PERSONAL AND FAMILY PREDICTORS OF SELF-DETERMINATION IN ADOLESCENTS WITH AUTISM SPECTRUM DISORDER (ASD)

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ABSTRACT

TARA E. REGAN: Personal and Family Predictors of Self-Determination in Adolescents with Autism Spectrum Disorder (ASD)
(Under the direction of Samuel L. Odom)

Adults with autism spectrum disorder (ASD) have the poorest postsecondary outcomes in comparison to their peers with and without disabilities (Howlin, Goode, Hutton, &Rutter, 2004). Since 2000, the prevalence rate has increased dramatically with 1 in 68 children diagnosed with ASD (Baio, 2014; Christensen et al., 2016), and more students with ASD are graduating from high school each year (Shattuck et al., 2012.) Self-determination is a predictor of better postsecondary outcomes for students with disabilities (Wehmeyer et al., 2013). However, there is a dearth of research on family involvement in self-determination because most studies have focused on the role of educators and school settings.

This dissertation study analyzed personal and family factors as predictors of self-determination in adolescents with ASD in a sample from the Center on Secondary Education for Students with Autism Spectrum Disorder (CSESA). The sample included 547 adolescents with ASD attending high schools in North Carolina, Wisconsin, and California. CSESA research staff administered and collected data from students, educators and school staff, and parents across several time points. This research study examined pre-test data related to adolescents' self-determination and the independent variables: age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, adaptive behavior, parent education, household income, type of neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment.

Based on the functional theory of self-determination, Bronfenbrenner's ecological theory, previous self-determination, postsecondary, and/or autism research, 13 personal and family factors were identified as predictors of self-determination and formed three hierarchical multiple linear regression models: (1) personal factors; (2) family factors; (3) family factors while controlling for personal factors. The first two models comprised of two steps to evaluate the relationship between non-malleable factors and malleable factors. ASD severity, annual household income, parent perceptions of their child's self-determination, and family empowerment were statistically significant predictors of self-determination. There were statistically significant relationships of whole steps (i.e., non-malleable factors and malleable factors) and models with self-determination, substantiating theory about the complexity of person and the environment. Implications and recommendations for research and practice are discussed.

DEDICATION

This dissertation is dedicated to my family. To my parents, Rory and Kelly, my sister Tasha, and my brothers, Tyler and Tanner. Thank you for your unconditional love, support, and inspiration that have helped fuel my years and years of school. You encouraged my love of learning, to follow my passion, and to find the joy in every day. All of you are the reasons why I continue to pursue my work. I love you all. Mean it.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND SYMBOLS

AIR	AIR Self-Determination Scale
APA	American Psychiatric Association
ASD	Autism spectrum disorder
CDC	Centers for Disease Control
CSESA	Center on Secondary Education for Students with Autism Spectrum Disorder
FES	Family Empowerment Scale
ID	Intellectual disability
IDEA	Individuals with Disabilities Education Act
IES	Institute for Education Sciences
LD	Learning disability
M	Mean
N	Sample size
NLTS2	National Longitudinal Transition Study-2
p	p-value
SCQ	Social Communication Questionnaire
SD	Standard deviation
SDS	ARC Self-Determination Scale
SRS	Social Responsiveness Scale – 2
VABS	Vineland Adaptive Behavior Scales
ZBI	Zarit Burden Inventory

CHAPTER 1: INTRODUCTION

Individuals with autism spectrum disorder (ASD) have the poorest postsecondary outcomes in comparison to their peers with and without disabilities (Howlin, Goode, Hutton, & Rutter, 2004; Shattuck et al., 2012). These poor outcomes include low levels or lack of engagement in employment, education, independent living, and social and community activities (Newman, Wagner, Cameto, Knokey, 2009). In response, focus has shifted toward preparing youth with ASD for adulthood while they are still in high school in order to improve their post-school outcomes. At age 16, the Individuals with Disabilities Education Act (IDEA) (i.e., federal legislation mandating special education services to support needs of students with disabilities) requires a student's individualized education program (IEP) to include postsecondary goals related to training, education, employment, and independent living skills (IDEA, 2004). Nevertheless, students with ASD often leave high school without the skills, experiences, and supports to prepare them for adulthood (Carter, Austin, & Trainor, 2012). High schools also report challenges in supporting their students with ASD, especially in transition services and related skills (Hedges et al., 2014). Difficulties in meeting the needs of students on the autism spectrum can be attributed to the heterogeneity of ASD, resulting in wide-ranging services and supports that still need to be individualized (Hendricks & Wehman, 2009).

Parents and families are also involved in the transition process for their child with ASD. In fact, they still have a critical role in their child's life during this time period. There is a gap in research focused on transition and families, with the few extant studies focusing on stress (Shattuck et al., 2007; Smith, Maenner, & Seltzer, 2012; Taylor & Seltzer, 2010), financial

burden (Kogan et al., 2008; Parish, Thomas, Rose, Kilany, & Shattuck, 2012), and concerns about coordinating activities and services during adulthood (Lawrence, Alleckson, & Bjorklund, 2010). Currently adult services do not match the high level of needs parents and families have during this time period (Smith & Anderson, 2013). Additionally, more knowledge is needed about factors that are supporting families while simultaneously preparing their child with ASD for adulthood.

Identifying the predictors associated with successful outcomes after high school allows teachers and family members to prepare adolescents with ASD for the transition into adulthood. There is burgeoning research focused on identifying variables that predict positive postsecondary outcomes in this population. In this research, self-determination has been identified as a predictor of positive postsecondary outcomes in students with intellectual disability (ID) and learning disabilities (LD) (Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997).

Statement of the Problem

ASD is a neurodevelopmental disorder characterized by limitations in social communication and presence of restricted repetitive behaviors and interests (American Psychiatric Association [APA], 2013). Since 2000, the prevalence rate has increased dramatically to 1 in 68 children having a diagnosis of ASD (Baio, 2014; Christensen et al., 2016), and more students with ASD are graduating from high school each year (Shattuck et al., 2012).

When youth with ASD finish high school, they exit special education services mandated by IDEA and shift to adult services. This is a vulnerable shift for youth with ASD and their families because there is a higher likelihood of service disengagement during this period of time (Shattuck et al., 2011). Therefore, research consistently indicates adults with ASD have lacking

or low levels of engagement in postsecondary outcomes, such as employment, education, independent living, and social and community activities (Newman, Wagner, Cameto, Knokey, & 2009).

Supporting individuals with ASD is becoming increasingly expensive across the lifespan, with cost estimates of at least $236 billion annually in the United States (Buescher, Cidav, Knapp, & Mandell, 2014). The combination of financial needs, increasing prevalence rate, and growing adulthood population contributes to the demand for more research on the ASD population at this age. Recently, more organizations and funding agencies are becoming aware of this demand, and researchers are shifting focus towards the transition to adulthood, post-school outcomes, and lifespan issues for individuals with ASD and their parents and families. For example, the Interagency Autism Coordinating Committee (IACC), a Federal advisory committee that provides advice to the Secretary of Health and Human Services on issues related to ASD, published a 2013 report calling for more research on transition and lifespan issues (IACC, 2014).

The A.J. Drexel Autism Institute and its Life Course Research Program published the National Autism Indicators Report in 2015 and reported several research gaps needed for further study including (a) the disconnection and lack of engagement of youth with ASD after high school, (b) post-school outcomes, and (c) how "our current indicators … fail to consider what young adults want for themselves." (p. 65, Roux, Shattuck, Rast, Rava, & Anderson, 2015). The last statement refers to current limitations in indicators, assessment tools, and other methods to effectively delineate and evaluate what youth with ASD want in adulthood. However, there is a growing literature in the special education field on self-determination and its association with positive post-school outcomes that could eventually fill this gap. Self-determination has been

identified as a predictor of better postsecondary outcomes for students with learning disabilities (LD) and intellectual disability (ID) (Wehmeyer et al., 2013). Many predictors of self-determination in these groups of students have been studied including age, gender, cognitive ability, disability severity, and race/ethnicity (Wehmeyer et al., 2011). For example, Wagner, Newman, Cameto, Levine, and Marder (2007) found that youth with ASD report lower rates of self-determination than their peers with disabilities. Despite growing number of studies, no one has deliberately studied predictors of self-determination in youth with ASD.

Definition of Self-Determination

Self-determination has a variety of definitions, however, for the purposes of this study, self-determination will be defined as the:

> "… combination of skills, knowledge, and beliefs that help them engage in goal-directed, self-regulated, autonomous behavior. Self-determination requires an understanding of one's strengths and limitations and a belief in oneself as capable and effective. When acting on the basis of these skills and attitudes, individuals have greater ability to take control of their lives and assume the role of successful adults in our society." (Field, Martin, Miller, Ward, & Wehmeyer, 1998, p. 2).

The concept of self-determination has foundations in the philosophical doctrine of determinism, which states that all events, behaviors, and thoughts are caused by antecedent events (Wehmeyer et al., 2003). Wehmeyer (1996) proposed the functional theory of self-determination and further defined self-determination as: "acting as the primary causal agent in one's life and making choices and decisions regarding one's quality of life free from undue external influence or interference." (p. 24). Causal agents have volition and make decisions based on their own will, preferences, choices, and interests (Wehmeyer, 1996; 1998; Wehmeyer, Agran, & Hughes, 1998). This theory proposes that self-determination is reflected in: (a) behavioral autonomy (i.e., acting according to preferences, interests, or abilities, and being independent from external influence); (b) self-regulated behavior (i.e., self-monitoring, self-

instruction, self-evaluation, and self-reinforcement, goal-setting and attainment, problem-solving, and decision-making); (c) psychological empowerment (i.e., perceived control, derived from personal efficacy and locus of control); and (d) self-realization (i.e., self-knowledge and understanding).

Difference Between Self-Determination and Self-Advocacy

In the research and practice, self-determination and self-advocacy are frequently interchanged terms. Similar to self-determination, self-advocacy has many definitions. Martin, Huber-Marshall, and Maxson (1993) asserted that self-advocacy is "the realization of strengths and weaknesses, the ability to formulate personal goals, being assertive, and making decisions." (p. 56). Moreover, Test, Fowler, Wood, Brewer, and Eddy (2005) conducted a literature review of self-advocacy and developed a comprehensive framework. This self-advocacy framework included: (a) knowledge of self, (b) knowledge of rights, (c) communication, and (d) leadership. Compared to self-determination, self-advocacy is conceptualized as an act or a skill (Balcazar, Fawcett, & Seekins, 1991; Sievert, Cuvo, & Davis, 1998).

Theoretical and Conceptual Framework

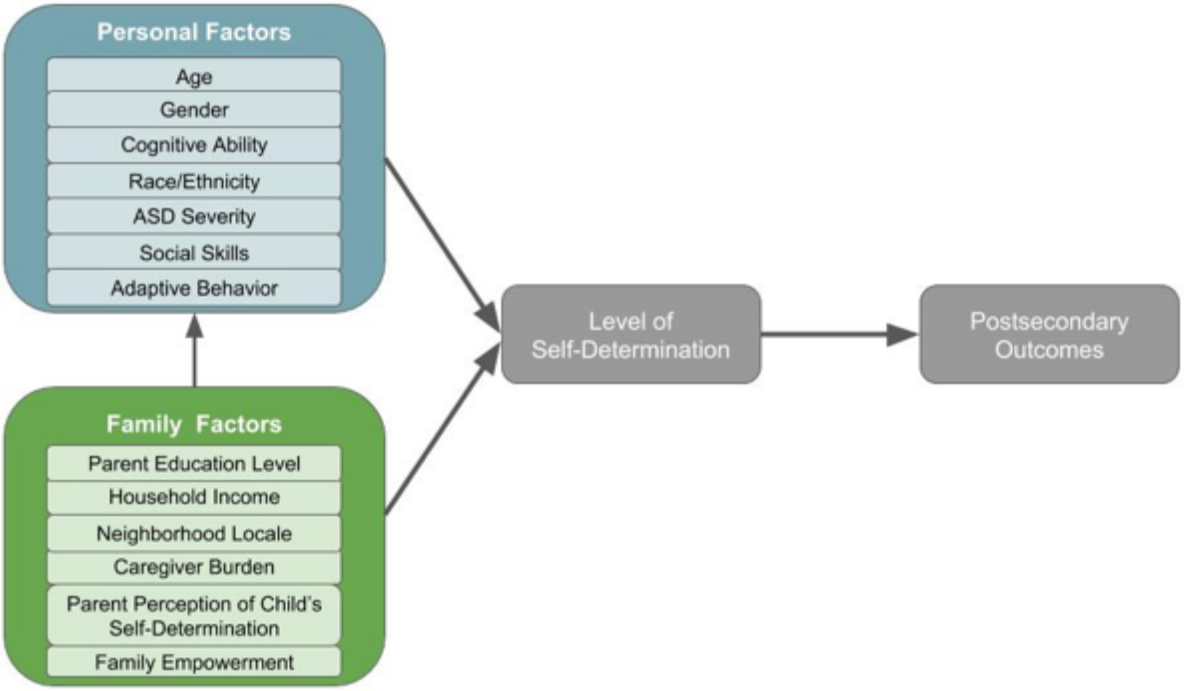
Functional theory of self-determination. The functional theory of self-determination centers on the concepts of the individual (i.e., individual as a causal agent) and interdependence between the individual and environment (Wehmeyer, 2001). Interdependence occurs because individuals are not completely independent or autonomous, and they function in relation to other individuals and the environment. This theory has been empirically validated (Shogren et al., 2008; Wehmeyer et al., 1996) and operationalized by the development of assessments, including the *Arc Self-Determination Scale* (Wehmeyer & Kelchner, 1995) and *AIR Self-Determination Scale* (Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994), which has in turn supported the

growth of research in self-determination (Wehmeyer, Agran, Hughes, Martin, Mithaug, & Palmer, 2007).

Social-ecological model of self-determination. The social-ecological model of self-determination builds on the functional theory of self-determination and Bronfenbrenner's ecological systems theory (1979, 2005) which proposes individual development occurs at four levels: the microsystem (i.e., direct daily environment, interactions with family members and teachers), mesosystem (i.e., connections, interactions between home and school), exosystem (i.e., indirect environment, parents' employment), and macrosystem (i.e., social and cultural values). Thus, the social-ecological model captures reciprocal interactions between personal and environmental variables that occur in self-determination (Walker et al., 2011). According to Walker and colleagues (2011), the social-ecological model consists of the following elements: (1) person- and environment-specific interventions frequently identified in self-determination theory and research; (2) person- and environment-specific interventions and practices; (3) mediating variables that impact efficacy of intervention; (4) practices that impact the mediating effect of variables in the intervention; and (5) expected self-determination and other outcomes from interventions. Research on self-determination employs the social-ecological model to understand the interaction of the person and environment on self-determination. Wehmeyer and colleagues (2010) also used the social-ecological model to describe self-determination in relation to the needs of youth with ASD and propose future intervention research. Relationships presented in the social-ecological model have many directions, indicating influence between systems. There are many environmental systems that have an influence on the individual, or at the micro-level, such as home and school settings.

Application to the present study. The conceptual framework for the present research study applies the functional theory of self-determination and social-ecological model and is presented in Figure 1. This framework has three foci: (1) influence of personal factors on self-determination; (2) influence of family factors on self-determination; (3) influence of family factors on personal factors and self-determination. First, the framework presents the person as a causal agent who has an influence on their level of self-determination through their personal characteristics, which will be referred to as "personal factors" in this study. Pulling from previous self-determination research, the following personal factors are included in the framework: age, gender, cognitive ability, race/ethnicity, social skills, and adaptive behavior. Second, the conceptual framework also presents the environment and environmental characteristics as an influence on the level of self-determination and on the person. This study focuses on environmental characteristics within the home setting and will be referred to as "family factors". These family factors include parent education level, household income, caregiver burden, parent perception of child's self-determination, and family empowerment. Third, the conceptual framework also presents the influence of family factors on personal factors and the resulting impact on level of self-determination. Pulling from the social-ecological model, the conceptual framework of this research study presents a unidirectional influence of family factors on the individual's microsystem. Finally, the conceptual framework shows the influence of level of self-determination on postsecondary outcomes. This research study will synthesize current literature on association of self-determination with postsecondary outcomes and contribute to that body of knowledge.

Figure 1.1.
Personal and Family Factors Conceptual Framework



Research Questions and Hypotheses

The aims of this study are to: (1) examine the association of personal factors on self-determination including age, gender, cognitive ability, race/ethnicity, social communication skills, and adaptive behavior; (2) examine the association of family factors on self-determination including parent education, household income, neighborhood, caregiver burden, parent perceptions of their child's self-determination, and family empowerment; and (3) examine the association of family factors on self-determination when controlling for personal factors. These aims are encapsulated within the following research questions:

Research Question 1: Do personal factors (age, gender, cognitive ability, race/ethnicity, ASD diagnosis, social skills, and adaptive behavior) predict self-reported self-determination in adolescents with ASD?

H_0 (Null hypothesis): The personal factors age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior are not predictors of self-determination.

H_A (Alternative hypothesis): At least one of the personal factors age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior is a predictor of self-determination.

Research Question 2: Do family factors (parent education, household income, neighborhood, caregiver burden, parent perception of self-determination, and family empowerment) predict self-reported self-determination in adolescents with ASD?

H_0: The family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment are not predictors of self-determination.

H_A: At least one of the family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment is a predictor of self-determination.

Research Question 3: Do family factors (parent education, household income, neighborhood, caregiver burden, parent perception of self-determination, and family empowerment) predict self-determination in adolescents with ASD when personal factors (age, gender, cognitive ability, race/ethnicity, ASD diagnosis, social skills, and adaptive behavior) are controlled?

H_0: The family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment are not predictors of self-determination while controlling for the group of personal factors.

H_A: At least one of the family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment is a predictor of self-determination while controlling for the group of personal factors.

Significance of the Study

The rationale that underlies this research is that although youth with ASD have poor postsecondary outcomes, adolescents and young adults with ASD also have a potential for growth in self-determination and transition outcomes (Wehman et al., 2014). Currently, youth with ASD are not actively engaged participants in their lives or in transition planning (Shogren & Plotner, 2012) and in comparison, are less so than any other disability population (Cameto, Levine, & Wagner, 2004; Shogren & Plotner, 2012). However, Wehmeyer, Shogren, Zager, Smith, and Simpson (2010) asserted students with ASD have the potential to acquire self-determination skills with appropriate educational supports and accommodations. They recommended the development of interventions to promote self-determination in youth with ASD, adaptation of existing interventions, and employment of the social ecological approach to promoting self-determination in this population. Despite this assertion, gaps in the literature still exist, and Wehmeyer and colleagues (2010) also described the lack of research and interventions for self-determination of students with ASD.

