Employment Status and Choice-Making in Adults with Intellectual Disability with and without Autism Spectrum Disorder or Down Syndrome

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

Kelsey Lynn Bush

Graduate Program in Psychology

The Ohio State University

2015

Master's Examination Committee:

Marc J. Tassé, Ph.D., Advisor

Luc Lecavalier, Ph.D.

Susan Havercamp, Ph.D.
Abstract

This study provides an in-depth look at the current state of employment for adults with intellectual disability (ID) with or without autism spectrum disorder (ASD) or Down syndrome (DS), and each groups’ choice-making abilities as it pertains to short-term choices (i.e., choosing their daily schedule, choosing what to do in their free time, choosing what to do with their spending money), and long-term choices (i.e., choosing where they live, choosing their roommate, and choosing their service coordinator). This study conducted secondary data analyses using the National Core Indicator’s Adult Consumer Survey datasets from years 2011-2012 and 2012-2013 on three populations of interest, adults with ASD and ID, adults with DS and ID, and adults with ID and no ASD or DS, to address the following research questions: Do age, ID severity level, behavior problems and/or number of mental health conditions for taking medication predict employment status in individuals with an ASD, DS, or other groups of ID? Do individuals with an ASD differ from those with DS or other groups of ID in their employment status when controlling for those variables that showed high correlations from the previous research question? Do individuals with an ASD differ from those with DS or other ID in regards to the extent to which they are involved in making short-term choices and long-term choices? Does the extent to which individuals make short-term and long-term choices correlate with employment status in people with an ASD, DS, or other ID? Of the individuals with jobs, does having been involved in the decision of where you
work relate to employment status in individuals with ASD, DS or ID? Exploratory and confirmatory factor analyses were used to derive the latent variables of short-term and long-term choices from the choice making section of the Adult Consumer Survey. Median analyses were used to indicate group differences in demographic variables, as well as employment status and choice making, while correlations and regressions were used to determine factors related to employment status and choice making.

Results indicated that each study group has different levels of employment, different factors associated with successful employment, and varying levels of choice making. As a group, adults with DS had the highest rates of paid community jobs, followed by adults with ID, and then adults with ASD. As a group, adults with ID made the most long-term and short-term choices, followed by adults with DS, and then adults with ASD. In regression analyses, short-term choices and ID severity level were significantly associated to level of employment for adults with ASD and DS. Choice-making as it relates to employment is discussed, along with overall trends in employment rates for individuals with developmental disabilities.
Acknowledgements

I would first like to express my utmost appreciation to my advisor, Dr. Marc J. Tassé, for his continuous support and encouragement of my master’s project and graduate career. I would additionally like to thank my thesis committee members Dr. Luc Lecavalier and Dr. Susan Havercamp for their advice and insightful comments. I am especially grateful to Dr. Robert Cudeck for his unremitting statistical guidance on all things factor analysis and overall encouragement. I would like to thank Rebecca Andridge for her statistical help and advice. This work would not have been possible without the generosity of NASDDS/HSRI for granting me access to their National Core Indicators Adult Consumer Survey dataset. I would like to thank my parents for their ceaseless love and support throughout my life, and instilling the belief in me that I can accomplish anything. I would like to thank my brother, Benjamin, for being my role model. Lastly, I would like to thank all of my wonderful friends, family, professors and teachers who have gotten me to this point in my career.
Vita

May 2009 .................................................. Brebeuf Jesuit Preparatory School

2013 .......................................................... B.S. Cognitive Studies, and Human and Organizational Development, Vanderbilt University

2013-2014 .................................................... University Fellowship, The Ohio State University

2014 to present ............................................ Graduate Teaching Associate, Department of Psychology, The Ohio State University

Fields of Study

Major Field: Psychology
# Table of Contents

Abstract ......................................................................................................................... ii  

Acknowledgements ........................................................................................................ iv  

Vita ................................................................................................................................. v  

List of Tables .................................................................................................................. x  

List of Figures ................................................................................................................. xi  

