was removed, because it was conceptually different from the other two variables; (b) **parent participation in special education** - the variable of *parent participation in school activities* was not conceptually related to students' employment outcomes and this variable was less correlated with the other two observed variables; therefore, this variable was taken out from the final model to improve the overall model fit; (c) **academic performance** - the subscore of *calculation* was excluded because it contributed to a lot of unexplained variance and had lower correlations with the other five subscores; and (d) **daily functioning skills** - to achieve acceptable model fit for the measurement model of daily functioning skills, only five indicators that appeared to be more related to youths' ability to obtain and maintain a job in community were included: *tell time on a clock with hands, read and understand common signs, count change, get to places outside the home*, and *use public transportation to get around town*.

The final combined measurement model achieved a satisfactory model fit: χ^2 (248) = 446.54, $p < .001$, RMSEA = .038 (90% CI [.032, .043]), BIC = 44186.11, CFI = .95, TLI = 0.95. Table 2-2 shows the observed variables included in the measurement models to represent the seven latent variables.

Path analyses for the structure model. Figure 2-1 displays the final structural equation model (Model 1) predicting the employment outcomes for transition-age youth with ASD, with standardized estimates of the pathways. In Model 1, we identified *parent participation in special education* and *family background* as two exogenous variables (which are independent variables that are not affected by other factors in the model), *academic performance*, *daily functioning skills*, *self-determination*, and *school-based transition supports* as mediators, and *graduation year* as a covariate. Model 1 demonstrated strong overall model fit: χ^2 (261) = 466.43, p < .001, RMSEA = .037 (90% CI [.032, .043]), BIC = 44123.57, CFI = .95, TLI = 0.95. In Model 1, time since leaving school and family background are included as control variables. Thus, the model shows the adjusted effect, controlling for the number of years after high school exit, as more time might allow for more work experience. *Family background* was included as a control variable in the model because it has been reported to have an impact on youths' functional performance and transition outcomes in previous studies (Dell'Armo & Tasse, 2018; Kirby, 2016). Regarding the covariates, *graduation year* did not significantly predict *employment outcomes*, and *family background* only had a significant relationship with *self-determination*.

All paths in Model 1 were significant, with the exception of two pathways between covariates and certain latent variables (*graduation year* and *employment outcomes*; *family background* and *daily functioning skills*) and one pathway between *self-determination* and *school-based transition supports*. Overall, the model explained 48% of the variance in *employment outcomes* (R^2 = .48), 59% of the variance in *school-based transition supports* (R^2 = .59), 94% of the variance in *academic performance* (R^2 = .94), 65% of the variance in *daily functioning skills* (R^2 = .65), and 25% of the variance in *self-determination* (R^2 = .25).

Model 1 showed that *academic performance* and *school-based transition supports* were two important mediators between *parent participation in special education* and *employment outcomes*. There appeared to be two pathways to predict *employment outcomes* in Model 1: one was through *academic performance* (pathway illustrated with dotted lines in Figure 2-1) and the other was through *school-based transition supports* (pathway illustrated with dashed lines), with or without *youths' daily functioning skills* as a mediator. In these two pathways, *parent participation in special education* played an important role: in the pathway with dotted lines, higher level of *parent participation in special education* was associated with higher *youth academic performance*, which subsequently predicted better *employment outcomes*. In the pathway with dashed lines, higher *parent participation in special education* had a positive association with youths' receipt of *school-based transition supports*, which in turn was associated with better *employment outcomes*. In addition, *academic performance* had a strong negative association to *school-based transition supports*, which implied that students who had better academic performance were less likely to receive school-based transition supports.

We then hypothesized that these two pathways might reflect the experiences of students with different levels of daily functioning. For students who had higher levels of daily functioning skills, the determinant of their *employment success* might be their level of *academic performance*. In contrast, for students who had comparatively lower daily functioning skills, *school-based transition supports* might play an important role in youths' employment success after school.