Promoting the growth of self-determination during adolescence and adulthood can lead to more positive outcomes across the lifespan (Wehmeyer & Schwartz, 1997; Wehmeyer et al., 2013). Knowing that individuals with ASD have more difficulty than their peers achieving success in adulthood, there is a need for more support and interventions. For example, Test, Smith, and Carter (2014) stated a need for promoting rigor, relevance, and relationships to meet

the multifaceted needs of youth with ASD. However, there is a dearth of research in the practices and interventions available targeting self-determination for this population. Developing appropriate practices and interventions for youth with ASD warrants the examination of factors associated with self-determination, such as personal and family factors. Building upon recommendations from Trainor and colleagues (2008), (a) multidimensional transition strategies should be developed, that (b) recognize sociocultural differences, and (c) are served across settings, including the home.

This research study will contribute to our understanding about the state of self-determination in adolescents with ASD, as well as associated personal and family factors that influence self-determination. Personal and family factors will be delineated as malleable or non-malleable factors. The malleable factors are targeted outcomes in intervention (i.e., social skills, adaptive behavior, family empowerment), and non-malleable factors (i.e., gender, race/ethnicity, household income) are the targeted groups for types of intervention. The conceptual framework for this study illustrates the association of personal and family factors on self-determination level and serves as a basis and connection for future interventions in the home setting.

The present research study will investigate the association of personal and family factors on self-determination in adolescents and young adults with ASD. It will also examine the degree to which family factors predict self-determination when personal factors are controlled. This research study focuses on the unidirectional relationship between family factors and personal factors to establish our understanding of family factors in relation to self-determination. The majority of self-determination research has described the influence of personal factors on self-determination, and this research study aims to examine the role of parents and families. Understanding personal factors and self-determination in the ASD population will contribute to

our knowledge about how to develop targeted and appropriate interventions. Also, understanding family factors and self-determination will contribute to our knowledge about training parents and families to practice and generalize self-determination skills in home settings.

Organization of the Study

The remaining sections of this research study are presented in the following four chapters. Chapter 2 consists of a review of the literature surrounding self-determination, personal factors, family factors, and influence of family factors over personal factors. Chapter 3 presents the methodology used for this research study, data collection, and associated data analysis. Chapter 4 presents a description of the quantitative data analysis and summary of the research findings. Finally, Chapter 5 presents an overview of the research study, implications of findings, and recommendations for future research and practice associated with self-determination and youth with ASD.

CHAPTER 2: LITERATURE REVIEW

Introduction

In this chapter, the literature review first addresses postsecondary outcomes of youth with ASD and how self-determination can promote better outcomes. Secondly, personal factors such as age, gender, race/ethnicity, IQ, ASD severity, adaptive behavior and social skills are presented, as they relate to self-determination. Thirdly, family factors such as parent education, household income, neighborhood locale, caregiver burden, parent perspective of child's self-determination, and family empowerment are presented as they relate to self-determination. Fourthly, the social-ecological model will be revisited to evaluate the influence of family factors over personal factors in relation to self-determination. Lastly, a summary of the literature review will be presented. All of these personal and family factors and their relationships to self-determination are essential to overall postsecondary outcomes of youth with ASD and help drive value to the role of families and the home setting.

Association of Self-Determination with Postsecondary Outcomes

The majority of self-determination research is located in the school setting. Several studies have shown that student involvement in the transition planning process and participation in the IEP meeting have been linked to successful post-school outcomes for students with disabilities (Cobb, Lehmann, Newman-Gonchar, & Alwell, 2009; Wehmeyer & Palmer, 2003). Furthermore, self-determination interventions have been identified as an evidence-based practice for students with disabilities (Test et al., 2009). Shogren, Wehmeyer, Palmer, Rifenbark, and

Little (2015) conducted a follow-up analysis of a randomized control study to examine the efficacy of self-determination interventions with students with disabilities, including students with ASD. They examined the relationship between level of self-determination when exiting high school and adult outcomes within one and two years post-high school. Findings suggest that high levels of self-determination upon exiting high school predicted positive outcomes is employment and community access at one year post high school. Exposure to self-determination interventions while in high school may also lead to more stability in student outcomes over time, which is consistent with earlier findings (Wehmeyer & Palmer, 2003).

Findings from early studies established significant differences between students with disabilities who have higher and lower levels of self-determination (Wehmeyer et al., 1996). Higher levels of self-determination are associated with successful post-school outcomes for students with disabilities. Follow-up studies with students with higher self-determination scores had more positive post-school outcomes both one year and three years later (Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997). In a similar study, Wehmeyer and Schwartz (1997) found students with intellectual disability (ID) with high self-determination scores were more likely to have a higher quality of life.

As a result of the positive association between self-determination and improved adult outcomes, instruction and opportunities for self-determination have been identified as crucial components of secondary programs (Harris & Robertson, 2001; Thoma & Getzel, 2005) as well as a priority in secondary special education settings (Carter, Lane, Pierson, & Stang, 2008). However, in practice, researchers have demonstrated that instruction on self-determination at the secondary level is often implemented inconsistently (Carter, Lane, Pierson, & Glaser, 2006; Mason, Field, & Sawilowsky, 2004) and students with disabilities who attend and participate in

their IEP meetings are more likely to be passive rather than active decision makers (Martin, Huber-Marshall, & Sale, 2004; Martin, Van Dycke, Greene, et al. 2006). There is a need for consistent implementation with opportunities to generalize skills to the IEP or transition planning meeting. Furthermore, there is no extant research about developing self-determination or opportunities to practice self-determination in the home with caregivers and families.

Factors Influencing Self-Determination

In the self-determination literature, researchers have hypothesized and examined factors that influence a person's level of self-determination. From there, a number of personal and family factors have been identified (Wehmeyer et al., 2011). These factors are of interest to this study, in addition to several factors relevant to ASD, post-school outcomes, and family outcomes. Based on the functional theory of self-determination, the social-ecological model, and conceptual framework for this research study, these factors will be divided into personal and family factors. Additionally, research findings in self-determination suggest a relationship between a variety of personal factors and outcomes and emphasize that looking at any one of these factors in isolation will not provide a full picture of the complex contextual factors that affect outcomes (Shogren, Luckasson, & Schalock, 2014; Shogren & Shaw, 2016). Therefore, these factors are grouped by personal and family factors. Factors will further be delineated by non-malleable and malleable factors. Non-malleable factors are demographic variables and descriptive characteristics that cannot be changed as the result of an intervention. Whereas malleable factors can be changed (e.g., behavior, skills) and often are the target of change for interventions. The following personal factors are defined and described: age, gender, cognitive ability, race/ethnicity, ASD severity, social communication, and adaptive behavior. The following family factors are discussed: parent education, household income, neighborhood,

caregiver burden, parent perception of child's self-determination, and family empowerment. Lastly, the influence of family factors over personal factors is discussed.

Personal Factors

At the individual level, personal factors are tied to one's personal and cultural identity. This section defines and describes how the following personal factors are related to self-determination in this research study: age, gender, IQ, race/ethnicity, ASD severity, social skills, adaptive behavior. Most of these factors have been identified and examined by other researchers in relation to self-determination, ASD, and/or post-school outcomes. Age, gender, cognitive ability, race/ethnicity, and ASD diagnosis are non-malleable personal factors while social communication and adaptive behavior are malleable personal factors.

While highlighting these personal factors as predictors of self-determination, it is necessary to note how they also influence each other. Previous studies in self-determination, autism, and/or post-school outcomes have examined the relationship between one or more of these personal factors. Whether they were analyzed as predictors, covariates, moderators, and mediators, it is important to include for the purposes of this research study. Furthermore, noting their impact is supported by the functional theory of self-determination and the social-ecological model of self-determination. Adding to the complex nature of self-determination, personal factors are influential to each other and do not have direct pathways toward level of self-determination or other outcomes of interest. For example, Liptak, Kennedy, and Dosa (2011) found in the National Longitudinal Transition Study-2 (NLTS2) sample that age, gender, and race statistically significant predictors of participating in adulthood experiences such as employment, education, and social activities. This finding illustrates how a number of personal

factors have been studied previously and contributed to the body of knowledge related to self-determination, autism, and post-school outcomes.

Age. Chronological age has been found to influence level of self-determination. Wehmeyer (1996) found level of self-determination to be a developmental trend throughout adolescence for youth with and without disabilities, such that older adolescents are more self-determined than younger adolescents. Similarly, Wehmeyer and Garner (2003) found that age predicted membership in a high or low autonomy group (i.e., one of the four characteristics of self-determination). These findings indicate that age is a dynamic personal factor to be considered when examining predictors of self-determination.

Gender. Lindstrom and colleagues (2012) studied self-determination in a group of twenty-five young adult females with disabilities and found that the majority self-reported barriers in areas associated with self-determination. Those with lower levels of self-determination also had challenges in interpersonal skills, career options, school system issues, and disability needs. Similarly, Shogren and Shaw (2017) found differences in self-determination between gender. In their study, males with high incidence disabilities had higher levels of self-determination had greater access to services and accommodations, and lower use of financial supports.

Gender is also examined within the ASD population because of gender differences in prevalence rate and ASD characteristics presentation. The presentation of autism symptoms varies between gender (Dukekot et al., 2017; Dworzynski et al., 2012). Additionally, the prevalence rate estimates for children aged 8 is higher for boys, 1 in 42; whereas the prevalence rate for girls 1 in 189 (Baio, 2014). No extant research has examined gender differences in association with levels of self-determination in youth with ASD.

Cognitive ability. Over 40% of individuals with ASD have an average to high IQ (Christensen et al., 2016; Pugliese et al., 2016). Cognitive ability has been studied as a predictor of post-school outcomes for individuals with ASD. For example, Howlin et al. (2004) found that individuals with an IQ greater than 70 had higher levels of work compared to individuals with an IQ lower than 70. Liptak et al. (2011) identified within the NLTS2 sample that having an educational classification of intellectual disability inversely predicted engagement in employment or education after high school. Howlin and colleagues (2004) also found quality of friendships and residential status to be negatively predicted by IQ. These findings indicate that IQ has significant role in predicting post-school outcomes across a variety of domains.

Youth with higher cognitive ability are more likely to have higher levels of self-determination (Stancliffe et al., 2000). Wehmeyer (1996) studied self-determination in a sample of 500 students and found that students with ID had the lowest self-determination in comparison to students with LD and without disabilities. However, other studies yielded mixed results of the association between cognitive ability and self-determination. Wehmeyer and Garner (2003) found a correlation between self-determination and IQ scores, but, after conducting a discriminant function analysis for predictors of self-determination, IQ did not predict membership in the high self-determination group. The results of this study indicate that cognitive ability is a key and complex factor in examining self-determination.

Race/ethnicity. Several studies have focused on race/ethnicity in youth with disabilities. For example, Hispanic youth with disabilities (Shogren et al., 2014) and African-American youth with disabilities (Fujiura & Yamaki, 1997; Fujiara, Yamaki, & Czechowicz, 1998) score lower levels of self-determination and related areas such as financial independence in adulthood in comparison to White youth with disabilities. However, these groups have higher levels of

support (i.e., financial support, relationships) (Shogren, Kennedy, Dowsett, Garnier, et al., 2014). Although it appears paradoxical, parents being more likely to seek out self-determination behaviors related to familial goals could account for this finding. In addition to race, family culture influenced self-determination (Shogren, 2012; Trainor, 2005). Cross-culturally, concepts such as personal control over the environment, self-help, and goal orientation vary in importance (Turnbull & Turnbull, 2001; Zhang, 2006), and may encourage values and behavior that are different from individualism, which is a mainstream White cultural value in the United States (Zhang, Wehmeyer, & Chen, 2005).

ASD severity. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines the diagnostic criteria for ASD as well as three levels of impairment or needs for support (APA, 2013). Level of impairment is determined by a combination of limitations in social communication and the appearance of restricted, repetitive behaviors. Level 1 is referred to as "requiring support". Individuals with ASD in this designation are considered "high functioning", however, without supports, they have noticeable limitations in social communication. Individuals may speak in full sentences and engage in communication, but have difficulty initiating and interpreting social interactions, planning and staying organized, and making friends. Level 2 describes a group of individuals with ASD who are "requiring substantial support". They have marked limitations in verbal and nonverbal social communication skills, social challenges even when supports are in place, further limited initiation of social interactions, and restricted and repetitive behaviors appear more frequently. Lastly, Level 3 refers to those who are "requiring very substantial support". This group of individuals with ASD have severe limitations in verbal and nonverbal social communication skills and restricted and repetitive behaviors that interfere

with functioning and interactions. While the DSM-5 describes three levels of impairment, severity and level of support varies from person to person.

Variability of autism severity is associated with differences in cognitive ability, language, and adaptive behavior. Georgiades and colleagues (2013) identified three distinct subgroups in preschoolers with ASD presenting different levels of social communication challenges and restricted repetitive behavior. In the follow-up study at age six, only two subgroups were identified, suggesting that phenotypic variability changes over time (Georgiades et al., 2014). ASD is considered a lifelong developmental disability, however, symptoms can change across development. Studies examining autism symptoms from early childhood to adulthood suggest that parents report more severe ASD symptoms in early childhood than in adolescence and adulthood (Taylor & Seltzer, 2010). Billstedt, Gillberg, and Gillberg (2007) conducted a longitudinal follow-up study with adults with ASD who received the diagnosis in childhood. After evaluating symptoms, they found that adults with ASD were less likely to have severe communication impairments, such as echolalia (i.e., repetition of speech) than younger individuals with ASD. Between adults with ASD and their younger selves, they experience similar challenges in social interactions and variability in restricted repetitive behaviors (i.e., maladaptive and stereotyped behavior).

Prior self-determination research focused on youth with disabilities; however, a limited number of studies have focused on the influence of ASD severity on self-determination. Chou and colleagues (2017) examined the characteristics of self-determination (i.e., behavioral autonomy, self-regulated behavior, psychological empowerment, and self-realization) in middle and high school students with disabilities. In their study, students were in equally sized groups of students with ASD, learning disability (LD), and intellectual disability (ID). They found that

students with ASD had significantly lower levels of autonomy and psychological empowerment in comparison to the other groups of students. In contrast, students with ASD did not differ in levels of self-regulation and self-realization in comparison to the other groups of students. The authors suggested social skills of students with ASD may significantly influence level of self-determination as a function of limitations in autonomy resulting from social communication limitations.

Social skills. Social communication limitations are a characteristic of autism spectrum disorder (APA, 2013). Limitations in social communication, or social skills, are considered an underlying contributor to difficulties in independent functioning (Howlin, Mawhood, & Rutter, 2000). Practicing self-determination requires asking, clarifying expectations, and expressing preferences (Hurlbutt & Chalmers, 2004) and occurs via social interactions in a social environment (Wehmeyer, et al., 2014). Mithaug (1998) argued that self-determination always has a social context because these contexts usually involve interactions with other people (Wehmeyer et al., 2010).

The association of social skills and self-determination have not been studied in the ASD population. However, researchers have examined the relationship of social skills to the promotion of self-determination in other populations, including students with emotional behavioral disorders and LD. For example, Pierson, Carter, Lane, and Glaeser (2008) examined the influence of social skills and problem behaviors on self-determination in 90 high school students with emotional disturbances and LD. They found social skills to be a significant predictor of students' level of self-determination. These findings have been consistent with other studies in that social skills ratings are moderately correlated with overall levels of self-determination (Faherty, 2000; Nota, Ferrari, Soresi, & Wehmeyer, 2007; Pierson et al., 2008).

Adaptive behavior. Adaptive behavior is the collection of conceptual, social, and practical skills individuals perform every day (American Association of Intellectual and Developmental Disabilities [AAIDD], 2013). These skills include communication (e.g., receptive and expressive language), daily living skills (e.g., hygiene and household chores), socialization (e.g., forming interpersonal relationships and coping), motor skills (e.g., gross and fine motor skills) (AAIDD, 2013; Sparrow, Balla, & Cicchetti, 1984; 2005). Another definition of adaptive behavior suggests that it is proactive process in which people "organize their lives in purposeful, flexible, and advantageous ways to meet the demands of multiple environments." (p. 282, Weller, Watteyne, Herbert, & Crelly, 1994).

Individuals with ASD have challenges in adaptive behavior (Kanne et al., 2011; Kenworthy et al., 2010; Klin et al., 2007; Pugliese et al., 2015). Most of the research examining adaptive behavior in ASD has been cross-sectional, while some longitudinal research has been conducted with individuals who need less support or with high-functioning ASD. For example, Kanne and colleagues (2011) examined youth with high-functioning ASD and observed delays in socialization skills and moderate delays in communication and daily living skills. The findings indicate that individuals with ASD are not developing adaptive behavior skills at the same rate as their typically developing peers. Furthermore, Klin et al. (2007) found negative correlations between age and adaptive behavior scores and suggested that the gap between attainment of adaptive behavior skills and developmental expectations widens across time.

Adaptive behavior is essential to completing tasks independently as well as is associated with one's quality of life (Tasse et al., 2012). In adults with ASD and ID, higher levels of adaptive behavior skills are associated with more employment opportunities and increased independence in residence status (Farley et al., 2009). Additionally, the ability to generalize

skills across settings relies on adaptive behavior. Youth with ASD have difficulty generalizing skills across settings (Hume, Boyd, Hamm, & Kucharczyk, 2014). To date, no extant research has evaluated the potential of a relationship between adaptive behavior and self-determination. Yet, adaptive behavior has shown to be a predictor of outcomes related to quality of life for people with ID (Simoes, Santos, Biscaia, & Thompson, 2016). More longitudinal research is needed to understand how adaptive behavior changes over time with individuals with ASD.