Chapter 1: Introduction ..................................................................................................... 1  
  Choice Making as a Factor of Self-Determination ......................................................... 2  
  Importance of Employment ............................................................................................. 4  
  Employment Policy ........................................................................................................ 5  
  Predictive Factors for Employment ................................................................................. 6  
  Summary ......................................................................................................................... 9  
  Aims ............................................................................................................................... 9  

Chapter 2: Methods ........................................................................................................ 11  
  Data Source .................................................................................................................. 11  
  Sample .......................................................................................................................... 12
Analyses on Job Statistics.................................................................29

Ordinal Logistic Regression for the Three Research Groups................31

Ordinal Logistic Regression on Total Study Sample..........................33

Confirmatory Factor Analysis ..........................................................34

Analyses on Short-Term and Long-Term Choices..............................35

Correlations between Long-term Choices, Short-Term Choices, and Job Status....37

Ordinal Logistic Regression with Short-term and Long-term Choices Variables....37

Correlation between Length of Employment and Choosing Your Job........41

Chapter 4: Discussion........................................................................42

Group Comparisons .........................................................................42

Predictors of Employment .................................................................46

Choice-Making ................................................................................48

Job Choice and Employment Length..................................................51

Limitations .......................................................................................51

Conclusions and Future Directions....................................................52

References .......................................................................................54

Appendix A: NCI Adult Consumer Survey Questions..........................60

Appendix B: Table of Factor Loadings for EFA.....................................66

Appendix C: Correlations between Variables in CFA...........................67
Appendix: D: Frequency Distributions of New Variables Long-Term Choices and Short-Term Choices.................................................................................................................................68

Appendix E: CFA Structure and Regression Weights .................................................................70
List of Tables

Table 1: Descriptive Statistics ........................................................................................................24
Table 2: Age Statistics by Disability Group .....................................................................................27
Table 3: Statistics on Job Status ......................................................................................................31
Table 4: Factor Score Weights for the 6 Variables in CFA .............................................................34
Table 5: Descriptive Statistics for Factor Score Weights Applied to Complete Cases.........34
Table 6: EFA Factor Loading Scores ...............................................................................................66
Table 7: Correlation Matrices between Short-Term Choices, Long-Term Choices, and Job Status across Disability Groups ................................................................................67
Table 8: CFA Standardized Regression Weights ..........................................................................71
List of Figures

Figure 1: Number of Mental Health Conditions for taking Medications by Disability Group .......................................................................................................................................................................................... 25

Figure 2: Percent of Individuals in each ID Severity Level by Disability Group .......... 26

Figure 3: Percent of Individuals in Paid Community Employment in each Age Class by Disability Group .......................................................................................................................................................................................................................................................... 28

Figure 4: Percent of Individuals in Paid Facility Work in each Age Class by Disability Group .......................................................................................................................................................................................................................................................... 28

Figure 5: Percent of Individuals at Each Level of Employment by Disability Group ...... 29

Figure 6: Frequency Distribution of Long-Term Choices ........................................ 68

Figure 7: Frequency Distribution of Short-Term Choices ........................................ 69

Figure 8: CFA Structure with Two Latent Variables and Standardized Regression Weights .......................................................................................................................................................................................................................................................... 70
Chapter 1: Introduction

When Kanner first described “autistic disturbances of affective contact,” in 1943, it was considered a rare disorder (Kanner, 1943). Today, the Center for Disease Control and Prevention (CDC) estimates that 1 in 68 children have an autism spectrum disorder (ASD; CDC, 2014). This represents a thirtyfold increase since the first autism prevalence rates were reported in the early 1970s (CDC, 2014). A plethora of literature is available regarding social functioning, language abilities, social skills, treatments, etc. for children with ASD, but research on outcomes in adults with ASD is scarce in comparison. With this increased prevalence, and because ASD is a life-long condition, it is essential to understand the needs of adults with ASD to prepare the current adult service systems to adequately support this group.