To test the proposed two-pathway hypothesis, the sample was divided into two groups based on the level of daily functioning skills (below and above the median of daily functioning scores) and then the model fit was examined in these two groups. To simplify this post-hoc analysis, the two latent variables of *self-determination* and *family background* were excluded as they did not have a significant role in the hypothesized model. Model 2 illustrates the paths and the standardized estimates of correlation coefficients for the students with ASD who had higher daily functioning skills (n = 260) (see Figure 2-2). This model with four latent variables showed acceptable overall model fit: χ^2 (71) = 115.30, p = .001, RMSEA = .049 (90% CI [.032, .065]), BIC = 16279.06, CFI = .96, TLI = 0.95. As hypothesized, the pathway with dashed lines had a significant impact on the *employment outcomes* for this group, with significant paths through *parent participation in special education*, *academic performance* and *employment outcomes* having higher coefficient values than the other path through *school-based transition supports*. Model 2, using the sample of youth with ASD with higher daily functioning skills, better explained the variance in *academic performance* (R^2 = .73) than the variance in *school-based transition supports* (R^2 = .03). In contrast, Model 3 shows that the pathway with dotted lines appeared to explain the outcomes for youth with lower daily functioning skills (n = 260). The significant paths through *parent participation in special education*, *school-based transition supports* and *employment outcomes* had higher coefficient values than the same path for youth with ASD with higher daily functioning skills (see Figure 2-2). Model 3 generally fit the data well for youth with lower daily function: χ^2 (71) = 101.52, p = .01, RMSEA = .041 (90% CI [.021, .058]), BIC = 11751.46, CFI = .97, TLI = 0.96. Model 3, using the sample of youth with ASD with lower daily functioning skills, accounted for a relatively large amount of variance in *school-based transition supports* (R^2 = .50), with 36% of the variance in *employment outcomes*.

Examining alternative explanations. To validate the proposed model (Model 1), an alternative model was examined in which *academic performance* and *school-based transition supports* were not hypothesized as mediators between *parent participation in special education* and *employment outcomes*. Model 4 shows the paths and the standardized estimates of correlation coefficients for the four latent variables (*academic performance*, *school-based transition supports, self-determination,* and *daily function*) as equally important mediators (see Figure 2-3). The overall model fit was considered acceptable but not good: χ^2 (262) = 496.84, p < .001, RMSEA = .040 (90% CI [.034, .045]), BIC = 44147.04, CFI = .95, TLI = 0.94. The level of fit of the alternative model was much lower than Model 1 (BIC of Model 1 vs. Model 4 = 44123.57 vs. 44147.04). The alternative model explained less variance of the mediators compared to Model 1: 45% of the variance in *employment outcomes* (R^2 = .45), 35% of the variance in *school-based transition supports* (R^2 = .35), 69% of the variance in *academic performance* (R^2 = .69), 73% of the variance in *daily functioning skills* (R^2 = .73), and 29% of the variance in *self-determination* (R^2 = .29). Furthermore, the correlation coefficients between the three latent variables (*self-determination, daily functioning skills,* and *academic performance*) and the *employment outcomes* were not significant, which suggested that the mediating effects of these latent variables were diluted. Without identifying the relationships between these mediators (such as the correlations between *school-based transition supports,* and *academic performance*) as we did in Model 1, the overall model fit of the alternative model (Model 4) decreased. The results supported Model 1 as having the better fit for the data compared to the alternative model.

Discussion

This analysis using NLTS-2 data was the first to use structural equation modeling to examine the complex relationships between student factors, family-related factors, school-based transition supports, and employment outcomes for youth with ASD. This research also identified malleable factors, such as parent participation in youths' education and school-based transition services, which can be addressed to improve employment outcomes for youth with ASD. The findings suggested that there are two primary pathways for students with ASD who have different levels of daily functioning skills. For youth with ASD who have higher daily functioning skills, their level of academic performance mediated the relationship between parent participation in special education and employment outcomes. In contrast, for youth with ASD with lower daily functioning skills, school-based transition supports mediated the association between parent participation in special education and employment success. These results suggest there are different determinants of employment outcomes for different subgroups of students on the autism spectrum. Future research that examines youths' daily functioning skills would help determine what school-based transition services or academic supports may best prepare youth with ASD for employment after high school.

In both of the pathways identified, parent participation in special education played an important role in predicting employment outcomes. This study adds to prior studies that have identified family background and parents' characteristics as important predictors of post-school outcomes for youth with ASD. This study further examined how parent participation in special education and parents' roles in youths' future planning impacts employment outcomes for youth with ASD. Prior research has indicated that parents' physical and mental distress, household income, and education level influence the likelihood that their youth receives necessary services (Taylor & Henninger, 2015; Wei et al., 2014). However, in qualitative research, parents of youth with ASD expressed that they had difficulty accessing appropriate transition services (Anderson, Lupfer, & Shattuck, 2018). Parents indicated that they were often in disagreement with schools when trying to access adequate services for their youth with ASD (Wei et al., 2014). Families of youth with ASD often spend significant efforts to advocate for necessary services compared to parents of youth with other disabilities (Wei et al., 2014). As youths' postsecondary outcomes often reflect family values and cultural beliefs, it is important to improve the family-professional collaboration in transition evaluation and planning (Carter, Trainor, Sun, et al., 2009; Dymond, Gilson, & Myran, 2007).