Family Factors

Numerous factors aim to capture the complexity of family characteristics and the home environment. For the purposes of this study, family factors will be examined in relationship to self-determination of youth with ASD. Previously, some of these family factors have been the focus of research on self-determination, ASD, and/or post-school outcomes. Parent education, household income, and neighborhood are non-malleable family factors and caregiver burden, parent perception of child's self-determination, and family empowerment are malleable family factors. Some of these family factors have been studied together in research on self-determination, autism, and/or post-school outcomes. Details about how they relate to each other will be included. The theoretical and conceptual frameworks of this research study support the intertwined relationships between family factors.

Parent education. Parent education level has been found to influence post-school outcomes. Chiang, Cheung, Li, and Tsai (2013) found a positive relationship between level of parent education and employment outcomes of youth with ASD. The more education the primary caregiver had, the more likely their child with ASD will be employed in adulthood. Similarly, Liptak et al. (2011) found increased social participation of adults with ASD. Although, the association of self-determination and parent education level has not been studied, these findings

indicate that parent education level is a dynamic family factor to be considered when examining self-determination.

Household income. Chiang, Cheung, Hickson, Xiang, and Tsai (2012) studied post-school outcomes in the National Longitudinal Transition Study – Wave 2 (NLTS-2) database and found that youth with disabilities from higher income households engaged in more postsecondary education activities in comparison to youth with disabilities from lower income households. In this study, a high-income household was defined as ≥$50,000 and low-income household as ≤$25,000. Similarly, Shogren and Shaw (2017) found financial independence of adults with disabilities to be influenced by their family's household income. The authors suggested that family resources are a strong predictor of access to and success in post-school outcomes such as postsecondary education. Studies examining household income and self-determination remain to be conducted.

Neighborhood. Currently, there is no extant research on the association of neighborhood locale and self-determination or postsecondary outcomes. However, this factor characterizes the type of community and resources that are available. Identifying and securing community resources are often a component of self-determination curricula (Wehmeyer et al., 2013) as well as measured in family empowerment scales (Koren et al. 1992).

Caregiver burden. Gerontology studies have focused on caregiver burden and self-determination with caregivers of the aging population (without developmental disabilities) who need end-of-life care (Kietzman, Benjamin, & Matthias, 2013; Kim et al., 2008). For example, Kietzman and colleagues (2013) asked caregivers about perceived choice (i.e., whether caregivers perceive they have a choice in becoming a caregiver) and motivation. Many caregivers reported ambivalent feelings about choice, which may contribute to perceptions of

increased caregiver burden. The authors suggested cultural background as a basis to construct caregiver expectations of perceived choice and motivation.

Although research on burden and stress in caregiving for the aging population may provide insight into the caregiving role as it relates to the ASD population, there are major differences. Early research on caregiving for the aging population found that the majority of caregivers are not excessively burdened (Zarit, Reeves, & Bach-Peterson, 1980; Townsend, Noelker, Deimling, & Bass, 1989). Whereas, parental distress in comparison is commonly reported for caregivers of youth with ASD (Smith & Anderson, 2014).

Parental perception of child's self-determination. Several studies have focused on the relationship of parent expectations to positive postsecondary outcomes. Carter, Austin, and Trainor (2011) found high parental expectations of youth with a severe disability strongly associated with youth obtaining employment after high school. Similarly, Doren, Gau, and Lindstrom (2012) found that high parental expectations for youth to graduate from high school with a standard diploma, obtain a paid job, and attend postsecondary education after high school, were significantly associated with adolescents with disabilities accomplishing these goals.

Like parent expectations, parent perceptions of their child's self-determination also play a role in regard to self-determination. Carter and colleagues (2013) found that parents of adult children with ASD and ID valued self-determination. Surprisingly, parents also reported that their young adult children did not often perform these skills well. Overall, young adults with mild to moderate disabilities and without ID were perceived by their parents as having higher levels of self-determination compared to young adults with more severe disabilities and ID.

Outside of the United States, researchers in Spain have examined parent perspectives of self-determination in their child with ID/DD. Arellano and Peralta (2013) surveyed parents to

examine their knowledge, attitudes, and strategies. They found that many parents have a limited vision of the concept of self-determination, confusing it with autonomy, which is instead one of the essential characteristics, or self-sufficiency. However, globally, parents had positive attitudes of their children, influenced by age (of parent and child) and the severity of disability. This is consistent with previous studies that life cycles both of the family and individual with a disability have an effect on values regarding self-determination and respective goals (Brotherson et al., 2008; Turnbull & Turnbull, 2001). More research is needed to examine how self-determination is constructed through the parent-child relationship and how it is related to characteristics of the child's disability.

Family empowerment. Family empowerment is defined as a psychological process that involves parents actively attempting to change or eliminate stressful events by applying knowledge and skills (Guttierrez, 1994). Parent empowerment is associated with positive outcomes in families of school-aged children with and without developmental disabilities (Nachshen & Minnes, 2005; Scheel & Rieckmann, 1998). However, no studies have examined the relationship between family empowerment and self-determination of individuals with ASD or post-school outcomes.

Like family empowerment, family involvement has been studied in special education research. Evidence supports active parent involvement in the development of IEPs, including transition services, goals, and objectives, strongly correlates with achievement of postsecondary transition success (Destefano, Heck, Hasazi, & Furney, 1999; Sinclair, Christenson, & Thurlow, 2005; Wandry & Pleet, 2003).

Relationship Between Family and Personal Factors

As the conceptual models described indicate, personal factors within individuals play a vital role in developing and shaping self-determination (Wehmeyer et al., 2011). The personal factors of individuals can push self-determination in either a positive or negative direction. For the purposes of this research study, personal and family factors are considered to impact level of self-determination, and family factors also impact personal factors with interactions influencing the level of self-determination, as previously displayed in Figure 1.1. The following section will discuss how family factors either promote or hinder personal factors in relation to self-determination of youth with ASD.

As displayed by social-ecological model and conceptual model of this study (Figure 1.1), family factors influence personal factors. This is supported by Bronfenbrenner's ecological systems theory (1979, 1989), in which individual development occurs at four levels: the microsystem (i.e., direct daily environment, interactions with family members and teachers), mesosystem (i.e., connections, interactions between home and school), exosystem (i.e., indirect environment, parents' employment), and macrosystem (i.e., social and cultural values). Thus, the social-ecological model captures reciprocal interactions between person- and environmental variables that occur in self-determination. This research study focuses on the unidirectional relationship between family factors and personal factors to establish our understanding of family factors in relation to self-determination.

Several studies suggested the need to better understand context in relation to the development and practice of self-determination. For example, Trainor, Lindstrom, Simon-Burroughs, Martin, and Sorrells (2008) proposed that cultural and diverse identities are defined by multiple sociocultural factors including gender, racial/ethnic identity, disability, and socio-

economic status. Further, they proposed that research and intervention development must consider these factors and how they variably contribute to outcomes. Similarly, another research team developed a curriculum for a group of women with disabilities to challenge obstacles participants face. As a result of the pilot study, vocational self-efficacy, social efficacy, and awareness related to career planning significantly increased (Lindstrom, Doren, Post, & Lombardi, 2012). These findings indicate that the complexity of one's identity includes personal and family factors, and it is critical to include both in examining self-determination.

There are no extant studies centered on family factors and self-determination. This research study aims to contribute to our knowledge about this association. Additionally, there are no studies focused on practicing self-determination in the home setting. Self-determination research has primarily been conducted in special education settings (Carter, Lane, Pierson, & Stang, 2008), with the goal of increasing active participation in IEP or transition planning meetings (Wehmeyer & Palmer, 2003). This research study also aims to contribute to the self-determination body of knowledge for future intervention development.

Measuring Self-Determination

Researchers have developed and employed assessments to measure self-determination. Two of the most commonly used assessments are the *AIR Self-Determination Scale* (AIR; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994) and the *Arc Self-Determination Scale* (SDS: Wehmeyer & Kelchner, 1995). The AIR and SDS are measures of global self-determination, and they provide distinct information about the self-determination construct. Both have been established in a factor analysis study with youth with ID and LD (Shogren et al., 2008). The SDS consists of a self-report measure and the AIR has teacher, parent/caregiver, and self-report formats. The SDS and the AIR student version are related (r=.50), but studies

consistently indicate that they measure distinct aspects of the self-determination construct. The SDS measures the four characteristics of self-determination: behavioral autonomy, self-regulated behavior, psychological empowerment, and self-realization. The AIR measures capacity and opportunity.

The AIR will be the self-determination measure used in this study. The AIR is based on self-determined learning theory, which explains the process of how people become self-determined learners (Mithaug, Mithaug, Agran, Martin, & Wehmeyer, 2003). The AIR measures capacity, opportunity, and their interaction. Capacity refers to the knowledge, abilities, and perceptions that enable students to become self-determined, and opportunity refers to the chances provided to students to apply their knowledge and abilities related to self-determination (Wolman et al., 1994). The AIR is reliable (Cronbach's $\alpha = 0.88$) (Wong, Wong, Zhuang, & Lius, 2017), and validated by factor analysis (Mithaug, Campeau, & Wolman, 2003). Chou et al., (2015) used the AIR in a study involving 95 middle and high school students with ASD. Item analysis and confirmatory factor analysis demonstrated reliability and validity for the measurement of global self-determination measure.

The student version of the AIR has 24 questions and yields capacity and opportunity subscale scores. The capacity subscale consists of questions pertaining to things students do related to self-determination ("Things I Do" subscale) and how students feel about performing these self-determined behaviors ("How I Feel" subscale). The opportunity subscale has questions regarding students' perceptions of opportunity to perform self-determined behaviors at home and at school, on a scale of 1 (*never*) to 5 (*always*).

Literature Review Summary

Promoting self-determination is a necessity for youth on the autism spectrum. Self-determination has been determined as a predictor of better post-school outcomes for youth with disabilities. Some of these studies have extended their reach to youth with ASD, who reportedly have low levels of self-determination. Therefore, it is warranted to examine what the predictors are for self-determination. The development of self-determination will vary depending on personal and family factors. Based on the theoretical foundation of the functional theory of self-determination and the social ecological model, researchers and practitioners must understand the complex nature of self-determination and that there is no common design that will work best under all circumstances and for all individuals. They must understand the personal and family factors and review how to design interventions and practices to be the most efficient and effective. Therefore, these interventions allow youth with ASD to focus on skills associated with self-determination.

Studying all of the available personal and family factors will give research and practice many different approaches to develop self-determination interventions or environments to support self-determination. Additionally, by looking at personal and family factors, they will be able to determine what elements are related to positive post-school outcomes for this population. These intervention and environmental decisions will help determine how parents, schools, and communities can better support youth with ASD.

Self-determination is an essential element in becoming an adult and making major life decisions. Researchers and practitioners must review the correct self-determination assessments and ensure those are used during the development of self-determination when making transition planning decisions and in monitoring postsecondary goals. This will lead to better quality

postsecondary goals and self-determination for schools and parents in the long term. Parents' ability to be flexible in today's environment is more important than ever, as the needs of their child's change as they reach adulthood. A strategic focus on self-determination will add value for parents and families.

Based on this literature review, personal and family factors have a connection to self-determination. Understanding how to best align parents and educators for success is critical for youth with ASD. By working with parents to develop a collaborative relationship, it will lead to youths' long-term success. The functional theory of self-determination and social ecological model both are important, as all self-determined behavior will need to align with the youth's strategies and goals. Considering these elements will help researchers and practitioners design interventions that promote success and adds value to the home setting and parents' influence on post-school outcomes.

CHAPTER 3: METHODOLOGY

Introduction

This study used data collected as part of the multi-site Center on Secondary Education for Students with Autism Spectrum Disorder (CSESA) study led by Principal Investigators Drs. Samuel Odom and Kara Hume. CSESA is a research and development center funded by the Institute of Education Sciences (IES), the statistics, research, and evaluation segment of the U.S. Department of Education. CSESA designed and implemented a comprehensive intervention model for high school students with ASD. The intervention program was developed through collaboration with experts in ASD, transition, and implementation, as well as with high schools, families, adolescents with ASD, and community members. The goal of the CSESA comprehensive intervention model was to improve high school experiences and postsecondary outcomes for individuals with ASD.

As part of a cluster randomized control trial efficacy study conducted at 60 high schools in North Carolina, Wisconsin, and California, research staff collected data at multiple time points. High schools were recruited, selected, and randomized into the CSESA intervention program or the control (Service as Usual [SAU]) program for two school years. Participating schools were further divided into two cohorts, based on start date. Pre-test data from the first time point (i.e., Cohort 1: Fall 2014 and Cohort 2: Fall 2015) will be used for the present research study.

Research Design

The study employed a quantitative, non-experimental design to measure the relationship between self-determination (dependent variable), personal factors (independent variables: age, gender, cognitive ability, race/ethnicity, ASD diagnosis, social skills, and adaptive behavior) and family factors (independent variables: parent education level, household income, caregiver burden, parent perception of self-determination, and family empowerment). The design was also explanatory, because hierarchical multiple linear regression generated information to explain the conceptual framework of this research study, which is noted in the previous section (Tabachnick & Fidell, 2013).

Participants

Participants included 547 students diagnosed with ASD enrolled in the CSESA study. The participants lived in one of three states: 1) North Carolina (195 students), Wisconsin, (153 students), and California (199 students). The CSESA study sample comprised of students who are White (51%), Hispanic (18.6%), Black/African-American (12.4%), Multi-racial (4.8%), Asian (4.2%), and American Indian/Alaskan Native (1.8%). There were 464 males (86%) and 75 females (14%). Research staff confirmed ASD diagnosis through primary or secondary IEP disability category designation. At pre-test, students' mean age was 16.1 years old and ranged between 13.6 to 20.9 years old All student demographics are presented in Table 3.2. in the measures section.

Inclusion criteria. First, the CSESA study recruited districts, schools, and then staff to participate in the study. To be eligible for the study, students were recruited by special education staff from all eligible students at their schools. Further, to be eligible at the time of enrollment, students must have had a current primary or secondary designation of autism on their

Individualized Education Program (IEP). Additionally, they must have had at least two years remaining in high school to ensure participation for the duration of the two-year intervention study. Students with a 504 plan (under Section 504 of the U.S. Government Rehabilitation Act of 1973) who did not have an active IEP as well as students with no uncorrected severe hearing or vision impairment were excluded from participating in this study.

Measures

Students enrolled in the study by November 1st and all pre-test data was collected by February 1st, which was within the first year of the study. Pre-test data for Cohort 1 was collected during the 2014-2015 school year and pre-test data for Cohort 2 was collected during the 2015-2016 school year. Assessments were completed by teachers and parents. CSESA research staff administered student assessments. The following measures collected personal and family factors and used in this research study for analysis. They are also represented in Table 3.1.

Table 3.1.
Factor and Measure Descriptions

Variable	Measure	Respondent
Personal Factors (IVs)		
Age	Demographic Information Form	Parent/caregiver
Gender	Demographic Information Form	Parent/caregiver
Cognitive Ability	Leiter International Performance Scale-Third Edition (Leiter-3)	Student (administered by CSESA research staff)
Race/Ethnicity	Demographic Information Form	Parent/caregiver
ASD Diagnosis	Social Communication Questionnaire (SCQ)	Parent/caregiver
Social Skills	Social Responsiveness Scale-2 (SRS-2)	Teacher
Adaptive Behavior	Vineland Adaptive Behavior Scale (Vineland)	Teacher
Family Factors (IVs)		
Parent Education	Demographic Information Form	Parent/caregiver
Household Income	Demographic Information Form	Parent/caregiver
Neighborhood	NCES Database	N/A
Caregiver Burden	Zarit Burden Inventory (ZBI)	Parent/caregiver
Parent Perspective of Student Self-Determination	AIR Self-Determination Scale (AIR-Parent)	Parent/caregiver
Family Empowerment	Family Empowerment Scale (FES)	Parent/caregiver
Dependent Variable		
Self-Determination	AIR Self-Determination Scale (AIR-Student)	Student (administered by CSESA research staff)

Age. Information about the student's age was collected from the CSESA Demographic Form. Parents completed the Demographic Form. This form was part of a packet of assessments sent to the home (see Appendix A for the CSESA Demographic Form). The mean age at

enrollment was 16.1 years old and ranged between 13.6 to 20.9 years old (see Table 3.2. for more details).

Gender. Information about the student's gender was collected from the CSESA Demographic Form. Parents completed the Demographic Form at the start of the CSESA study. This form was part of a packet of assessments sent to the home (see Appendix A for the CSESA Demographic Form). Table 3.2. presents demographic information about student gender.

Cognitive ability. This non-malleable factor was measured with the *Leiter International Performance Scale-Third Edition* (Leiter-3; Roid & Miller, 2013). The Leiter-3 is a non-verbal measure of intelligence developed to assess individuals between the ages of 3 to 75 years old, and is intended for use with populations who benefit from a nonverbal measure of cognitive ability, including those with communication disorders, cognitive delay, English as a second language, hearing impairment, traumatic brain injury, and ASD. In addition to non-verbal administration, the Leiter-3 also differs from other measures of cognitive ability and intelligence because it relies on fluid reasoning and visual processing.

This instrument was administered by trained CSESA research staff with student participants and scoring was completed with respective Leiter-3 software. The Leiter-3 includes two groups of subscales: cognitive subscales that measure fluid intelligence and attention and memory subscales. CSESA research staff administered four subscales: figure ground, form completion, classification/analogies, and sequential order. Validity data to support the instrument is adequate (Roid & Miller, 2013). The average Leiter non-verbal IQ was 85.8 (SD = 27.2), with a range of 30-141 (see Table 3.3. for more details).

Race/ethnicity. Information about the student's race/ethnicity was collected from the CSESA Demographic Form. Parents completed the Demographic Form at the start of the CSESA

study (see Appendix A for the CSESA Demographic Form). This form was part of a packet of assessments sent to the home. Table 3.1. presents demographic information about student race/ethnicity.

ASD severity. The *Social Communication Questionnaire* (SCQ; Rutter, Bailey, & Lord, 2007) is a parent-report measure for children aged four and above consisting of 40 items. The SCQ is considered a reliable and valid measurement of ASD symptoms (Rutter, Bailey, & Lord, 2003). It was designed as a companion screening tool for the *Autism Diagnostic Interview-Revised* (ADI-R). The test developer measured correlations between the SCQ and ADI-R and validity on a sample of children with and without ASD. A raw score >15 differentiates ASD from non-ASD. Parents completed the measure are the start of the study. Table 3.3. presents information about the SCQ scores of students in the CSESA study.