In addition to the aging population of individuals with autism, individuals with Down syndrome (DS) are living longer than they ever have before. In the 1930s and 1940s, the life expectancy for this population was only 10 to 15 years (Penrose 1949). Many individuals born with DS didn’t even live to see their first birthday. The most common causes of death for these individuals were respiratory illness and congenital heart disease (Thase, 1982). Today, medical advances have aided in individuals with DS experiencing an average life expectancy of 60 years (Baird & Sadovnick, 1988, Yang, Rasmussen, & Friedman, 2002). A system of services needs to be able to accommodate the adult-aged needs for individuals with DS. These two populations, individuals with ASD and DS, are two specific groups of individuals with disabilities that will be analyzed
in this paper in terms of employment and choice making. A third population, individuals with idiopathic Intellectual Disability (ID) will be examined as a control group.

Choice Making as a Factor of Self-Determination

It is a common understanding that adults should have control over their own lives. Individuals with disabilities, however, often do not make some of the elemental decisions in their lives that the typically developing population takes for granted, like where to eat for lunch, when to wake up on Saturday morning, or what type of occupation to pursue. Wehmeyer (1997) outlined a framework of self-determination as it relates to the lives of those with disabilities. In his framework, Wehmeyer describes ‘essential characteristics’ of a person that contribute to the extent to which they are self-determined; they include 1) autonomous functioning, 2) self-regulation, 3) psychological empowerment, and 4) self-realization. All of these elements can be impacted by a number of things, most notably, age, opportunity, capacity, and circumstances (Wehmeyer, 1997). While choice making is not an essential characteristic of self-determination, it is a critical component to being able to carry out self-determined acts. Parents, teachers, and individuals with disabilities all see the importance for increased opportunity and skills in making choices (Agran, Krupp & Storey, 2010, Carter et al., 2013, Carter et al., 2009)

Choice-making, for this reason, has been a target area for skill building in the education system and for interventions to decrease problem behavior or increase quality for life for children with disabilities (Cannella et al., 2005, Powers et al., 2012, Shogren et al., 2015). The literature suggests that ID severity level is a predictor of self-determination, with increased cognitive abilities leading to increased self-determination (Neely-Barnes et al., 2008, Stancliffe, 2001, Stancliffe & Abery, 1997, Shogren, 2013,
Wehmeyer & Garner, 2003, Wehmeyer, Kelchner & Richards, 1995). Living arrangement has also been shown to be associated with self-determination. Individuals that live in more individualized, community-based settings show greater self-determination (Stancliffe, 2001, Wehmeyer & Bolding, 2001, Wehmeyer & Bolding, 1999, Wehmeyer, Kelchner & Richards, 1995). As such, it makes sense that individuals with disabilities living in the community have more opportunities to make choices than individuals with disabilities living in institutions (Stancliffe & Abery, 1997).

Choice-making has not only been analyzed as an outcome of interest, but has also been analyzed in regards to its predictive validity for other adult outcomes, such as employment, independent living, and financial independence. Wehmeyer and Palmer (2003) compared two groups of children who scored either high or low on the Arc’s Self-Determination Scale (SDS) upon high school graduation. They found that increased self-determination led to better rates of employment, increased access to health benefits, financial independence and independent living (Wehmeyer & Palmer, 2003).

Powers and colleagues (2012) implemented a 12-month self-determination intervention in 29 high school students. They found that the intervention increased scores on the Arc’s SDS and lead to positive outcomes after high school, including increased rates of employment and independent living when compared to controls (Powers et al., 2012). More recently, Shogren and colleagues have reported on a longitudinal randomized self-determination intervention study on 779 high school students to track the effects of multiple self-determination interventions into adulthood. Shogren and colleagues found that self-determination status on the Arc’s SDS upon high-school graduation was associated with increased rates of employment and community access one
year after graduation (Shogren et al., 2015). Adult outcomes and choice-making are intertwined constructs, as analysis of adult outcomes can only truly be assessed based on aspects of the individual’s life that he or she deems important.