This study showed that daily functioning skills are a key determinant of what types of service and supports youth might benefit from (e.g. transition services vs. supports to improve academic skills) in order to achieve employment success after school. Specifically, better academic performance and receiving transition supports mediated the predictive relationship between parent participation in special education and employment outcomes for students with ASD who had higher and lower daily functioning skills. Daily functioning skills are critical for youth with ASD to live independently, participate in society, and pursue employment (Anderson et al., 2014;

Roux et al., 2013; Shattuck et al., 2012). Youth with ASD, however, may have particular difficulty with daily functioning skills due to challenges with executive functioning skills, social competence, and cognitive flexibility in unexpected situations (Anderson, Shattuck, Cooper, Roux, & Wagner, 2014; Taylor & Mailick, 2014).

Most schools provide instruction and special education to develop daily functioning skills for youth with ASD who have intellectual challenges (Wei, Wagner, Christiano, Shattuck, & Yu, 2014). For youth with lower levels of academic performance, parents may focus on transition services, such as employment preparation, to ensure their child can succeed in work or independent living after graduation. For youth with ASD who have less developed daily functioning skills, receiving appropriate transition supports at school may be critical for acquiring the necessary skills to work, obtaining adequate vocational services, and gaining successful employment experiences after school.

In contrast, youth with ASD who have stronger academic performance and who do not show significant challenges in daily functioning may not receive equivalent transition services because school personnel and their parents may focus on preparing them for postsecondary education, which is further predictive of better employment outcomes (Kaya et al., 2018; Migliore, Timmons, Butterworth, & Lugas, 2012). More postsecondary education is associated with the potential to obtain employment with higher pay (Kaya et al., 2018; Migliore, Timmons, Butterworth, & Lugas, 2012; Sung, Sanchez, Kuo, Wang, & Leahy, 2015). Because students with ASD who have higher daily functioning skills generally do not have significant needs in basic daily functioning tasks (e.g. basic communication skills) and show potential in academics in the general education curriculum, schools may focus more on preparing these students for postsecondary education. This focus may result in lack of attention to youths' other transition needs, such as employment preparation.

The findings showed the importance of youths' academic performance in predicting employment outcomes after high school. The effect was especially salient in the sample of students with ASD who had higher daily functioning skills. Although the current practice in special education for youth who are higher functioning emphasizes academic performance, to our knowledge there is no study investigating the effects of providing academic support on employment outcomes of youth with ASD. Future research is needed to clarify the relationship between academic instruction in general education, academic support and accommodations in special education, and employment outcomes for students with ASD.

School-based transition supports were an important mediator that predicted youths' employment success. However, previous literature has indicated that students with ASD who have higher daily functioning skills often receive fewer services (Test et al., 2014). Most existing school supports were designed for students with significant disabilities and may not be appropriate for students who do can perform simple discrete daily living skills but who still have challenges in managing complex tasks or problem solving in unexpected situations (Test et al., 2014). In addition, an overemphasis on academic performance and time constraints of multiple school activities for academically-capable students with ASD may lead to less opportunity to receive transition supports or other types of services needed to achieve transition success (Anderson & Butt, 2018; Orsmond, Munsell, & Coster, under review). There is a need for further research to investigate different service needs of youth with ASD to inform appropriate employment preparation program development to support youth with a range of daily functioning skills.

Prior research has indicated that self-determination is an important characteristic that predicts employment success for youth with disabilities (Carter, Trainor, Sun, et al., 2009). Self-determination in the context of employment includes self-evaluation; providing self-relevant information of strengths, interests and needs to employers and supportive agencies; and self-disclosure of the disability if needed (Carter, Trainor, Sun, et al., 2009). Under the Americans with Disabilities Act (ADA, 1990), youth with disabilities are expected to self-advocate for reasonable accommodations, such as transportation assistance and accessibility to public buildings. However, contrary to previous literature (Gaumer Erickson, Noonan, Zheng, & Brussow, 2015), this analysis did not find significant associations between self-determination and youths' academic performance, school-based transition supports, or employment outcomes for high school students with ASD. The non-normal distribution of the self-determination scores (slight negative skew) observed in this data set may have decreased the statistical power to show significant correlations with other latent variables. Adding other related factors, such as daily-functioning skills, into the model may also have diluted the impact of self-determination on employment outcomes. In addition, the fair to poor internal consistencies (the range of Cronbach's $\alpha = .16 - .79$) for the subscales and whole scale of the Arc Self-determination Scale with the sample of youth with ASD may also have contributed to insignificant results. Future research may investigate the role of self-determination in student's employment outcomes and examine whether there are potential moderators between self-determination and post-school outcomes for students with ASD.