Table 3.2.
Student Demographics

	N	%
Gender		
Male	464	86
Female	75	14
Missing	0	0
Race/Ethnicity		
American Indian/Alaskan Native	10	1.8
Asian	23	4.2
Black/African-American	68	12.4
Hispanic	102	18.6
White	279	51
Multi-racial	35	4.8
Other	23	4
Missing	9	2
	MD (SD)	Range
Age at enrollment (n=534)	16.1 (1.4)	13.6-20.9
Leiter Non-Verbal IQ (n=500)	85.8 (27.2)	30-141
SCQ (n=411)	20.7 (7.6)	0-37

Social skills. The *Social Responsiveness Scale* (SRS-2; Constantino & Gruber, 2005) is a 65-item rating scale that social skills of youth with ASD. The SRS-2 measure can be completed by parents or teachers. In the CSESA study, teachers completed the SRS-2 about students. The SRS-2 includes items that assess social awareness, social cognition, social communication, social motivation, and characteristics related to autism (e.g., restricted, repetitive behaviors and interests). The instrument uses a 4-point Likert scale (*not true, sometimes true, often true, and*

almost always true) for each item. The SRS-2 total score serves as an index of severity of social limitations of individuals with autism. Higher scores on the SRS indicate greater severity. The test developers report that the SRS exhibits strong supportive discriminant, concurrent, and structural validity and reliability (Constantino & Gruber, 2005). Table 3.3. presents information about the SRS-2 scores of students in the CSESA study. Additionally, more information about social skills presentation in youth with ASD is presented in Table 3.4.

Adaptive behavior. *Vineland Adaptive Behavior Scales II* (Vineland; Sparrow, Balla, & Cicchetti, 2006) is a standardized adaptive behavior test. There are four forms of the Vineland, two using information obtained in a semi-structured interview with a parent/caregiver and two using a rating form completed by a teacher or parent. In the CSESA study, teachers completed the teacher report, which is a rating form with 221 items to report about students. The Vineland covers four adaptive behavior domains: communication, daily living skills, socialization, and motor skills. Teachers completed the following subsections: receptive verbal skills, expressive verbal skills, written verbal skills, personal, academic, school and community, interpersonal relationships, play and leisure, coping skills, communication, daily living skills, and socialization. The total Adaptive Behavior Composite Score was used for data analysis. Table 3.3. presents information about the Vineland scores of students in the CSESA study, and Table 3.4 shows information about scores and range of adaptive behavior presentation in youth with ASD.

Table 3.3.
Personal Factor Measures

	N	Mean	SD	Range
Social Responsiveness Scale-2	511	70.39	12.25	39-110
Vineland Adaptive Behavior Composite Standard Score	465	75.73	16.69	20-131

Table 3.4.
Personal Factor Description

Factor	Measure	Description of Ranges
Adaptive Behavior	Vineland Adaptive Behavior Scales	Score ranges are determined by a combination of the following subscales completed by teachers: • Communication (Receptive, Expressive, Written) • Daily Living Skills (Personal, Domestic Community) • Socialization (Interpersonal Relationships, Play and Leisure Time, Coping Skills) • Motor Skills (Fine, Gross) ***High*** *(130-140)* ***Moderately High*** *(115-129)* ***Adequate*** *(86-114)* ***Moderately Low*** *(71-85)* ***Low*** *(20-70)*
Social Skills	Social Responsiveness Scale (SRS-2)	Score ranges are determined by a combination of the following subscales completed by teachers: social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behavior ***Mild*** *(65 and below)* ***Moderate*** *(66 – 75)* ***Severe*** *(76 and higher)*

Parent education. Parent demographic information about the parent's level of education was collected from the CSESA Demographic Form. Parents completed the Demographic Form at the start of the CSESA study (see Appendix A for the CSESA Demographic Form). This form was part of a packet of assessments sent to the home. Table 3.5. presents parent education of participants in the CSESA study.

Household income. Parent demographic information about household income was collected from the CSESA Demographic Form. Parents completed the Demographic Form at the start of the CSESA study (see Appendix A for the CSESA Demographic Form). This form was part of a packet of assessments sent to the home. Table 3.5. presents household income of participants in the CSESA study.

Neighborhood. Parent demographic information about neighborhood was collected through National Center for Education Statistics (NCES). The CSESA research study gathered information about school neighborhood through NCES and the Education Demographic and Geographic Estimates (EDGE) program. The NCES generates geographic data from the U.S. Census Bureau to develop a locale framework and classify neighborhood categories into four basic types: city, suburban, town, and rural (Geverdt, 2015). The neighborhood locale consists of a total of 12 distinct categories (see Appendix B for the list and definitions) that can be collapsed into an urban-rural dichotomy. Table 3.5. presents neighborhoods of schools and participants in the CSESA study.

Table 3.5.
Parent Demographic Measures

Category	N	%
Parent Education		
<High school	20	4
High school	64	12
Associate's degree/Some college	126	23
College degree	134	25
Graduate degree	80	14
Missing	117	22
Family Annual Income		
<40K	97	18
40-79K	120	22
≥80K	200	37
Missing	122	23
Neighborhood		
City-large	99	18.1
City-midsize	40	7.3
City-small	70	12.8
Rural-distant	7	1.3
Rural-fringe	41	7.5
Suburb-large	244	44.6
Suburb-midsize	17	3.1
Town-distant	21	3.8
Town-fringe	8	1.5

Caregiver burden. The *Zarit Burden Interview* (ZBI: Zarit, Orr, & Zarit, 1985) assessed level of burden for caregivers. In the CSESA study, parents completed the ZBI from a packet of assessments sent to the home. The instrument is most widely used in assessing burden experienced by family caregivers who look after the community-residing elderly. It comprises 22 questions graded on a scale from 0 to 4, according to the presence or intensity of an affirmative

response. The ZBI measures the caregivers' health, psychological well-being, social life, finances, and the relationship between the caregiver and child. Table 3.5. presents information about the ZBI scores from parents in the CSESA study. The test developers report that the ZBI has internal consistency ranging from 0.85 to 0.94 (Zarit, Orr, & Zarit, 1985).

Parent perspectives of student self-determination. The *AIR Self-Determination Scale* (AIR; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994) is a self-determination assessment developed by the American Institute for Research. There are three versions of the AIR completed by different reporters: parents, teachers, and students. In the CSESA study, parents completed the AIR from a packet of assessments sent to the home. Parents rate statements using a 5-point Likert-type scale ranging from *1= never* to *5 = always*. Parent perspectives of student self-determination are calculated by combining the total mean scores from the capacity and opportunity subscales. Table 3.5. presents information about the AIR Parent scores from parents in the CSESA study. Adequate reliability and validity for the parent scale has been demonstrated in prior studies (Carter et al., 2009).

Family empowerment. The *Family Empowerment Scale* (FES; Koren et al., 1992) is a 34-item scale that measures family empowerment. In the CSESA study, parents completed the FES as part of the packet of assessments sent to the home. The FES is developed for families of children with emotional disabilities, and measures the extent to which parents feel empowered across three dimensions: (1) family, (2) service use, and (3) access to the larger community and political environment. Items are rated on a 5-point Likert Scale from *1= not at all true* to *5 = very true*. Item scores are summed to an overall score, with higher scores indicating greater empowerment. Table 3.6. presents information about the FES scores from parents in the CSESA

study. Reliability and validity of this measure have been established and replicated in the research literature (Koren et al., 1992).

Table 3.6.
Family Factor Measures

	N	Mean	SD	Range
Zarit Burden Inventory	421	32.52	8.75	18.00-65.00
AIR – Parent Mean	413	3.32	.61	1.00-5.00
Ability	431	2.56	.80	1.00-5.00
Opportunities at Home	431	3.81	.70	1.00-5.00
Opportunities at School	414	3.57	.80	1.00-5.00
Family Empowerment Scale	430	3.82	.55	1.88-5.00

Self-determination. Student self-determination is the dependent variable and outcome measure. Student self-determination was measured using the AIR student version (Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994*)*. In the CSESA study, students completed the AIR with a member of the research staff. The AIR student version comprises five subscales: (1) capacity – ability, (2) capacity – knowledge, (3) capacity- perceptions, (4) opportunities at school, and (5) opportunities at home. Students rate statements using a 5-point Likert-type scale ranging from *1= never* to *5 = always*. The student self-determination score is calculated by combining the total mean scores from the grouped capacity and opportunity subscales (see Table 3.6. for more details). About 6.2% of students (N = 34) could not complete the scale. The following details are characteristics about this group of students by gender (79.4% male), race/ethnicity (50% White, 14.7% Hispanic, 14.7% African-American), age (M = 17.0, SD =

1.74), cognitive ability (M = 42, SD = 17.61), ASD severity (M = 25.95, SD = 7.10). Table 3.7. presents information about the AIR-Student scores in the CSESA sample, and Table 3.8 shares more details about how self-determination is measured and presented using the AIR-Student measure.

Table 3.7.
AIR-Student Measure

	N	Mean	SD	Range
AIR – Student Mean	482	3.67	.71	1.25-5.00
Ability	493	3.63	.77	1.00-5.00
Perception	489	3.76	.79	1.17-5.00
Opportunities at School	489	3.50	.95	1.00-5.00
Opportunities at Home	485	3.78	.93	1.00-5.00

Table 3.8.
Presentation of Self-Determination in Youth with ASD

Factor	Measure	Description of Ranges
Student Self-Determination	AIR Self-Determination	***High*** *(3.75-5.00)* = High level of capacity, many opportunities to practice self-determination at home and school settings ***Moderate*** *(2.25-3.75)* = Moderate level of capacity, moderate level of opportunities to practice self-determination at home and school settings ***Low*** *(1.00-2.25)* = Low level of capacity, moderate level of opportunities to practice self-determination at home and school settings

Data Analysis

The present study employed descriptive statistics, bivariate correlational analysis, and hierarchical multiple linear regression. Data was analyzed using SPSS statistical software. There were two sets of independent variables. The first were personal factors: (1) age, (2) gender, (3) cognitive ability, (4) race/ethnicity, (5) ASD diagnosis; (6) social communication; and (7) adaptive behavior. The second were family factors: (1) parent education, (2) household income, (3) caregiver burden, (4) parent perspective of student's self-determination, and (5) family empowerment. The total score of self-determination served as the dependent variable.

Bivariate correlational analysis was used to assess the strength of the relationship between personal factors, family factors, and self-determination. Then the relationship between self-determination was assessed using hierarchical multiple linear regression models. Hierarchical multiple linear regression is a valid statistical model for analysis of a single outcome variable when multiple independent variables, or predictor variables, are used

(Tabachnick & Fidell, 2013). Predictor variables explain the amount of variance (R^2) in the continuous dependent variable. This research study examined how predictor variables explain the amount of variance in student self-determination.

This research study evaluated a total of thirteen predictor variables within three sets of hierarchical multiple linear regression models to answer the three corresponding research questions. Research question 1 had seven predictor variables in the final model, research question 2 had six predictor variables in the final model, research question 3 had thirteen predictor variables in the final model. Additionally, all of the research questions analyzed two steps within each model. Within each step, variables were entered in the model in the following order: (1) non-malleable factors, (2) malleable factors. Non-malleable factors are demographic variables and descriptive characteristics that cannot be changed. Whereas malleable factors can be changed (e.g., behavior, skills) and often are the target of change for interventions. The following personal factors are non-malleable factors: age, gender, cognitive ability, race/ethnicity, and ASD severity; the following are malleable factors: social skills and adaptive behavior. The following family factors are non-malleable factors: parent education, household income, and neighborhood; and the following family factors are malleable: caregiver burden, parent perspective of their child's self-determination, and family empowerment.

Research Questions and Hypotheses

Research Question 1: Do personal factors (age, gender, cognitive ability, race/ethnicity, ASD diagnosis, social skills, and adaptive behavior) predict self-reported self-determination in adolescents with ASD?

H_0 (Null hypothesis): The personal factors age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior are not predictors of self-determination.

H_A (Alternative hypothesis): At least one of the personal factors age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior is a predictor of self-determination.

Hypotheses testing for RQ1. The statistical model used for RQ1 is the following:

$$y_i = b_0x_o + b_1x_{1i} + b_2x_{2i} + b_3x_{3i} + b_4x_{4i} + b_5x_{5i} + b_6x_{6i} + b_7x_{7i} + b_8x_{8i} + b_9x_{9i} + e_i$$

where:

(1) y is the dependent variable *student self-determination*,

(2) I = 1, 2, …, *n*, where *n* is the sample size,

(3) b_0 is the sample regression coefficient for the constant 1 (x_o), which is the y-intercept,

(4) b_1 is the sample regression coefficient for the independent variable *Age* (b_1)

(5) b_2 is the sample regression coefficient for the independent variable *Gender* (b_2)

(6) b_3 is the sample regression coefficient for the independent variable *Cognitive Ability* (b_3)

(7) b_4 is the sample regression coefficient for the independent variable *Race/Ethnicity* (b_4)

(8) b_5 is the sample regression coefficient for the independent variable *ASD Severity* (b_5)

(9) b_6 is the sample regression coefficient for the independent variable *Social Skills* (b_6)

(10) b_7 is the sample regression coefficient for the independent variable *Adaptive Behavior* (b_7)

(11) *e* is the error term.

The model fit for RQ3 was analyzed using a level of significance $\alpha = .05$:

H_0: $\rho^2 = 0$

H_A: $\rho^2 > 0$

where ρ^2 represents the population coefficient of determination. The model fit was calculated to determine if the multiple linear regression model is a statistically significant improvement over calculating arithmetic mean of the outcome variable. SPSS software was used to calculate values for model fit, specifically the values for R, R^2, and the adjusted R^2 for each of the models. In hierarchical multiple linear regression, R^2 values measure the amount of variance explained by predictor variables on the dependent variable, or outcome variable; and the adjusted R^2 value is based on quantity of predictors (i.e., the adjusted R^2 value increases when a predictor variable improves the model and decreases when a predictor variable has no statistical significance) (Tabachnick & Fidell, 2013).

Research Question 2: Do family factors (parent education, household income, caregiver burden, parent perception of self-determination, and family empowerment) predict self-reported self-determination in adolescents with ASD?

H_0: The family factors parent education, household income, neighborhood locale, caregiver burden, parent perspective of their child's self-determination, and family empowerment are not predictors of self-determination.

H_A: At least one of the family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment is a predictor of self-determination performance.

Hypotheses testing for RQ2. The statistical model used for RQ2 is the following:

$$y_i = b_0x_o + b_1x_{1i} + b_2x_{2i} + b_3x_{3i} + b_4x_{4i} + b_5x_{5i} + b_6x_{6i} + e_i$$

where:

(1) y is the dependent variable *student self-determination*,

(2) I = 1, 2, …, *n*, where *n* is the sample size,

(3) b_0 is the sample regression coefficient for the constant 1 (x_o), which is the y-intercept,

(4) b_1 is the sample regression coefficient for the independent variable *Parent Level of Education* (b_1),

(5) b_2 is the sample regression coefficient for the independent variable *Household Income* (b_2),

(6) b_3 is the sample regression coefficient for the independent variable *Neighborhood* (b_3),

(7) b_4 is the sample regression coefficient for the independent variable *Caregiver Burden* (b_4),

(8) b_5 is the sample regression coefficient for the independent variable *Perspective of Child's Self-Determination* (b_5),

(9) b_6 is the sample regression coefficient for the independent variable *Parent Family Empowerment* (b_6),

(10) *e* is the error term.

The model fit for RQ2 was analyzed using a level of significance $\alpha = .05$:

H_0: $\rho^2 = 0$

H_A: $\rho^2 > 0$

where ρ^2 represents the population coefficient of determination. The model fit was calculated to determine if the multiple linear regression model is a statistically significant improvement over calculating arithmetic mean of the outcome variable. SPSS software was used to calculate values for model fit, specifically the values for R, R^2, and the adjusted R^2 for each of the models. Variables with higher adjusted R^2 scores have more variance on the outcome.

Research Question 3: Do family factors (parent education, household income, neighborhood, caregiver burden, parent perception of self-determination, and family empowerment) predict self-determination in adolescents with ASD when personal factors (age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior) are controlled?

H_0: The family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment are not predictors of self-determination while controlling for the group of personal factors.

H_A: At least one of the family factors parent education, household income, neighborhood, caregiver burden, parent perspective of their child's self-determination, and family empowerment is a predictor of self-determination while controlling for the group of personal factors.

*Hypotheses testing for RQ3***.** The statistical model used for RQ3 is the following:

$y_i = b_0x_o + b_1x_{1i} + b_2x_{2i} + b_3x_{3i} + b_4x_{4i} + b_5x_{5i} + b_6x_{6i} + b_7x_{7i} + b_8x_{8i} + b_9x_{9i} + b_{10}x_{10i} + b_{11}x_{11i} + b_{12}x_{12i} + b_{13}x_{13i} + e_i$

where:

(1) y is the dependent variable *student self-determination*,

(2) I = 1, 2, …, *n*, where *n* is the sample size,

(3) b_0 is the sample regression coefficient for the constant 1 (x_o), which is the y-intercept,

(4) b_1 is the sample regression coefficient for the control variable *Age* (b_1)

(5) b_2 is the sample regression coefficient for the control variable *Gender* (b_2)

(6) b_3 is the sample regression coefficient for the control variable *Cognitive Ability* (b_3)

(7) b_4 is the sample regression coefficient for the control variable *Race/Ethnicity* (b_4)

(8) b_5 is the sample regression coefficient for the control variable *ASD Severity* (b_5)

(9) b_6 is the sample regression coefficient for the control variable *Social Skills* (b_6)

(10) b_7 is the sample regression coefficient for the control variable *Adaptive Behavior* (b_7)

(11) b_8 is the sample regression coefficient for the independent variable *Parent Level of Education* (b_8)

(12) b_9 is the sample regression coefficient for the independent variable *Household Income* (b_9)

(13) b_{10} is the sample regression coefficient for the independent variable *Caregiver Burden* (b_{10})

(14) b_{11} is the sample regression coefficient for the independent variable *Neighborhood* (b_{11})

(15) b_{12} is the sample regression coefficient for the independent variable *Parent Perspective of Child's Self-Determination* (b_{12})

(16) b_{13} is the sample regression coefficient for the independent variable *Family Empowerment* (b_{13})

(1) *e* is the error term.