Analysis Limitations

This research was conducted using data from the NLTS-2 dataset; therefore, the analysis was limited to the available data and variables. There were several limitations to using this data set. First, a considerable portion of the sample with ASD (31.52%) in the analysis was lost due to missing or unavailable data at Wave 5. There were group differences in race/ethnicity, family income, and parent education levels between the sample included in the analysis and the sample lost to follow-up in Wave 5. These differences may have decreased generalizability of the findings. Second, the measures of latent variables were limited to the questions or assessments available in the NLTS-2 data. For example, we were not able to control for youths' IQ in the data analysis because it was not obtained during data collection. We were not able to build an ideal construct that included comprehensive aspects of the abstract concepts of interest to represent certain latent variables, such as student's *daily functioning skills*, due to the limited items asked in the survey. This limitation may have contributed to the unexpected non-significant correlations between *self-determination* and other variables. However, using NLTS-2 data for secondary analysis also has some benefits which cannot be obtained otherwise. For example, by using this data set, we were able to access a large nationally representative sample with a longitudinal follow-up study design.

Implications for Future Research and Program Development

Future research focused on identifying the specific transition service needs of youth with ASD who have different characteristics, such as interests, social skills, disability levels, daily functioning skills, or academic performance would be valuable. In addition, future research may consider how to support parent participation in youths' special education and transition planning. As shown in this analysis using data from a longitudinal prospective study, parents' involvement was important in predicting youths' employment outcomes for students across the autism spectrum. As parents are the primary service coordinators and caregivers when their child transitions out of school, providing family-centered services may improve youths' employment success after graduation (Dymond et al., 2007). Given the limitation of this secondary analysis using NLTS-2 data, replications of this study in other samples with ASD or youth with related disabilities would be valuable to confirm the findings of this research.

This research is important in several different ways. First, this was the first analysis to consider how modifiable factors impact employment success of students with ASD. Most prior studies only examined non-malleable factors, such as parent education status and ethnicity. In this analysis, we focused on *school-based transition supports*, *youths' academic performance, daily functioning skills,* and *self-determination* as key factors to improve students' employment outcomes. The findings provide information about what schools can do to help students with ASD succeed after high school, regardless of their socioeconomic conditions. Second, this study examined whether there are different service needs for students with ASD who have different levels of daily functioning abilities. Previous research has shown that individuals with ASD have a wide range in daily functioning skills, symptoms, social and communication skills, intellectual levels, and personalities (Kucharczyk et al., 2015). Due to this variation, best practice in clinical and educational services recommends individualized and person-centered supports and intervention (Kucharczyk et al., 2015). However, previous studies have only identified factors related to transition outcomes in the overall autistic population and have not investigated potential differences for youth on the autism spectrum who have different characteristics. In this analysis, we found two different pathways determining student employment outcomes that suggest youth with different daily functioning skills may need different school supports. The findings also have policy implications related to the variations in service needs for students with different daily functioning skills to maximize student employment success.

Table 2-1. *Descriptive Statistics of Sample Demographic Characteristics (N = 570)*

Variable	**Frequency** [a]	**% of participants**
Year of Graduation (Total n = 540)		
2000 – 2001	10	2%
2001 – 2002	20	4%
2002 – 2003	10	2%
2003 – 2004	80	15%
2004 – 2005	110	20%
2005 – 2006	100	19%
2006 – 2007	120	22%
2007 – 2008	60	11%
2008 – 2009	20	4%
Never in school	10	2%
Ethnicity/Race (Total n = 570)		
White	360	63%
African-American	140	25%
Hispanic	40	7%
Asian/Pacific Islander	20	4%
American Indian and others	10	2%
Gender (Total n = 520)		
Male	440	85%
Female	80	15%
Household Income Level (Total n = 500)		
Very low (< $20,000)	80	16%
Low ($20,001 - $35,000)	70	14%
Moderate (35,001 - 50,000)	80	16%
High (> $50,000)	270	54%
Education Level for Mother or Female Legal Guardian (Total n = 530)		
Less than high school	40	8%
High school diploma or GED	110	21%
Some college	170	32%
Bachelor’s degree or higher	210	40%

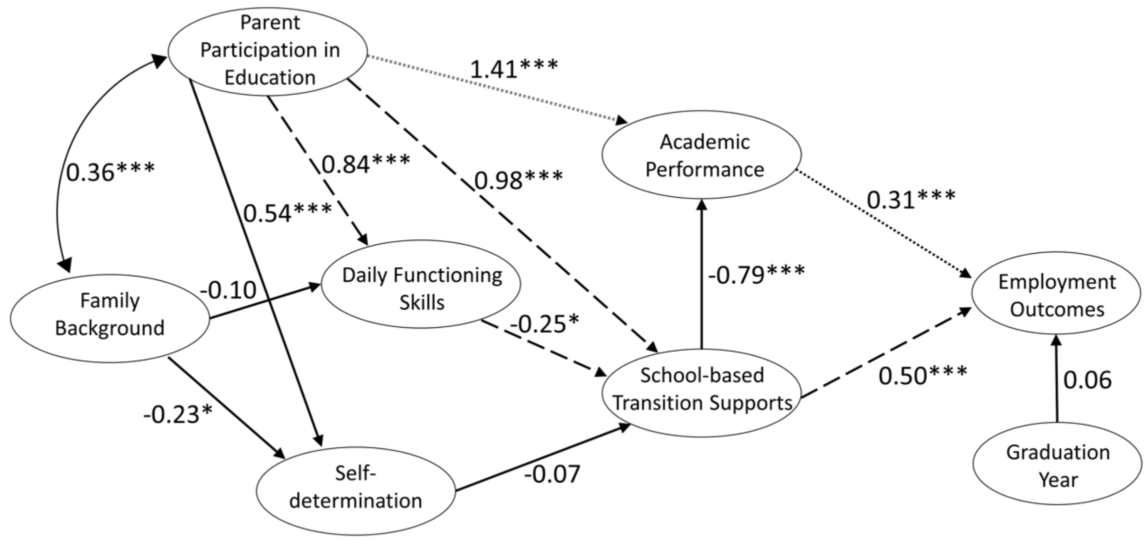
[a] Sample sizes are rounded to the nearest 10 in accordance with the data-use agreement with the Institute for Education Sciences.

Table 2-2. *List of Latent Variables and the Observed Variables for the Final Model*

Latent variable	Observed variable	Data sources
Employment outcomes		
	Employment Status	W5, youth & parent survey
	Amount paid for current job	W5, youth & parent survey
	Number of months youth has had job	W5, youth & parent survey
School-based transition supports		
	Vocational-related services	W2, school program survey W2, youth & parent survey
	Support for transition planning	W2, school program survey
	Work experience at high school	W2, youth & parent survey
Daily functioning skills		
	Tells time on a clock with hands	W1, parent survey
	Reads and understands common signs	W1, parent survey
	Counts change	W1, parent survey
	Gets to places outside the home	W1, parent survey
	Uses public transportation to get around town	W1, parent survey
Self-determination		
	Autonomy	W2, student assessment
	Self-realization	W2, student assessment
	Empowerment	W2, student assessment
	Self-efficacy	W2, youth survey
Academic performance		
	Applied problems	W2, student assessment
	Science	W2, student assessment
	Reading comprehension	W2, student assessment
	Vocabulary	W2, student assessment
	Social science	W2, student assessment
Parent participation in special education		
	Parents' role in transition planning	W2, parent survey
	Parents' expectations- work related	W2, parent survey
Family background		
	Household income	W1, parent survey
	Mother's education	W1, parent survey

Figure 2-1.

Full Model of the Predictors and Employment Outcomes for Youth with ASD

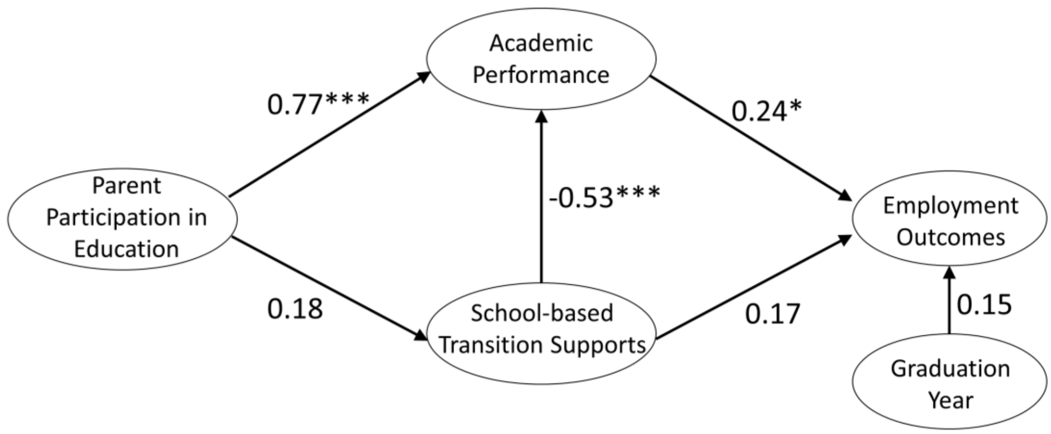


Note. There are four mediators (*academic performance, daily functioning skills, school-based transition supports*, and *self-determination*), two exogenous variables (*parent participation in special education* and *family background*) and one covariate (*graduation year*). Fully standardized estimates are reported. Dotted lines and dashed lines represent two different pathways between *parent participation in special education* and *employment outcomes*.
*p < .05; **p < .01; ***p < .001.