The model fit for Research Question 3 was analyzed using a level of significance $\alpha = .05$:

H_0: $\rho^2 = 0$

H_A: $\rho^2 > 0$

where ρ^2 represents the population coefficient of determination. The model fit was calculated to determine if the multiple linear regression model is a statistically significant improvement over calculating arithmetic mean of the outcome variable. SPSS software will be used to calculate

values for model fit, specifically the values R^2 and adjusted R^2 for each of the models. Variables with higher adjusted R^2 scores have more variance on the outcome.

Chapter Summary

Chapter 3 described the chosen methodology for this research study. First, CSESA as the larger study was introduced, followed by the design of the current research study. design of the study. Next, the participants and inclusion criteria were presented. Subsequently, the instrumentation and measures were discussed. Lastly, data analysis procedures were described. The upcoming Chapter 4 presents detailed results of this research study.

CHAPTER 4: RESULTS

Introduction

This research study investigated the predictive power of the independent variables (personal factors: age, gender, IQ, race, ASD severity, social skills, adaptive behavior; family factors: parent education, household income, neighborhood locale, caregiver burden, parent perspective of child's self-determination, and family empowerment) on the dependent variable, the self-determination of adolescents with ASD. Research Question 1 focused on the influence of non-malleable and malleable personal factors on self-determination. Research Question 2 focused on the influence of non-malleable and malleable family factors on self-determination. Finally, Research Question 3 focused the influence of family factors while controlling personal factors on self-determination. Chapter 4 presents the results of the research study, including meeting the assumptions relevant to hierarchical multiple linear regression, bivariate correlational analyses, and model summaries for all three research questions.

Assumptions

There are eight assumptions to meet for multiple linear regression analysis. The criteria are listed in the following section and include details from the study describing how they were met. Two assumptions focus on measuring the dependent variable on a continuous level and independent variables on a continuous or nominal level. All of the independent variables are either continuous or nominal and the dependent variable is continuous. The rest of the

assumptions are about the dataset used for multiple regression analysis. There are no additional assumptions to meet for specifically hierarchical regression.

Independence of observations. There must be independence of observations within the data. The correlation of observations is tested using the multiple regression technique in SPSS and reviewing results from the Durbin-Watson analysis. If the value is around 2, then the residuals are independent from one another. The Durbin-Watson statistic was the following: Research Question 1 = 1.94; Research Question 2 = 1.934; Research Question 3 = 1.94. All of these values are around 2, therefore, residuals from all of these models are independent from one another and no further analysis is needed.

Linear relationship and homoscedasticity. Each of the independent variables must have a linear relationship with the dependent variable. This was tested by visually analyzing the scatterplot produced for each research question. The predicted values are on the x-axis and standardized residuals on the y-axis. If there was a linear relationship between the independent variables and dependent variable, the data points will stay close to the regression line, also referred to as the line of best fit. Based on figures 4.1, 4.2, and 4.3, this assumption has been met.

Figure 4.1.
Research Question 1 Scatterplot

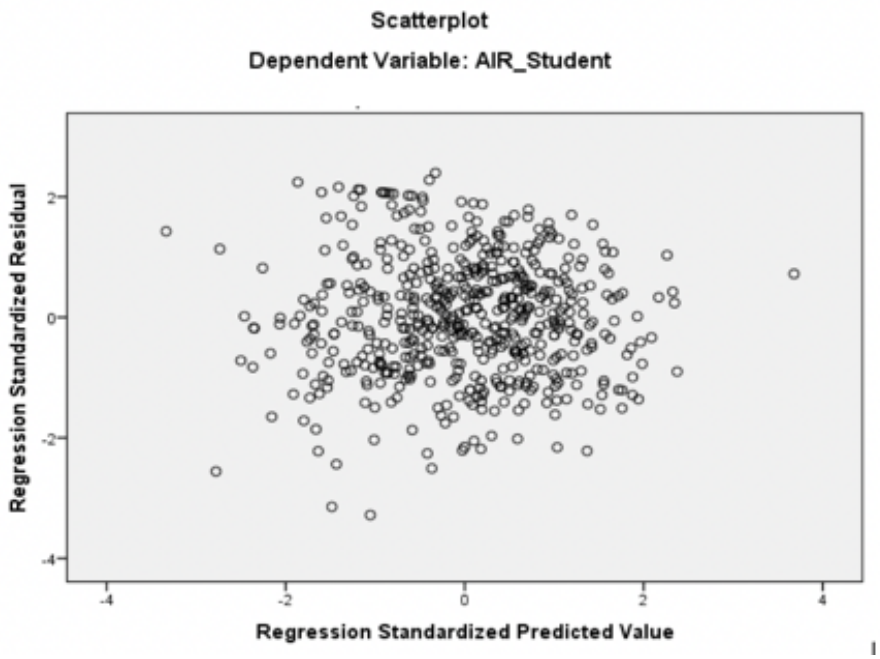


Figure 4.2.
Research Question 2 Scatterplot

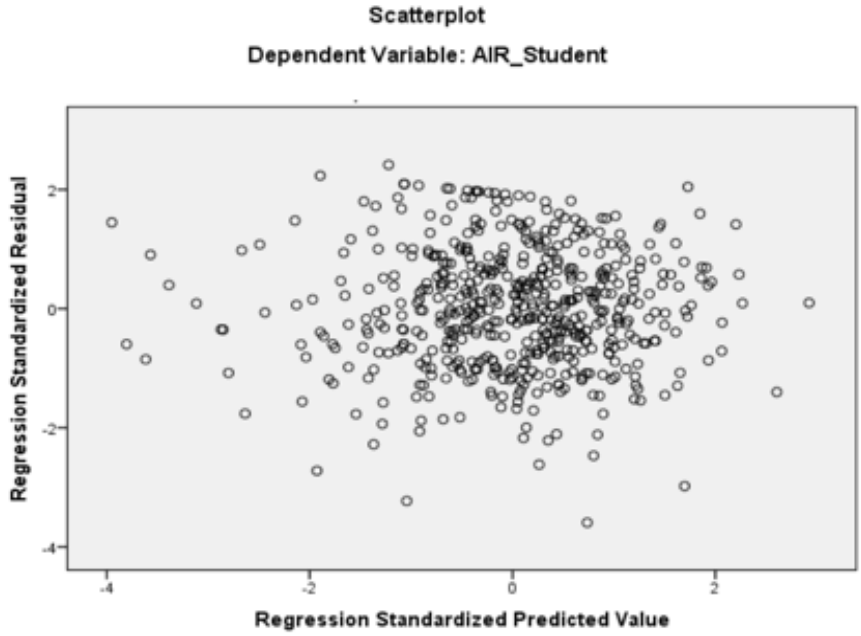
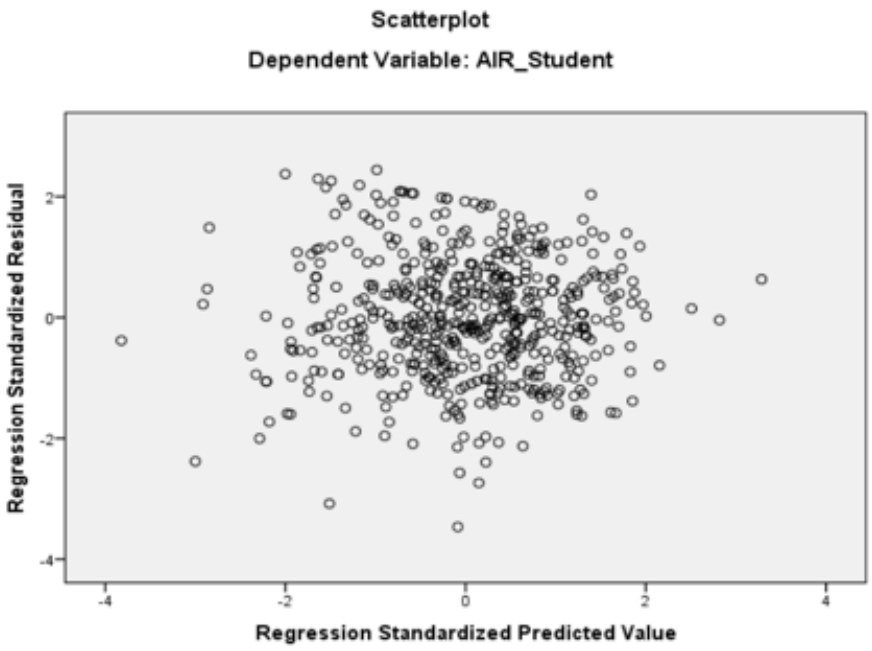


Figure 4.3.
Research Question 3 Scatterplot



Multicollinearity. The assumption of multicollinearity refers to the need to ensure that two or more independent variables are not highly correlated with one another. If there is multicollinearity, it will be difficult to determine results of each of the hierarchical multiple linear regression models. To check for multicollinearity, tolerance and variance inflation factors (VIF) are reviewed. The tolerance must be > 0.1 and the VIF < 10.00 to ensure there is no multicollinearity within multiple regression models. Tables 4.1, 4.2, and 4.3 display tolerance and VIF for all of the independent variables within the three research questions. All of the values for tolerance are > 0.1 and all of the values for VIF are < 10.00, therefore, there is no multicollinearity within these hierarchical multiple linear regression models.

Table 4.1.
Research Question 1 Multicollinearity Test

Model		Tolerance	VIF
1			
	Age	.87	1.16
	Gender	.99	1.00
	Cognitive Ability	.79	1.26
	Race/Ethnicity	.98	1.02
2			
	Age	.84	1.19
	Gender	.87	1.15
	Cognitive Ability	.54	1.85
	Race/Ethnicity	.97	1.03
	ASD Severity	.85	1.18
	Social Skills	.52	1.90
	Adaptive Behavior	.37	2.73

Table 4.2.
Research Question 2 Multicollinearity Test

Model		Tolerance	VIF
1			
	Parent Education	.74	1.46
	Household Income	.75	1.33
	Neighborhood	.98	1.02
2			
	Parent Education	.72	1.38
	Household Income	.73	1.37
	Neighborhood	.98	1.02
	Caregiver Burden	.86	1.16
	AIR Parent	.90	1.11
	Family Empowerment	.84	1.19

Table 4.3.
Research Question 3 Multicollinearity Test

Model		Tolerance	VIF
1			
	Age	.84	1.19
	Gender	.87	1.15
	Cognitive Ability	.54	1.85
	Race/Ethnicity	.97	1.03
	ASD Severity	.85	1.18
	Social Skills	.52	1.91
	Adaptive Behavior	.37	2.73
2			
	Age	.83	1.21
	Gender	.86	1.17
	Cognitive Ability	.52	1.92
	Race/Ethnicity	.92	1.09
	ASD Severity	.81	1.24
	Social Skills	.51	1.98
	Adaptive Behavior	.35	2.87
	Parent Education	.69	1.45
	Household Income	.69	1.45
	Neighborhood	.97	1.03
	Caregiver Burden	.81	1.24
	AIR Parent	.77	1.21
	Family Empowerment	.83	1.29

No significant outliers. Within the multiple regression model, there must not be any significant outliers within the data set. Within SPSS, if standardized residuals are greater than or less than 3 standard deviations, they are treated as outliers. Casewise diagnostics are used to determine if there are significant outliers in the data set. For this study, the outliers were determined to not adversely affect the data set; therefore, they remained in the models.

Residual errors. Figures 4.4, 4.5, and 4.6 present histograms of the standardized residuals. When evaluating for errors, it is important the standardized residuals to closely appear

to a normal distribution. All three histograms representing each research question indicate a close approximation to the normal distribution. Therefore, no further analysis is needed to examine for residual errors.

Figure 4.4.
Research Question 1 Histogram of Standardized Residuals

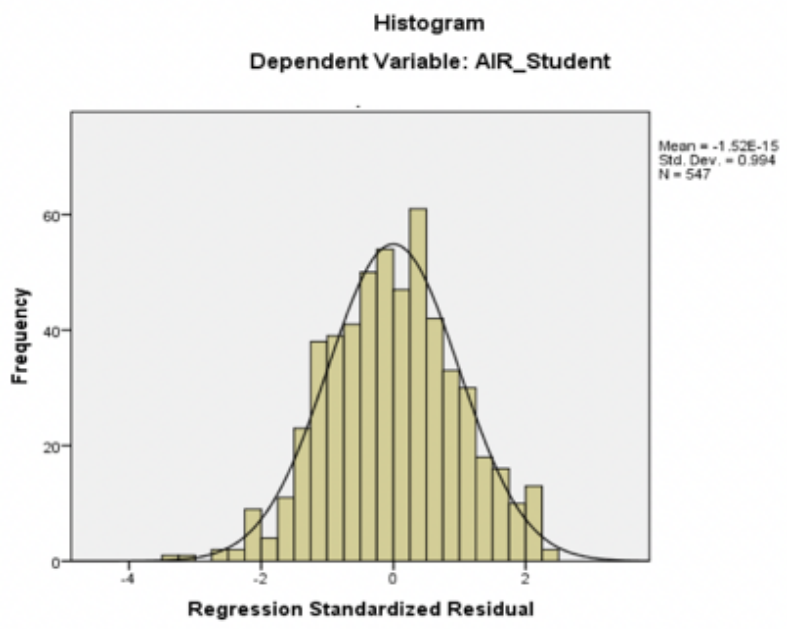


Figure 4.5.
Research Question 2 Histogram of Standardized Residuals

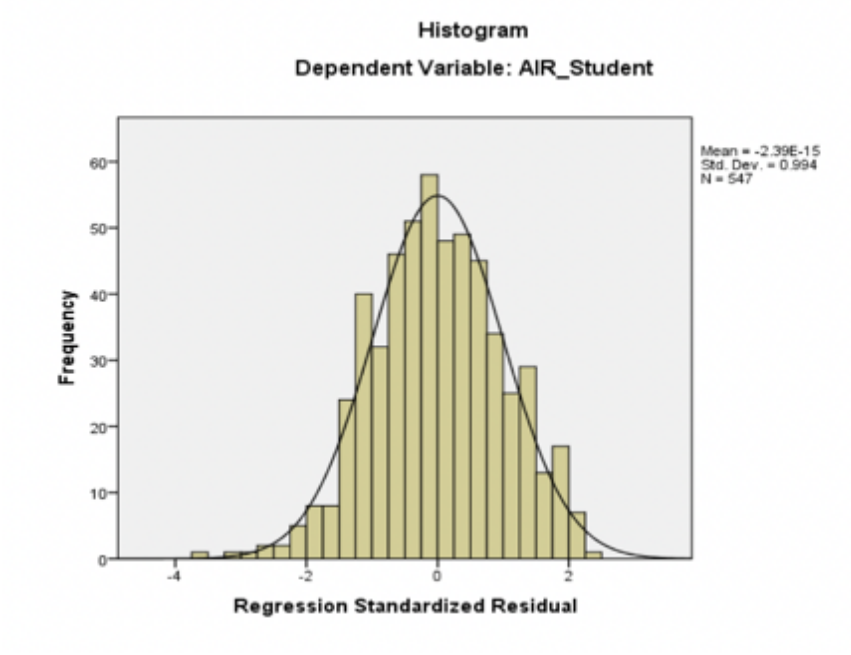
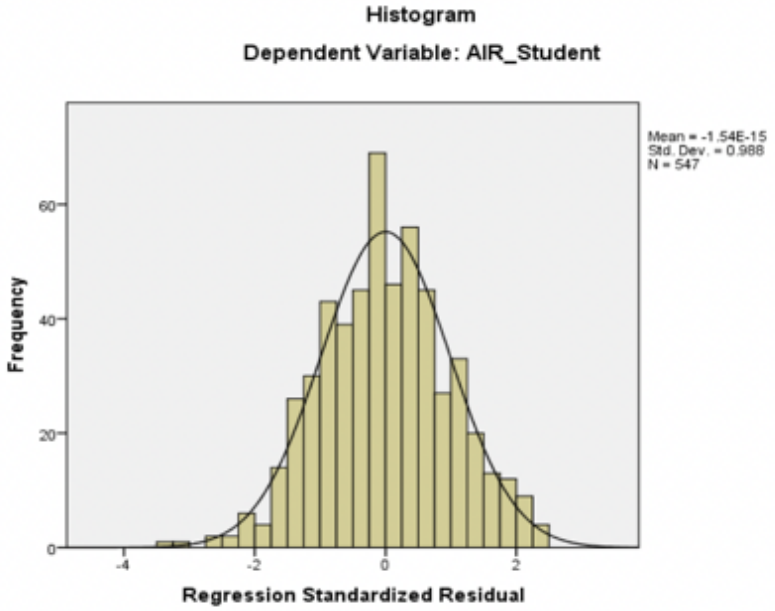


Figure 4.6.
Research Question 3 Histogram of Standardized Residuals



In addition, Figures 4.7, 4.8 and 4.9 display the normal probability plots (P-Ps) of the standardized residuals for each model. All three plots display data points that lie very close to the line of best fit, and also indicate no major deviations from normality (Pallant, 2010).