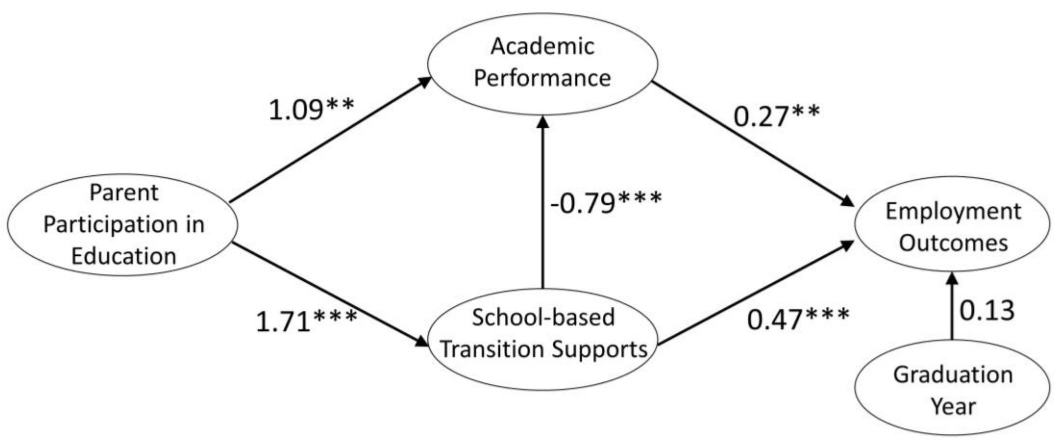
Figure 2-2.

Models and the Paths for Youth with ASD with Different Levels of Daily Functioning Skills

Model for youth with ASD with higher daily functioning skills (Model 2)



Model for youth with ASD with lower daily functioning skills (Model 3)

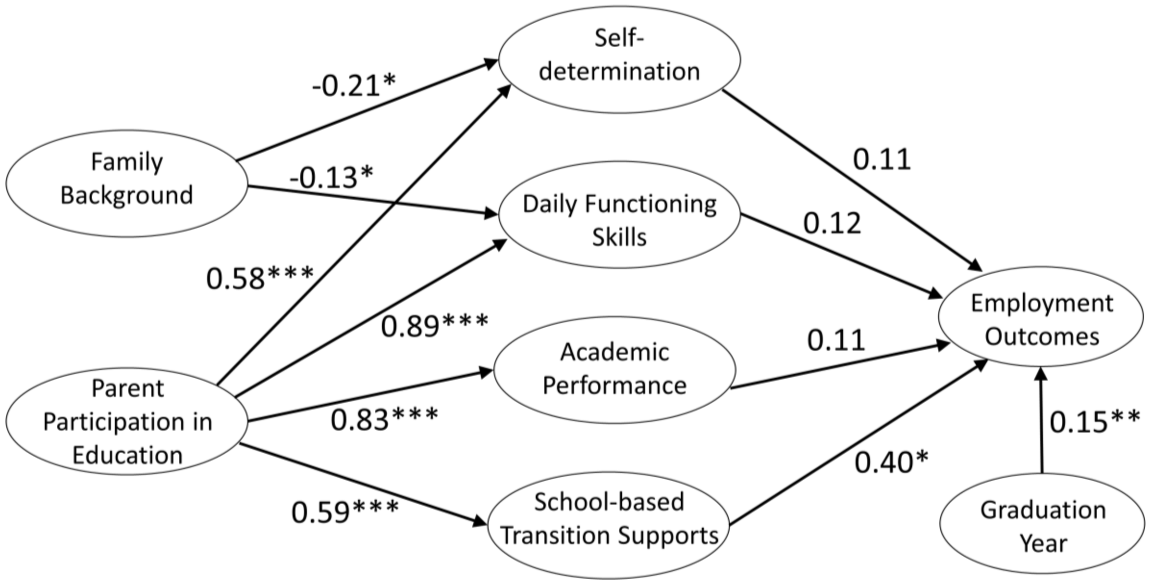


Note. Results of SEM analysis for youth with ASD who have higher daily functioning skills ($n = 258$) are presented above in Model 2. Results of SEM analysis for youth with ASD who have lower daily functioning skills ($n = 257$) are presented in Model 3. The standardized estimates of correlation coefficients are reported. Dashed line represents *no significant correlation.*

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

Figure 2-3.

The Alternative Model of the Predictors and Employment Outcomes for Youth with ASD.



Note. There are four mediators (*self-determination, daily functioning skills, academic performance,* and *school-based transition supports*), two exogenous variables (*family background* and *parent participation in special education*) and one covariate (*graduation year*). Fully standardized estimates are reported.
*p < .05; **p < .01; ***p < .001. Dashed line represents *no significant correlation.*

General Discussion

By conducting mixed methods research, we were able to understand the importance of school-provided supports and services to help students with ASD prepare for employment, which includes investigation of: (1) *what* factors impact youths' employment outcomes and the complex relationships between multiple individual and contextual factors, (2) *how* the contextual barriers and facilitators influence school personnel's experience of supporting youth on employment, and (3) *in what ways* school personnel incorporate contextual and individual factors together and create supports to meet youths' individual needs. This study has made an important contribution to our understanding of the employment supports provided by schools and the unique needs of transition-age youth with ASD related to employment preparation.

In the first study, we investigated the contextual barriers and facilitators of employment preparation. By conducting semi-structure interviews, we were able to deeply understand school personnel's successful experiences and their perceptions of how to help youth prepare for employment. We found that school personnel considered youths' characteristics and contextual factors as equally important and indivisible to achieve employment success. This research redirects the focus from improving discrete skills in prior interventions to considering more holistically the match between the person and their surrounding contexts. The findings of the research highlight the importance of context in the transition process.

In the second study, we examined the multifaceted associations between personal factors, family-related factors, school-based transition services, and employment outcomes. By using structural equation modeling, this study is the first to examine the direct and indirect relationships between predictors and employment outcomes for youth with ASD. Specifically, we found two pathways which predicted employment outcomes for youth with ASD who have different levels of daily functioning skills. Expanding upon previous studies which have identified certain personal and family-related factors associated with employment outcomes, we further examined the malleable predictors that can be addressed in future transition programs and services, including parent participation in education, youths' daily functioning skills, and school-based transition supports.

Although we considered the two studies to be a mixed methods approach, there are disagreements in the field on how to define mixed methods research and where the mixed methods approach starts and ends (Creswell & Plano Clark, 2017). Some researchers view mixed methods as a *methodology* which comprehensively includes a worldview of research, philosophical background, data collection, analysis, and result interpretation (Creswell & Plano Clark, 2017). However, other researchers view mixed methods as a *methodological* approach, which focuses on data analysis and interpretation, because it is difficult to combine different philosophical positions of positivism (quantitative paradigm) and naturalism or constructivism (qualitative paradigm) (Creswell & Plano Clark, 2017; Doyle, Brady, & Byrne, 2009). In this dissertation, we adopted a pragmatic approach, which adopts a practical and outcome-oriented philosophical position, as the worldview of inquiry. We defined mixed methods as combining qualitative and quantitative strands in analysis and interpretation based on the pragmatic worldview (Doyle et al., 2009; Johnson & Onwuegbuzie, 2014). We conducted a sequential mixed methods study and built the quantitative analysis on the findings of a qualitative study. We then used the results of quantitative analysis to validate the findings of qualitative research.

The mixed methods research design provides a unique perspective to identify the factors which influence school personnel's experience of preparing youth with ASD for employment and, by using a SEM statistical approach, we further developed a statistical model which explained the complex relationships between the factors and youths' employment outcomes. We identified school system, family, and community as three important contextual factors that influence youths' employment outcomes. We used the findings of qualitative study as the theoretical basis in the quantitative study to develop the hypothesized model tested through SEM analysis. Informed by the qualitative study, we identified *school-based transition supports, family background,* and *parent participation in special education* as three contextual predictors of youths' employment outcomes in the statistical model. We were not able to include any community factors in the proposed model due to the limited information collected by the NLTS-2 dataset. The results of *school-based transition supports* and *parent participation in education* as two key predictors of youths' employment outcomes validated the findings from the qualitative study. That is, contextual factors appeared to be equally as important as personal characteristics for youth with ASD's employment success.