Figure 4.7
Research Question 1 Normal P-P Plot of Regression

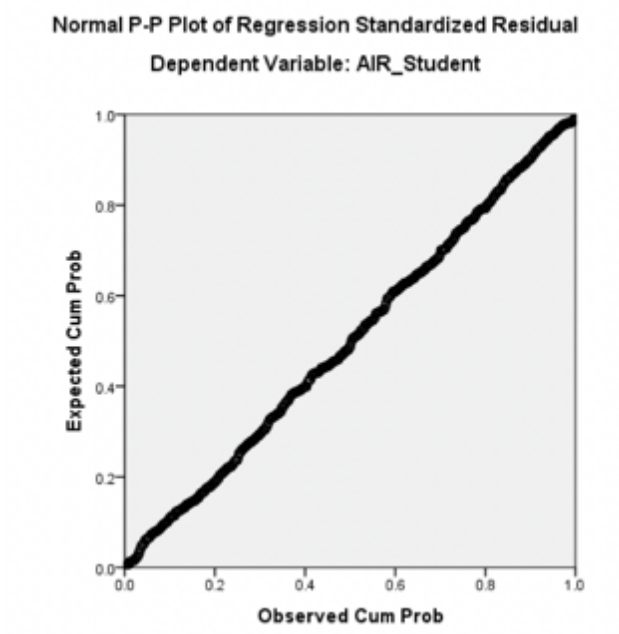


Figure 4.8.
Research Question 2 Normal P-P Plot of Regression

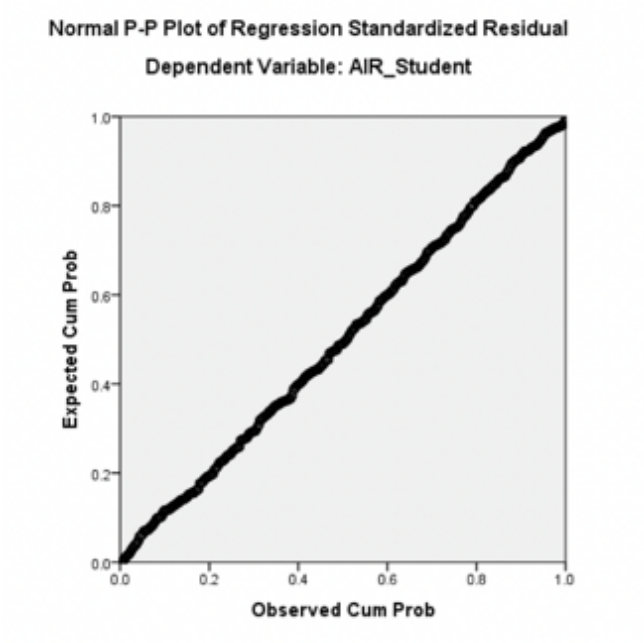
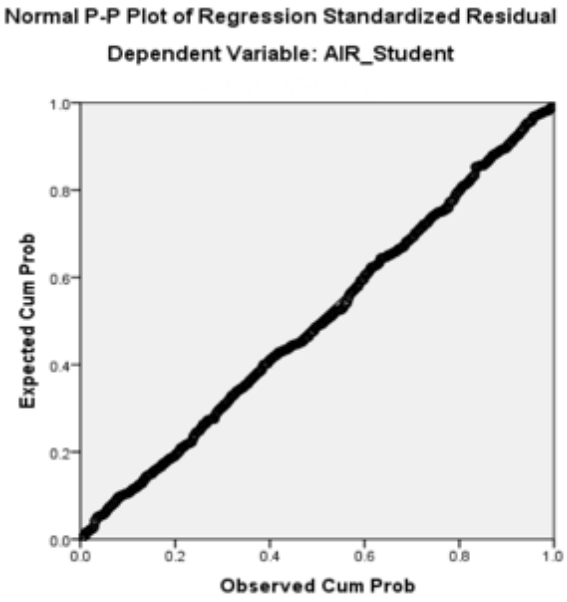


Figure 4.9.
Research Question 3 Normal P-P Plot of Regression



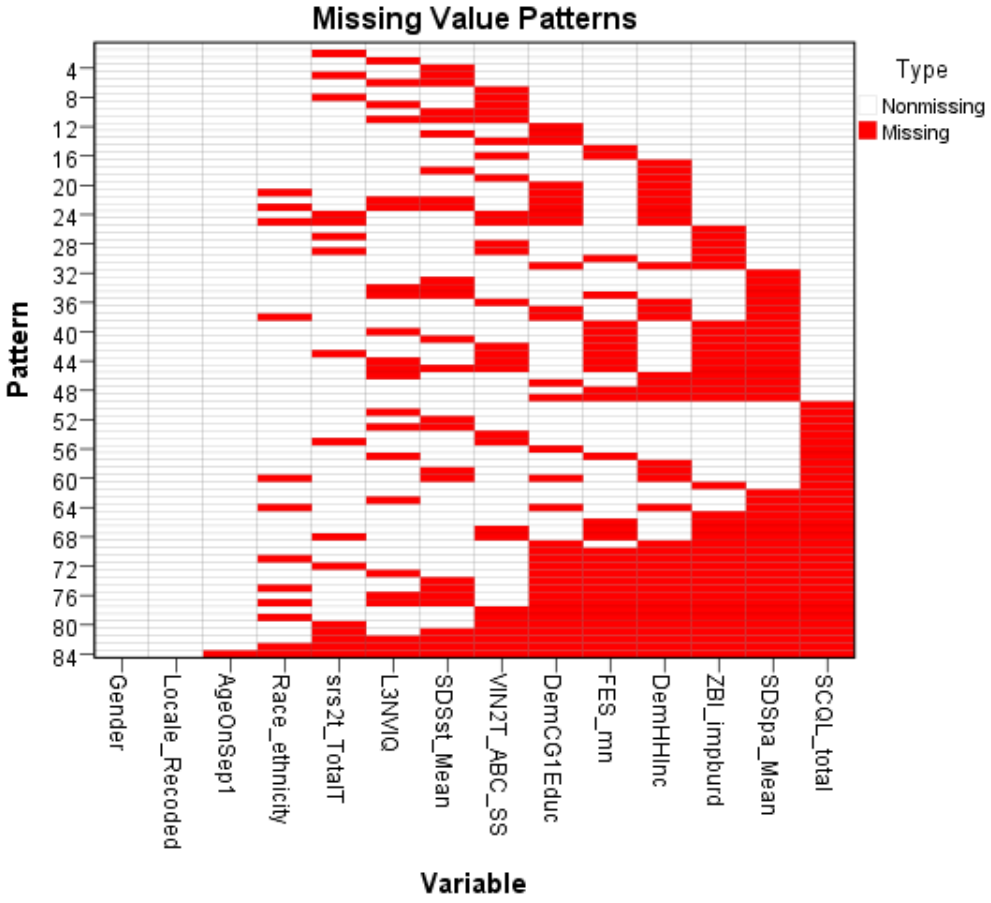
Missing Data

Within the CSESA sample used for this research study, there is a sizable amount of data is missing. There are three classifications of missing data: (1) missing not at random (MNAR) which means there are systematic differences between missing values and observed values; (2) missing completely at random (MCAR) which means there no systematic differences between missing values and observed values; and (3) missing at random (MAR) which means any systematic difference between missing values and observed values can be explained by differences in observed data (Rubin, 1976; Little & Rubin, 2002). Two methods help determine the type of missing data classification. First, if there are more than 5% of missing values from the sample, then it is MAR or MCAR. There are about 13% missing values in the overall sample.

Second, missing value patterns were examined. Figure 4.10. displays the missing value patterns and represents missing values with the color red. It is apparent some variables have more missing data than other variables (e.g., AIR-parent, SCQ). To be considered a missing data pattern, missing values need to appear in the upper left and lower right of the figure and/or in patterns in the middle. After examining the missing data for patterns, the sample for the current research study was determined to be MAR.

Figure 4.10.

Missing Value Patterns



If more than 5% of the values are missing in a sample, then multiple imputation is the recommended missing data procedure. Multiple imputation is commonly used with large samples and longitudinal data. The procedure creates multiple predictors for each missing value and the multiplies the imputed data to create a pooled estimate in order to use a full and complete dataset in further data analysis (Rubin, 1987). In comparison to other missing data procedures (e.g., listwise deletion), multiple imputation is less stringent because it does not delete whole cases if there are any missing values. Therefore, based on the amount of missing data and MAR classification for the CSESA sample, multiple imputation was selected for this research study.

There are three steps to complete multiple imputation: (1) check for patterns of missing data; (2) impute the dataset according to the pattern of missing data; (3) pool imputed data to determine parameter estimates and standard errors of estimates. Table 4.5. presents the variable summary and percentage of missing data across assessments in the CSESA sample. SPSS statistical software was used to evaluate the patterns of missing data, generate multiple imputations of the dataset, and create pooled estimates of the sample. The SCQ has highest percentage of missing data (24.9%) and is closely followed by other parent measures. For samples with 10% to 30% missing data, 20 imputations are recommended to generate accurate pooled estimates (Graham et al., 2007). After multiple imputation, SPSS statistical software was employed to input the pooled data into the hierarchical multiple linear regression models for each research question.

Table 4.5.
Percentage of Missing Data

Assessment	Missing Values (N)	%	Observed Values (N)
SCQ	136	24.9	411
AIR Parent	134	24.5	413
ZBI	126	23.0	421
Household Income	119	21.8	428
FES	117	21.4	430
Vineland	82	15.0	465
AIR Student	65	11.9	482
Leiter	47	8.6	500
SRS-2	36	6.6	511
Race/ethnicity	34	6.2	513
Age	1	0.2	546

Bivariate Correlational Analysis

Bivariate correlational analysis was conducted using independent variables and the dependent variable. Independent variables were tested for significance prior to running the hierarchical multiple linear regression models. Personal factor independent variables are in Table 4.6. There are several statistically significant relationships between personal factor independent variables and self-determination. Cognitive ability and social skills had a statistically significant inverse correlation with self-determination, and ASD severity and adaptive behavior had a statistically significant positive correlation. Furthermore, there are statistically significant relationships between family factor independent variables. Age had statistically significant

relationships to cognitive ability, ASD severity, social skills, and adaptive behavior. Cognitive ability was significantly related to race/ethnicity, ASD severity, social skills, and adaptive behavior. Social skills had statistically significant relationships to age, gender, cognitive ability, and adaptive behavior. Adaptive behavior had statistically significant relationships to age, gender, cognitive ability, ASD severity, and social skills.

Table 4.6.
Bivariate Correlation Matrix for Personal Factors

Variable	1	2	3	4	5	6	7
1. AIR Student	--						
2. Age	-.046	--					
3. Gender	.019	.002	--				
4. Cognitive Ability	-.091*	-.369***	-.049	--			
5. Race/Ethnicity	-.018	-.081*	-.013	.141**	--		
6. ASD Severity	.112*	.011**	.011	-.302***	.038	--	
7. Social Skills	-.144**	.242***	.242***	-.306***	.060	.289***	--
8. Adaptive Behavior	.161**	.035***	.035	.636***	.007	-.320***	-.612***

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

Table 4.7. presents results from the correlational analysis using family factor independent variables. Caregiver burden was the only family factor independent variable with a statistically significant relationship to the dependent variable. Caregiver burden had a statistically significant inverse correlation with self-determination. Parent education had statistically significant relationships to household income and neighborhood. Caregiver burden was significantly related to parent perceptions of their child's self-determination and family empowerment. Finally, parent perceptions of their child's self-determination were inversely related to family empowerment.

Table 4.7.
Bivariate Correlation Matrix for Family Factors

Variable	1	2	3	4	5	6
1. AIR Student	--					
2. Parent Education	.009	--				
3. Household Income	.044	.479***	--			
4. Neighborhood	.007	-.143**	-.064	--		
5. Caregiver Burden	-.049***	.034	-.090	-.029	--	
6. AIR Parent	.122	.012	.042*	.018	-.227**	--
7. Family Empowerment	.092	.006	-.004	.018	.309***	-.324***

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

Lastly, a bivariate correlation matrix was generated using personal and family factor variables with self-determination. Table 4.8. presents results from the correlational analysis. In addition to the correlations mentioned in the previous two matrices, there are some correlations between personal and family factors of note. Household income had statistically significant relationships with age, gender, and race/ethnicity. Cognitive ability was inversely related to caregiver burden and family empowerment, and positively related to parent perception of their child's self-determination. ASD severity was significantly related to parent perception of their child's self-determination and caregiver burden. Social skills also were significantly related to parent perception of their child's self-determination and caregiver burden. Adaptive behavior had a statistically significant relationship to parent perception of their child's self-determination.

Table 4.8.
Bivariate Correlation Matrix for Personal and Family Factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AIR Student	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2. Age	-.046	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Gender	.019	.002	--	--	--	--	--	--	--	--	--	--	--	--
4. Cognitive Ability	.091*	-.369***	-.049	--	--	--	--	--	--	--	--	--	--	--
5. Race/Ethnicity	-.018	-.081*	-.013	.141**	--	--	--	--	--	--	--	--	--	--
6. ASD Severity	-.112*	.128**	.011	-.302***	.038	--	--	--	--	--	--	--	--	--
7. Social Skills	-.144**	.152***	.242***	-.306***	.060	.289***	--	--	--	--	--	--	--	--
8. Adaptive Behavior	.161**	-.350***	.035	.636***	.007	-.320***	-.612***	--	--	--	--	--	--	--
9. Parent Education	.009	-.077	.066	.053	-.051	.036	.057	.023	--	--	--	--	--	--
10. Household Income	.044	-.088*	.085*	.056	.129**	-.001	.073	.049	.479	--	--	--	--	--
11. Neighborhood	.007	.016	.032	-.040	.059	.041	.026	-.049	-.143**	-.064	--	--	--	--
12. AIR Parent	.122*	-.056	.029	.208***	-.063	-.293***	-.182***	.259***	.012	-.042	.018	--	--	--
13. Caregiver Burden	-.049	.072	.063	-.082*	-.008	.204***	.177**	-.110	.034	-.090*	-.029	-.227	--	--
14. Family Empowerment	.092*	-.040	-.043	-.104*	-.064	-.089	-.005	-.079	.006	-.004	.018	.309***	-.324***	--

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

Research Question 1 Model Fit

For Research Question 1, two sets of models were created with the goal to examine the combination of personal factors that account for the most variance in the model. The first model comprised of non-malleable factors (age, gender, and race/ethnicity, cognitive ability, and ASD severity), and the second model added malleable factors (social skills and adaptive behavior).

The hierarchical multiple regression model summaries for Research Question 1 are displayed in Table 4.9. Non-malleable personal factors age, gender, cognitive ability, race/ethnicity, and ASD severity were entered into Step 1 and explained 1.8% of the variance in self-determination. The malleable personal factors (social skills and adaptive behavior) explained an additional 3.5% of the variance in self-determination, after controlling for age, gender, cognitive ability, race/ethnicity, and ASD severity. The R^2 change in both steps was significant ($p < .001$).

In Step 1, age is significant ($p < 0.05$) as well as cognitive ability score and ASD severity are significant ($p < .01$, $p < .001$). In Step 2, age, gender, and race are not significant, and cognitive ability is no longer significant. Meanwhile, ASD severity, social skills, and adaptive behavior are significant predictors in the model ($p < .01$, $p < .001$). Both steps were significant additions to the model as indicated by the constant values ($p < .001$).

Table 4.9.
Research Question 1 Model Summary

Predictor variables	*Step 1*	*Step 2*
Constant	3.653***	3.593***
Age	-.010*	.008
Gender	.025	.034
Cognitive Ability	.070***	-.007
Race/Ethnicity	-.027	-.012
ASD Severity	-.089***	-.060**
Social Skills		-.072**
Adaptive Behavior		.108***
R^2	.018	.035
R^2 change	.015***	.017***

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

Research Question 2 Model Fit

For Research Question 2, two sets of models were created with the goal to examine the combination of family factors that account for the most variance in the model. The first model comprised of non-malleable factors (parent education, household income, neighborhood) and the second model added malleable factors (caregiver burden, parent perspectives of their child's self-determination, and family empowerment).

The hierarchical multiple regression model summaries for Research Question 2 are displayed in Table 4.10. Non-malleable family factors parent education, household income, and neighborhood were entered into Step 1 and explained .2% of the variance in self-determination. After entry of malleable family factors caregiver burden, parent perspective of self-determination, and family empowerment at Step 2, these factors explained 2% of the model. Only the R^2 change in Step 2 was significant ($p < .001$).

In Step 1, parent education and neighborhood were not significant predictors in the model, but household income was statistically significant ($p < .05$). In Step 2, parent education, neighborhood, ZBI are not significant. However, within this final model, household income and parent perspective of child's self-determination are significant ($p < .01$) as well as family empowerment ($p < .001$). Both steps were significant additions to the model as indicated by the constant values (*p* .001).

Table 4.10.
Research Question 2 Model Summary

Predictor variables	*Step 1*	*Step 2*
Constant	3.583***	3.163***
Parent Education	-.015	-.021
Household Income	.053*	.059**
Neighborhood	.010	.006
Caregiver Burden		-.002
Parent Perspective of Child's Self-Determination		.104***
Family Empowerment		.058**
R^2	.002	.028
R^2 change	.002	.026**

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

Research Question 3 Model Fit

For Research Question 3, two sets of models were created with the goal to examine the combination of individual variables that account for the most variance in the model, while controlling for others. The first model comprised of all personal factors (age, gender, and race/ethnicity, cognitive ability, ASD severity, social skills, and adaptive behavior), the second model added family factors (parent level of education, household income, neighborhood, caregiver burden, parent perspective of child's self-determination, and family empowerment).

The hierarchical multiple regression model summaries for Research Question 3 are displayed in Table 4.11. The personal factors age, gender, cognitive ability, race/ethnicity, ASD severity, social skills, and adaptive behavior were entered into Step 1 and explained 1.8% of the variance in self-determination. After entry of family factors parent education, household income, neighborhood, caregiver burden, parent perspective of child's self-determination, and family empowerment in Step 2, the total variance explained by the model was 5%. The R^2 change in both steps was significant (Step 1: $p < .05$; Step 2: $p < .01$). There were no significant predictors, however, both steps are overall statistically significant as indicated by the constant ($p < .001$).

Table 4.11.
Research Question 3 Model Summary

Predictor variables	*Step 1*	*Step 2*
Constant	3.593***	2.843***
Age	.008	.006
Gender	.034	.066
Cognitive Ability	-.007	.000
Race/Ethnicity	-.012	-.006
ASD Severity	-.060**	-.004
Social Skills	-.072**	-.005
Adaptive Behavior	.108***	.004
Parent Education		-.011
Household Income		.024
Neighborhood		.005
Caregiver Burden		.057
Parent Perspective of Child's Self-Determination		.002
Family Empowerment		.116
R^2	.031	.050
R^2 change	.031*	.020*

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

Chapter Summary

In summary, Chapter 4 presented an overview of the quantitative analysis and results of this research study. A hierarchical multiple linear regression was conducted for each of the three research questions. All respective assumptions for data analysis were met, and multiple imputation was used in the SPSS statistical software to impute missing values within the data. Personal and family factors were categorized as independent variables in relation to self-determination as the dependent variable. All independent variables were entered into models and analyzed as predictors for self-determination.

The data analysis confirmed statistically significant relationship across multiple independent variables across personal and environmental factors. Social skills, and adaptive behavior were statistically significant in Research Question 1, parent perception of their child's self-determination and family empowerment in Research Question 2, and this group in Research Question 3 while controlling for the personal factors with self-determination. The results also indicated no statistically significant relationship between independent variables gender, age, race, etc. Next, in Chapter 5, a discussion of the results of the research, limitations, implications for theory and practice, as well as recommendations for future research are presented.

CHAPTER 5: DISCUSSION

Introduction

The findings of this research study are aimed at presenting researchers and practitioners with empirical evidence to support self-determination intervention design decisions, as a way to help increase self-determination of youth with ASD. An objective of this investigation was to help extend the body of knowledge around self-determination, and more specifically, personal and family factors. The research study was conducted with a quantitative research design using a hierarchical multiple linear regression model. The results show statistically significant findings: (1) at least one of the personal factors is a predictor of self-determination; (2) at least one of the family factors is a predictor of self-determination; and (3) controlling for personal factors, family factors as a group are a predictor of self-determination. For all three research questions, the null hypothesis was rejected because at least one factor or a group of factors was statistically significant. A discussion of the statistical results is presented in this chapter, which will further support the importance of personal and family factors in predicting self-determination.

Discussion by Research Question

In order to add to the scholarly body of knowledge and give researchers and practitioners empirical evidence on how to design their self-determination interventions, the independent variables within personal and family factors were statistically tested to see if they predicted the dependent variable self-determination. Overall, the three hypotheses were confirmed and showed relationships between some of the independent variables and the dependent variable of this

research study. The results presented in Chapter 4 clearly show evidence that confirms the linear relationship between several personal and family factors and self-determination. In this section, the results of the data analysis are further explained.

Research question 1: Personal factors. The first model examined personal factors as predictors of self-determination. Independent variables previously introduced as non-malleable personal factors were entered into Step 1 and malleable personal factors were entered into Step 2. The analysis found both steps of the model significant ($p < .001$). However, according to the R^2 change, each step contributed a small amount of variance to the total model (Step 1: 1.8%, Step 2: 3.5%). The results showed the independent variables aided in predicting self-determination. Specifically, non-malleable factors alone such as age, cognitive ability, ASD severity contribute to self-determination. With the addition of malleable factors, ASD severity was still statistically significant, along with social skills and adaptive behavior.

Age. The results of this research study demonstrated age was a statistically significant predictor of self-determination in adolescents with ASD. Although, this non-malleable factor lost its salience when adding malleable factors in Step 2, it is an important factor to consider. This finding is consistent with previous studies that identified age as a significant predictor of self-determination in youth with ID and LD (Wehmeyer, 1996; Wehmeyer & Garner, 2003). Its significance is in congruence with the developmental trend of self-determination. Age is also a factor associated with mixed findings related to participation outcomes in youth with ASD (Liptak et al., 2011). The change in significance with the addition of malleable factors merits further study to investigate the relationship between age and social skills and adaptive behavior. However, this finding aligns with the idea that self-determination follows along a developmental trajectory: as individuals with and without ASD age, they develop more self-determined attitudes

and behaviors. While individuals navigate adolescence, they gain more autonomy, self-awareness, and opportunities to express themselves.

Cognitive ability. This non-malleable personal factor was also a statistically significant predictor of self-determination in Step 1. Youth with higher cognitive ability are more likely to have higher levels of self-determination (Stancliffe et al., 2000; Wehmeyer, 1996). Similar to results from Wehmeyer and Garner (2003) that IQ did not predict membership in the high self-determination group. The results of this research study indicated cognitive ability has a complex factor in examining self-determination. Youth with ASD and lower cognitive ability are often in settings where they receive a lot of supports and supervision from adults including educators and their parents. Within these settings, youth with ASD infrequently practice self-determination and perceive a higher level of self-reported self-determination because of the consistent supports they receive on a daily basis. This in turn, may contribute to youth with ASD's perceptions of dependence on others.

ASD severity. This finding was consistent with previous research comparing youth with LD, ID, and ASD (Chou et al., 2017), in that youth with ASD report lower levels of autonomy and psychological empowerment in comparison to other students with disabilities. Chou et al. (2017) suggested social skills of students with ASD may significantly influence level of self-determination as a function of limitations in autonomy resulting from social communication limitations. In this research study, higher ASD severity or significant needs predicts lower levels of self-determination. Increasing ASD severity refers to increasing supports needed regarding social communication skills and presence of restricted and repetitive behaviors that interfere with functioning and interactions. Similar to cognitive ability, youth with higher needs may not practice self-determination as often as others who need less support due to the presence and

supervision of adults including educators and parents. In comparison, youth with ASD who need less support are often in settings with less supervision in which they need to practice autonomy and asking for help.

Social skills. As a malleable personal factor, social skills were statistically significant in predicting self-determination. Pierson, Carter, Lane, and Glaeser (2008) examined the influence of social skills and problem behaviors on self-determination of high school students with emotional disturbances and LD. They found social skills to be a significant predictor of students' level of self-determination. These findings are consistent with other studies on the relationship of social skills and self-determination (Faherty, 2000; Nota, Ferrari, Soresi, & Wehmeyer, 2007). Self-determination is a practice requiring social communication skills within a social context (Mithaug, 1998) because practicing self-determination requires asking, clarifying expectations, and expressing preferences (Hurlbutt & Chalmers, 2004) and occurs via social interactions in a social environment (Wehmeyer et al., 2014). Having higher levels of social skills are important for being self-determined, because self-determination is developed across social interactions and contexts. Additionally, limitations in social skills are considered an underlying contributor to difficulties in independent functioning (Howlin, Mawhoood, & Rutter, 2000). Youth with ASD who have higher levels of social skills discover more opportunities to practice and interact with others to build their self-determination skills.

Adaptive behavior. Lastly, adaptive behavior was a significant predictor of self-determination. Currently, no extant research has evaluated the potential of a relationships between adaptive behavior and self-determination. However, higher levels of adaptive behavior are tied to several postsecondary outcomes including quality of life (Tasse et al., 2012) as well as employment opportunities and independent living (Farley et al., 2009). This research finding

indicates that youth with ASD who have higher adaptive behavior scores, tend to be more self-determined. With a higher level of adaptive behavior, practicing self-determination component elements such as self-regulation, decision-making, and choice-making are inherently a part of day-to-day activities.

Research question 2: Family factors. The first model examined family factors as predictors of self-determination. Independent variables previously introduced as non-malleable family factors were entered into Step 1 and malleable family factors were entered into Step 2. The analysis found both steps of the model significant ($p < .001$). However, according to the R^2 change, each step contributed a small amount of variance to the total model (Step 1: .2%, Step 2: 2%). The results show these independent variables aid in predicting self-determination. Household income was the only non-malleable family factor to contribute to self-determination. In Step 2, household income was still statistically significant. Parent perspective of their child's self-determination and family empowerment were the malleable factors that contribute to self-determination.

Household income. As a non-malleable family factor, household income as statistically significant across both steps of the model. This research finding is consistent with previous ASD studies finding families with lower household incomes tended to experience greater difficulty accessing services (Thomas et al., 2007; Liptak et al., 2008; Shattuck et al., 2012). Similarly, family resources are a strong predictor of access to and success in post-school outcomes such as postsecondary education. Youth with disabilities from higher income households engaged in more postsecondary education activities in comparison to youth with disabilities from lower income households (Chiang et al., 2012), and independence is also influenced by family household income (Shogren & Shaw, 2017).

Parent perspective of their child's self-determination. This malleable family factor was a significant predictor of self-determination. The findings of this research study expand upon what was previously known about the role of parent expectations in transition of youth with ASD (Kirby, 2016). High parental expectations are strongly associated with youth with disabilities engaging in positive postsecondary outcomes (Carter, Austin, & Trainor, 2011; Doren, Gau, & Lindstrom, 2012). Furthermore, higher parental expectations are influential on higher levels of their child's self-determination. This research finding about parent perceptions of their child's self-determination aligns with parent expectations of their child with ASD. Parents who perceive their child to be self-determined will find ways to promote and support self-determination. Whereas, parents who perceive their child limited or lacking self-determination perceive their child as dependent and may not naturally provide opportunities to promote and support self-determination.

Family empowerment. Family empowerment was also statistically significant in predicting self-determination. No studies have examined the relationship between family empowerment and self-determination of individuals with ASD or post-school outcomes. However, family involvement has been studied extensively in special education research. Evidence supports active parent involvement in the development of IEPs, including transition services, goals and objectives strongly correlates with postsecondary transition success (Destefano, Heck, Hasazi, & Furney, 1999; Sinclair, Christenson, & Thurlow, 2005; Wandry & Pleet, 2003). Access to services is also a subscale of the FES. Parents who have positive experiences with access and attainment of services may feel more empowered. Additionally, parents and families who are empowered are more likely to model empowerment, an element of self-determination, and encourage self-determination and empowerment in their child with ASD.

While accessing services, parents and families need to communicate needs for their child, and in turn, their child may have learned how to communicate their own needs with service professionals.

Research question 3: Family factors while controlling personal factors. The first model examined family factors as predictors of self-determination while controlling personal factors. Personal factors were entered into Step 1 and family factors were entered into Step 2. In Step 1, ASD severity, social skills, and adaptive behavior were statistically significant, and in Step 2, there are no statistically significant factors. However, the analysis found both steps of the model significant ($p < .001$). The R^2 change was statistically significant, and each step contributed a small amount of variance to the total model (Step 1: .2%, Step 2: .3%).

Summary. Based on the results of this study, there are a number of distinctions to make between predictors. Based on Research Question 1, the personal factors of ASD severity, social skills, and adaptive behavior were significant predictors of self-determination. Based on Research Question 2, family factors of household income, parent perspective of their child's self-determination, and family empowerment are significant predictors of self-determination. Controlling personal factors in Research Question 3, no independent variables were predictors of self-determination. Rather, the group in sum contributes to self-determination. These research findings contributed to our understanding about self-determination in a number of ways that will be discussed in the following section.

Limitations

There are a number of limitations to this research study to be noted. First, data used in the current analysis were only from pre-test data collection. Therefore, personal factors, family factors, and levels of self-determination are representative of levels at the beginning of the year,

which could change throughout the course of the school year. For example, as youth with ASD become more familiar with their schedules in high school, they may have higher levels of self-determination. Additionally, parent and teacher respondents may report differently about personal factors and family factors as the year progresses.

Although pre-test data typically have the highest response rates, and this was true with the data set for this research study, there was still a lot of missing data. Assessments were completed by multiple types of respondents and these are reflected in the response rate. Students had the highest rate of response, followed by teachers and school staff, and then parents. To be able to use all of the data, multiple imputation created a pooled mean estimate to use in this research study. Therefore, using multiple imputation requires caution. It is always ideal to have a more complete dataset for data analysis.

Another possible limitation of this research study was the varying respondents across measures. CSESA was a school-based intervention model and relied upon school staff in addition to parents to complete assessment packets, including assessments about personal factors. For example, school staff reported on social skills (SRS-2) and adaptive behavior (VABS) about youth with ASD enrolled in the CSESA study. While it would have been helpful to use assessments completed by the same respondent, their responses were helpful for the larger study and provided an additional perspective to these particular skills.

Exploring the profile of personal and family factors in relation to level of self-determination was beyond the scope of the current research study. Several studies have compared youth with disabilities based on self-determination level. For example, Wehmeyer and Palmer (2003) examined how postsecondary outcomes (employment, independent living, or community integration) of young adults with ID and LD related to self-determination group

before school exit. Additionally, past research has focused on elements of self-determination (i.e., autonomy, psychological empowerment) (Chou, Wehmeyer, Palmer, & Lee, 2016; Shogren & Shaw, 2017). However, this study did not address profiles or grouping according to level of self-determination.

Finally, while this study examined how personal and family factors impact level of self-determination, another limitation of the study was that other environmental characteristics or factors were not addressed. At pre-test youth with ASD in this study were all enrolled in high school, which is another location to practice and generalize self-determination skills. Teacher characteristics (e.g., number of years teaching, number of years teaching students with ASD, knowledge of evidence-based practices in ASD) may also predict level of self-determination. Additionally, teachers also completed an AIR-SDS about their perceptions of their student with ASD's self-determination. However, the current research study did not examine these additional environmental factors.

Future Research

The current research study examined how personal and family factors were associated with the level of self-determination of adolescents with ASD. In order to better understand these relationships, research in three areas is needed (1) how parents and youth with ASD interact and develop self-determination in the home, (2) what interventions led by parents in the home lead to promoting optimal self-determination of youth with ASD, and (3) what are the post-school outcomes associated with promoting optimal self-determination of youth with ASD.

First, we need to learn more about how parents and youth with ASD currently are interacting and developing self-determination at home. For example, we need to understand how parents are interacting with their child with ASD in activities to model or promote self-

determination. Also, more information is needed to determine when, how, and where parents are more likely to provide opportunities of self-determination. Parents may be more likely to support their child with ASD in higher-level activities such as soft skills or where youth with ASD may need additional support such as self-care activities. However, parents may be less likely to provide support during transition planning and self-advocacy activities. Further, parents may need more education and training about the types of opportunities they can provide in order to promote self-determination.

Similarly, additional research is needed to understand how self-determination can be developed within the home. The current research study did not explore this setting. While the current research study provides information concerning how personal factors moderate the relationship between family factors and self-determination, additional factors need to be explored Furthermore, this study found several family factors predicted self-determination, and additional parent and home variables would help further explain the active ingredients within the home that promote optimal levels of self-determination. For example, it would be helpful to include parents' knowledge and attitude related to ASD as variables. Further research is also needed that explores how parents and youth with ASD practice self-determination in the home. Past research indicated opportunities for self-determination lead to better outcomes for youth with disabilities (Wehman et al., 2014; Wehmeyer & Schwartz, 1997; Wehmeyer et al., 2013). Therefore, research is needed that explores self-determination with parents specifically in the home setting.

Second, we need to understand how self-determination interventions in the home led by parents promotes or hinders the development of self-determination of youth with ASD. While the current research study provides information about personal and family factors to target, additional characteristics need to be explored. For example, observational factors within the

home may also influence self-determination. It may be more difficult to observe within the home but should still be explored. Further, observing within the home will provide ideas as to how self-determination interventions and opportunities and be implemented for youth with ASD.

Longitudinal studies are needed to examine the impact postsecondary outcomes related to the level of self-determination of youth with ASD. Specifically, researchers need to explore how self-determination and its related personal and family factors mirror findings from studies with youth with other disabilities and promote better outcomes for these students. With appropriate training and education and preparation for adulthood, youth with ASD can integrate meaningfully into the community.

Researchers in the transition field should develop studies to tackle on more complex issues related to transition. Mazzotti and colleagues (2013) stated a need for high quality research to expand self-determination as an evidence-based practices and to understand its role as a predictor of postsecondary outcomes. The authors suggest analyzing personal factors related to specific outcomes (e.g., employment, education). Then, personal factors will be identified as protective factors (e.g., enable youth from diverse backgrounds to achieve their potential) and address risk factors (Trainor, 2008; Trainor et al., 2008). Additionally, the authors aim to make these evidence-based practices more useful for practitioners to know and apply with particular students in specific contexts. Being equipped with the knowledge about personal factors may help researchers and practitioners align self-determination interventions with varying personal factors.

Implications for Practice

With the growing group of youth with ASD approaching adulthood, it is essential for practitioners to shift focus towards transition planning. Currently, adults with ASD are struggling

and experience poor post-high school outcomes. In order to shift focus towards these outcomes, there is a need to establish practices to promote successful outcomes, such as self-determination. Furthermore, it is necessary to promote predictors of self-determination in order to provide the best interventions possible to youth with ASD. Designing interventions to help personal and family factors associated with self-determination is a critical element to expanding opportunities and its practice.

The purpose of this research study was to examine the influence of personal and family factors as predictors of self-determination. The research results showed the independent variables social skills, adaptive behavior, household income, parent perspectives of their child's self-determination, and family empowerment, can be used in predicting the dependent variable, self-determination. These independent variables contribute to our knowledge of how self-determination interventions can be developed to tailor to or target in addition to self-determination. The following implications of this research study are discussed: (1) significant personal factors, (2) significant family factors, (3) theory, and (4) models of self-determination intervention.

Personal factors. There are many personal factors for researchers, practitioners, and parents and families to consider. They will have to be creative in finding ways to tailor and target these factors in the development of interventions and strategies to support self-determination in youth with ASD. It is critical that professionals working with individuals with ASD during the transition to adulthood consider the multitude of factors explored in this research study. Practitioners should also be cognizant of supports that their students with ASD that may support these factors. Prior to implementing interventions to support self-determination, current skills

and needs should be assessed first. Age, cognitive ability, ASD severity, social skills, and adaptive behavior are discussed.

Age. As their students age throughout high school, practitioners should provide age-appropriate opportunities to practice self-determination. This will be especially critical as youth are approaching the end of high school and the start of adulthood. For example, practitioners can shift opportunities to practice self-determination in paid employment, postsecondary education, and independent living decision-making activities. Practice asking for accommodations in work and school settings will become increasingly relevant for youth with ASD as they age through adolescence.

Cognitive ability. Practitioners should consider youth with ASD's cognitive ability as a factor to tailor self-determination intervention and support. There are number of evidence-based practices to support teaching with students across the range of cognitive ability. For youth with mild to moderate disabilities, there are existing self-determination curricula focused on promoting active student involvement in IEP meetings including The *Self-Advocacy Strategy* (Van Reusen, Bos, Schumaker, & Deshler, 1994; Test & Neale, 2004), *Self-Directed IEP* (Martin, Marshall, Maxson, & Jerman, 1996; Martin, Van Dycke, Christensen, Greene, Gardner, & Lovett, 2006), and *Whose Future is it Anyway* (Wehmeyer et al., 2004; Wehmeyer, Palmer, Lee, Williams-Diehm, & Shogren, 2011). These are the most common and only manualized self-determination interventions. Educators can apply evidence-based strategies to meet the needs of students at varying cognitive ability levels. For those with higher cognitive ability, no adjustments to language and Lexile level may be necessary for listed interventions. However, educators will need to include more evidence-based practices and strategies identified for students with moderate to severe disabilities and modify these interventions to employ

systematic instruction (i.e., system of prompting, reinforcement, generalization), self-directed learning, and inclusive teaching (Browder, Wood, Thompson, & Ribuffo, 2014).