Different from previous studies which primarily focused on youths' individual abilities and skills, this research highlighted the contextual supports and challenges in different contexts (e.g. family, community and school). It identified key environmental factors in employment preparation that predicted employment outcomes (e.g. parent participation and school services) for youth with ASD. Krieger et al. (2018) recently conducted a scoping review to investigate the supporting and hindering environments that influence social participation for youth with ASD. They identified two themes to describe the function of the environmental characteristics: *providing security*, which includes the contextual factors that influence youths' sense of security, and *helping to connect*, which includes the contextual factors that support or limit youths' social relationships with others. The current research further emphasized the idea that school personnel comprehensively consider living in community, maintaining employment, and developing social connections as an inextricable whole.

This research was the first to identify the critical role of youths' daily functioning in determining what services may best support youth to obtain employment outcomes, including academic supports and school-based transition services. The findings provided supportive evidence for the development of individualized service provision for the population of youth with ASD, who are heterogeneous in terms of their daily functioning skills and academic performance. Wilczynski et al. (2013) recommended that professionals provide individualized scaffolding for youth with ASD to develop the necessary knowledge and skills for employment, search for appropriate jobs by understanding youths' individual abilities and needs, create natural supports based on the unique relationships between youth with ASD and people in workplace, evaluate the work environment and the potential environmental challenges, and educate employers and colleagues on the individual characteristics of youth with ASD. The current school service system, however, does not have the capacity to provide adequate services to meet the diverse needs of youth with ASD (Anderson et al., 2018; Taylor & Henninger, 2015; Test et al., 2014). Therefore, other contextual supports in the community from employers, colleagues, neighbors, friends, families, and other people are needed to help youth with ASD in the transition to employment (Test et al., 2014).

The findings of these two studies support the importance of meaningful integration and collaboration among vocational counselors, job coaches, school teachers, families, employers, and other community agencies in supporting youth with ASD to obtain and maintain employment. Previous studies also showed effective transition planning requires stakeholders to actively participate in multidisciplinary collaborations (Dymond et al., 2007). Chappel and Somers (2010) provided suggestions for inter-disciplinary collaborations between professionals as follows: (a) having regular meetings between case managers and teachers; (b) having a clear understanding of expectations and commitments between stakeholders; (c) sharing information and opportunities to collaborate; (d) developing a user-friendly transition system from school to vocational rehabilitation; (e) finding the key person who is responsible for cooperating in each of the two systems; (f) reaching a consensus before meetings; (g) developing an effective plan for information exchange; (h) finding a good evaluation tool; and (i) understanding the roles of each other and the collaboration plans (Wilczynski et al., 2013). In addition, parents and family members also play a critical role in helping youth establish career identities, setting career pathways, encouraging youth and providing emotional support, and supporting them to obtain and maintain employment (Carter et al., 2010; Lee &

Carter, 2012). An important focus for future research and interventions will be how to facilitate family-professional collaborations, provide family-centered services, and encourage parents to participate in transition planning (Carter et al., 2010; Dymond et al., 2007).

There are several strengths of this research. First, both studies contribute to the expanding literature base focused on youth with ASD in adolescence. We specifically focused on the transition period of youth with ASD and investigated school service provision to support youths' transition to employment. We explored what factors are critical to employment success and investigated the facilitators and barriers of employment supports by understanding school personnel's experiences.

Second, this research identified several malleable factors, including youth daily functioning skills, parent participation in education, and school-based services, that may be changeable when preparing youth with ASD for employment. Previous research has focused more on static factors associated with employment outcomes, such as symptom severity, socioeconomic conditions, and parent's education levels. We focus on the malleable factors as these are factors that can be altered to try to improve outcomes in the transition process.

Third, this research redirects the focus on addressing personal factors to a focus on environmental supports and challenges when youth prepare for employment. More work is still needed to determine how to provide contextual supports and accommodations to optimize youths' employment outcomes in a comparatively efficient way. Fourth, by using SEM analysis, this research has shown the complex relationships between multiple personal and contextual factors which predict employment outcomes. Future investigation of outcomes requires an approach that can reflect more of this complexity. This finding also has implication for future service provision, that professionals should simultaneously consider the multifaceted contextual factors and individual characteristics when preparing youth for employment and supporting transition to adulthood.

Finally, we identified the diverse service needs for youth with ASD with varying abilities. Although previous research has documented the large variation in cognitive abilities, social and communication capacities, interests and goals in the autism population, it is essential to clarify which services best meet the specific needs of different groups of youth with ASD (Kucharczyk et al., 2015). In summary, the findings of this research inform the optimization of employment-related services for youth and young adults with ASD and have clinical implications for future service development for employment preparation.

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Curriculum Vitae

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