ASD severity. As a non-malleable factor ASD severity is a complex factor to consider with self-determination interventions. ASD severity is a blend of limitations in social communication skills and level of support. Social communication skills will be discussed in the next section. However, level of support can be including the presentation of self-determination interventions. These interventions may need to incorporate the evidence-based practices and strategies listed above in the cognitive ability section.

Additionally, youth with ASD can practice with characteristics of self-determination such as goal-setting. Goal-setting is a process of identifying and defining a goal clearly and concretely, with specified action items to achieve the pre-defined and pre-determined outcome (Wehmeyer, Shogren, & Zager, 2010). Chunking complex goals would be applicable for engaging this group of students in goal-setting. Students could make a list of goals they are working towards, to have a concrete, visual reminder of goals that they can easily refer to. Furthermore, strategies to promote self-regulated behavior could be utilized to enable students with autism to self-monitor their progress towards their goals. Self-management is also an evidence-based practice for individuals with ASD (Wong et al., 2015). Goals for students with ASD must be developed specifically for the individual and should be functional in nature, with a focus on skills needed in current and future environments (Iovannone, Dunlap, Huber, & Kincaid, 2003). For example, youth with ASD may be involved in setting goals for gaining more work-based learning experiences while in high school, starting with on-campus jobs. This step-by-step process of goal-setting and gaining employment experiences while in high school promote development of self-determination.

Social skills. For youth with ASD and varying social skills, self-determination interventions are useful opportunities to practice these skills. Students with a wide range of social skills can develop these skills concurrently with self-determination. Self-determination relies upon a social context for its development, therefore, practitioners can incorporate social skills exercises, activities, and strategies into self-determination interventions. For example, students can partner with one another or work in groups to practice skills such as decision-making. Practitioners can embed self-determination in existing social skills interventions. Wong and colleagues (2014) identified a few evidence-based practices focused on social skills within their systematic review of evidence-based practices for individuals with ASD including social skill training, social narratives, and peer-mediated instruction and intervention. Practitioners can create multiple social narratives for youth with ASD to follow along with during the course of asking for help, clarifying information, and navigating situations where they may need to practice self-determination.

Adaptive behavior. Youth with ASD have difficulty generalizing skills across settings (Hume, Boyd, Hamm, & Kucharczyk, 2014). Self-determination interventions are most frequently situated in classroom settings with the goal to practice self-determination in the IEP or transition planning. However, little is transferred or generalized beyond this point for students until the next meeting. Practitioners should plan additional opportunities to practice self-determination, including problem-solving. Problem-solving a self-determination process which includes identifying and defining the problem, activity or task for which a solution is not readily apparent (Wehmeyer, Shogren, & Zager, 2010). There are a number of steps to conduct problem-solving, including identification of possible solutions with the lasting impact, indicating a decision of a preferred solution, followed by evaluation of the decision. Youth with ASD may

find the skills associated with problem-solving a challenge, especially when problems are based in social experiences and there are changing contexts and variables. Practitioners and families alike can collaborate in identifying, planning, and implementing ways to incorporate problem-solving into issues that arise at school and home. Practice in problem-solving across these contexts will aid in generalizing self-determination while simultaneously promote adaptive behavior. For example, problem-solving about an issue with peers and friends (e.g., how to find and spend time with friends) can be supported at school and home. Problem-solving on social issues also includes opportunities to practice social skills.

Family factors. Additionally, there are a few family factors for researchers, practitioners, and parents and families to consider. While this research study only provides support for family factors as predictors of self-determination, it is the only study to date that has investigated the influence of these factors as predictors of self-determination in youth with ASD. Practitioners are encouraged to consider self-determination interventions and collaborate with families as self-determination interventions increase self-determination skills in youth with ASD. Currently, there is limited research focused on parents and families during transition and adulthood. The majority of extant research centers on negative experiences related to caregiver stress (Shattuck et al., 2007; Smith, Maenner, & Seltzer, 2012; Taylor & Seltzer, 2010), financial burden (Kogan et al., 2008; Parish et al., 2012), and concerns surrounding adult services (Lawrence, Alleckson, & Bjorklund, 2010). Therefore, there is a need to shift focus toward parent and family behaviors and skills that promote self-determination and positive post-school outcomes for individuals with ASD. Families should be educated about factors that may promote self-determination and those that may inhibit self-determination in order to mitigate those effects. Practitioners and parents

should work together to navigate expectations and related malleable factors. Household income, parent perspective of their child's self-determination, and family empowerment are discussed.

Household income. As a non-malleable family factor, household income is a factor that practitioners can tailor self-determination interventions. There are a number of ways to tailor interventions in regard to household income. It is necessary for practitioners to consider the financial needs of students and parents and families for interventions. Families in low income households experience challenges in regard to family involvement (Park, Turnbull, & Turnbull, 2002). Practitioners will need to be reflect and challenge their own beliefs about low income families, connect with parents including asking for feedback, and provide opportunities for parents and families to get involved at the school. IEP and transition planning meetings are often the only time practitioners spend face-to-face time with parents and families, therefore, these are opportunities to check in with families. Practitioners can assess parents' level of knowledge, attitude, and opportunities for self-determination in the home as well as share educational resources and information about how they are supporting self-determination at school.

Parent perspective of their child's self-determination. Self-determination interventions benefit from including ways to incorporate parent perspective of their child's self-determination. Parents may be unfamiliar with self-determination and ways to embed opportunities in the home and support opportunities at school and in the community. This study found that parents on average perceive more opportunities to practice self-determination at school and home and less capacity in their child. Parents may perceive more opportunities than understand their child's capacity for self-determination. This knowledge in turn, will have a lasting influence on their child's future opportunities. Self-determination represents a range of activities from the day-to-day to outwardly seeking services and accommodations. Practitioners can work with parents and

families to start small (e.g., choice-making) and work incrementally towards more opportunities to practice self-determination in the home. Collaborating with parents and families is another way to educate and inform parents' perspectives about their child's self-determination and raise expectations about what their child can do. Parents may not know the extent of self-determination opportunities they can create and provide in the home, which is also influential of their perceptions of their child with ASD's self-determination.

Family empowerment. Lastly, family empowerment can be targeted in self-determination interventions. For the purposes of practice, family empowerment could be conceptualized as the parent and family version of self-determination. For self-determination interventions in the school setting, educators could collaborate with parents in delivering self-determination interventions. The curricula can outline self-determination activities to complete in the community ranging from applying for vocational rehabilitation services, learning the bus schedule and taking the bus to places of interest nearby, and making decisions about meals.

Community professionals can adapt and apply self-determination interventions specifically with parents and families. Family empowerment and self-determination are skills that could be concurrently targeted in interventions in the home and community. Parents, families, and their child with ASD can work together to focus on these skills. Parents and families who model family empowerment with their child with ASD may see a lasting impression. Modeling is an evidence-based practice for youth with ASD (Wong et al., 2015) and there are specific strategies to ensure modeling promotes the acquisition and generalization of self-determination.

Self-determination theory. From a theoretical stance, this research contributes to the literature surrounding functional theory of self-determination and social-ecological model of

self-determination. From a functional theory perspective, these research findings show malleable personal factors such as social skills and adaptive behavior contribute to how an individual interacts with their environment and vice versa through the influence of parent perspective of child's self-determination and family empowerment. Thus, these factors are necessary to the development of self-determination. Recently Shogren and colleagues (2015) introduced causal agency theory, which expands the functional theory of self-determination beyond the bidirectional relationship between the individual and their environment. Causal agency theory focuses on the need for self-determination interventions and assessments, developing and enhancing supports, and instruction on goal setting and attainment strategies. Results from this research study are also supported and described by causal agency theory. The results of this research study provide a basis for researchers and practitioners in developing and selecting an intervention, strategy, or practice and how they can impact self-determination. From a social-ecological viewpoint, the results suggest understanding family factors as a whole can influence personal factors and self-determination. Therefore, these factors help determine how to include parents and families in the development of their child's self-determination, as described by the social-ecological model.

Models of self-determination intervention. From a practical perspective, there are several direct implications for practitioners. This research study considers a wide range of practitioners to be implicated, from educators to adult service coordinators. The results suggest that many variables influence self-determination. Many family factors play a role in how youth with ASD perform self-determination. Models of intervention have been developed for teachers (Self-Determined Learning Model of Instruction [SDLMI], Mithaug et al., 1998; Wehmeyer et al., 2000), and most recently for supports within supported or customized employment (Self-

Determined Career Development Model [SDCDM]; Shogren et al., 2017; Wehmeyer et al, 2003; Wehmeyer et al., 2000). These models apply opportunities for instruction individuals with disabilities to practice self-regulation, goal setting, action planning, goal attainment, and promote self-determination. Based on the results of this study, similar models of intervention are warranted for the home setting with parents and families at the helm. Additionally, knowledge about personal factors can inform practitioners on how to adapt strategies, practices, and intervention design to align with non-malleable factors to help increase self-determination. This is a necessity for youth with ASD, as they will benefit from individualized supports that improve their self-determination and better equip them for adulthood. Understanding these research findings and implications places value on the personal and family factors related to self-determination and postsecondary outcomes. Next, the limitations of this research study are presented.

Along with additional characteristics and factors to be observed within the home, ways to extend opportunities to practice self-determination need to be explored. For example, practicing self-determination in school is still an avenue to generalize this skill. Martin and colleagues (2006) found that students with disabilities who received self-determination instruction have low levels of engagement or disengaged during their IEP meetings. But given preparation, students can be active participants during these meetings. Specifically, past research indicated preparation and opportunities to generalize self-determination lead to active participation in IEP meetings (Test et al., 2004) and positive outcomes (Arndt Konrad, & Test, 2006; Kelley, Bartholomew, & Test, 2011; Rehfeldt, Clark, & Lee, 2012; Wehmeyer, Garner, Yeager, Lawrence, & Davis, 2006; Woods, Sylvester, & Martin, 2010). Therefore, more research is needed that explores opportunities for youth with ASD to practice self-determination across settings. Additionally,

students with ASD have more difficulty generalizing self-determination skills (Fullerton & Coyne, 1999), and will need more support and instruction for transition planning and IEP meetings as well as practice self-determination in additional settings.

Conclusion

This study contributed to our knowledge about self-determination in adolescents with autism spectrum disorder. In particular, more is known about the influence of personal and family factors on self-determination. Our understanding has expanded in terms of what can contribute to levels of self-determination in adolescents with ASD. There more salient factors than others, but all have importance and value in relation to self-determination. In the future, we can develop self-determination interventions to link with development of social skills, adaptive behavior, parent perception of their child's self-determination, and family empowerment.

Although self-determination is not explicitly mandated by IDEA, it is too critical a skill not to overlook. Being taught self-determination skills and becoming more involved in the home setting in addition to school will help youth with ASD more accurately identify needs, strengths, preferences, and interests regarding employment, education, and adult living options in the future. Finally, teaching youth on the autism spectrum how to become more self-determined prepares them for the skills they will be using for a lifetime. It involves equipping students with the skills, knowledge, and attitudes they need to make personal life decisions and exert more control over their lives.

APPENDIX A: CSESA DEMOGRAPHIC FORM

CSESA
The Center on Secondary Education for Students with Autism

PLACE ID HERE

Child and Family Demographic Form

Child Demographic Information

1) Child's first and last name: _____

2) Child's date of birth: __ __ / __ __ / __ __ __ __
(Month) (Day) (Year)

3) Child's current chronological age: _____ years old

4) Child's current grade in school. *Choose one answer.*

☐(9)	9th grade
☐(10)	10th grade
☐(11)	11th grade
☐(12)	12th grade
☐(13)	Other ***Specify:*** _____

5) Select your child's gender. *Choose one answer.*

☐	Male
☐	Female

6) Select your child's ethnicity. *Choose one answer.*

☐	Non-Hispanic or Non-Latino
☐	Hispanic or Latino

7) Select your child's race. *Choose one answer.*

☐	American Indian/Alaskan Native
☐	Asian
☐	Black or African-American
☐	Native Hawaiian or other Pacific Islander
☐	White
☐	Multi/Biracial ***Specify:*** _____
☐	Other ***Specify:*** _____

Page **1** of **5**

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Child Diagnoses

8) Select your child's current diagnoses. *Check all that apply.*

☐(1)	Anxiety disorder
☐(2)	Asperger's syndrome
☐(3)	Attention deficit disorder/hyperactivity (ADD/ADHD)
☐(4)	Autism
☐(5)	Bipolar disorder (manic-depression)
☐(6)	Cerebral palsy
☐(7)	Childhood disintegrative disorder
☐(8)	Depression
☐(9)	Fragile X syndrome
☐(10)	Intellectual disability (also referred to as cognitive disability or mental retardation)
☐(11)	Learning disability
☐(12)	Obsessive-compulsive disorder
☐(13)	Oppositional defiant disorder
☐(14)	Pervasive developmental disorder (PDD-NOS)
☐(15)	Rett syndrome
☐(16)	Schizophrenia
☐(17)	Selective or elective mutism
☐(18)	Tourette syndrome
☐(19)	Tuberous sclerosis
☐(20)	Other ***Specify:*** _____

9) Write the age (in years and months) at which your child was first diagnosed with an autism spectrum disorder (autism OR Asperger's syndrome OR PDD-NOS). *If your child has received more than one of these diagnoses, please write the earliest age of diagnosis.*

Age of diagnosis with ASD	____ years, ____ months of age

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10) Select the professional who first diagnosed your child with an autism spectrum disorder (autism OR Asperger's syndrome OR PDD-NOS).*Select one.*

☐(1)	Developmental Pediatrician
☐(2)	Neurologist
☐(3)	Pediatrician
☐(4)	Psychiatrist
☐(5)	Psychologist at clinic
☐(6)	Psychologist at school
☐(7)	Clinic-based assessment team
☐(8)	School-based assessment team
☐(9)	Other ***Specify:*** _____
☐ (10)	Unknown

Home or Community-Based Services

11) Indicate the services and supports that your child is currently receiving ***outside of school*** (at home, in a clinic, or out in the community). *Select 'no' or 'yes' for each of the services. If you select 'yes', indicate the number of minutes per month of service that your child currently receives.*

	Type of service/support	No	Yes	Minutes per month
11.1	Speech/language	☐	☐	_____ minutes/month
11.2	Occupational therapy	☐	☐	_____ minutes/month
11.3	Physical therapy	☐	☐	_____ minutes/month
11.4	Counseling	☐	☐	_____ minutes/month
11.5	Social Skills Group	☐	☐	_____ minutes/month
11.6	Vocational Rehabilitation	☐	☐	_____ minutes/month
11.7	Other ***Specify:*** _____	☐	☐	_____ minutes/month

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Parent/Caregiver Demographic Information

Fill out both columns for your child's two primary caregivers. *Select one answer for each question.*

Caregiver 1 (CG1)

12.1 Relationship to child:

☐	Father
☐	Mother
☐	Other ***Specify:*** _____

13.1 CG1's Ethnicity (*Select one*)

☐	Non-Hispanic or Non-Latino
☐	Hispanic or Latino

14.1 CG1's Race (*Select one*)

☐	American Indian/Alaskan Native
☐	Asian
☐	Black or African-American
☐	Native Hawaiian or other Pacific Islander
☐	White
☐	Multi/Biracial ***Specify:*** _____
☐	Other ***Specify:*** _____

15.1 CG1's Highest level of education completed (*Select one*)

☐	5th grade or lower
☐	6th to 8th grade
☐	Partial High School
☐	High School Graduate *or* GED
☐	Associate degree *or* Technical Training *or* Partial College
☐	Bachelor's degree
☐	Master's *or* Doctorate *or* other professional degree

Caregiver 2 (CG2)

12.2 Relationship to child:

☐	Father
☐	Mother
☐	Other ***Specify:*** _____

13.2 CG2's Ethnicity (*Select one*)

☐	Non-Hispanic or Non-Latino
☐	Hispanic or Latino

14.2 CG2's Race (*Select one*)

☐	American Indian/Alaskan Native
☐	Asian
☐	Black or African-American
☐	Native Hawaiian or other Pacific Islander
☐	White
☐	Multi/Biracial ***Specify:*** _____
☐	Other ***Specify:*** _____

15.2 CG2's Highest level of education completed (*Select one*)

☐	5th grade or lower
☐	6th to 8th grade
☐	Partial High School
☐	High School Graduate *or* GED
☐	Associate degree *or* Technical Training *or* Partial College
☐	Bachelor's degree
☐	Master's *or* Doctorate *or* other professional degree

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16) Select the category that matches your household's pre-tax income in 2013.

☐	< $20,000
☐	$20,000-$39,999
☐	$40,000-$59,999
☐	$60,000-$79,999
☐	$80,000-$99,999
☐	> $99,999

This is the end of the questionnaire. Please look it over for questions you may have skipped and complete those as well.

Thank you for completing this form!

APPENDIX B: NCES NEIGHBORHOOD LOCALE FRAMEWORK

Classification	Criteria
City-Large	Territory inside an Urbanized Area and inside a Principal City with population of 250,000 or more.
City-Midsize	Territory inside an Urbanized Area and inside a Principal City with population less than 250,000 and greater than or equal to 100,000.
City-Small	Territory inside an Urbanized Area and inside a Principal City with population less than 100,000.
Suburban-Large	Territory outside a Principal City and inside an Urbanized Area with population of 250,000 or more.
Suburban-Midsize	Territory outside a Principal City and inside an Urbanized Area with population less than 250,000 and greater than or equal to 100,000.
Suburban-Small	Territory outside a Principal City and inside an Urbanized Area with population less than 100,000.
Town-Fringe	Territory inside an Urban Cluster that is less than or equal to 10 miles from an Urbanized Area.
Town-Distant	Territory inside an Urban Cluster that is more than 35 miles from an Urbanized Area.
Town-Remote	Territory inside an Urbanized Cluster that is more than 35 miles from an Urbanized Area.
Rural-Fringe	Census-defined rural territory that is less than or equal to 5 miles from an Urbanized Area as well as rural territory that is less than or equal to 2.5 miles from an Urban Cluster.
Rural-Distant	Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an Urbanized Area, as well as rural territorial that is more than 2.5 miles but less than or equal to 10 miles from an Urban Cluster.
Rural-Remote	Census-defined rural territory that is more than 25 miles from an Urbanized Area and also more than 10 miles from an Urban Cluster.

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