Importance of Employment

The purpose of Individuals with Disabilities Education Act (IDEA) is to serve children with disabilities up to the age of 21 in order to, “prepare them for further education, employment and independent living” (emphasis added) (Individual with Disabilities Education Act, 2004). While the ultimate outcome of a free, appropriate, public education may be employment, the rates of employment for those with ASD are reported between 10% - 56% (Barnard et al., 2001, Chiang et al., 2013, Eaves & Ho, 2008, Holwerda et al., 2013, Holwerda et al., 2012, Howlin, 2000, Howlin et al., 2004, Howlin et al., 2013, Levy & Perry, 2011, Shattuck et al., 2012, Taylor & Seltzer, 2011). The national rate of integrated community employment among all adults with disabilities during the fiscal year of 2009 was just 20.3 percent (Butterworth et al., 2011). The Bureau of Labor Statistics reported that as of July 2015, the participation rate (those working or actively seeking employment) of non-disabled workers was 69.0%, whereas the participation rate of disabled workers\(^1\) was only 19.8% (Bureau of Labor Statistics, 2015). What is most shocking about these employment statistics is that they do not reflect the trend of increasing community employment that was reported during the mid-80s and 90s. Rates of community employment have halted, while rates of facility-based work and

\(^1\) According to the Bureau of Labor Statistics, “A person with a disability has at least one of the following conditions: is deaf or has serious difficulty hearing; is blind or has serious difficulty seeing even when wearing glasses; has serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition; has serious difficulty walking or climbing stairs; has difficulty dressing or bathing; or has difficulty doing errands alone such as visiting a doctor's office or shopping because of a physical, mental, or emotional condition” (Bureau of Labor Statistics, 2015).
community, non-work settings have gone up (Butterworth et al., 2011). This finding may reflect, in part, the fact that workers with disabilities were affected more severely than workers without disabilities during the most recent economic recession (Butterworth et al., 2011).

Employment is an important issue on the individual and societal levels. Employment improves quality of life in individuals with disabilities (Eggleton et al., 1999, Garcia-Villamisar, Wehman, & Navarro, 2009, Persson, 2000), and with income, people can make more of their own decisions and move towards gaining independence. There exist inherent barriers to employment for people with ASD, however. Communication and social deficits that are characteristic of the disorder hinder successful employment (Hendricks, 2010, Howlin et al., 2013, Hurlbutt & Chalmers, 2004, Muller et al., 2003, Wehman et al., 2014, Whitehouse et al., 2009).

Employment Policy

In the past decade, policy has started to reflect this growing need for improved employment outcomes for individuals with IDD. Employment First policies have found their way into 32 states, with many more states taking action to adopt this position (Nord & Hoff, 2014). Employment First policies signify a state’s commitment to basic notions about individuals with IDD in regard to employment; that 1) individuals with IDD are able to perform work in integrated settings, 2) employment services and supports should be considered a priority over other day activities, and 3) that individuals with IDD should be paid at least minimum wage (Employment First, n.d.).
In 2011, the Center for Medicare and Medicaid Services clarified that Home and Community-Based Services (HCBS) waivers prefer individual integrated employment\(^2\) as an outcome. In addition, the Workforce Innovation and Opportunities Act (WIOA) of 2014 provides a vision for one-stop delivery system where adults with IDD will be provided with supports and services with the primary goal of individual integrated employment. This vision requires the collaboration of the Office of Career, Technical, and Adult Education, the Office of Special Education and Rehabilitative Services, and the Departments of Labor and Health and Human Services. Federal, state, and local efforts will all be essential in this transformation of the public workforce system. Provisions started going into effect July 2015.

**Predictive Factors for Employment**

Considering employment rates are low among all adults with disabilities, and that they face many barriers in gaining and securing work, it is important to look at what factors might predict successful employment. The literature on adult outcomes in ASD is small, and of that literature, employment is rarely used as a unique outcome measure, or the population focuses on higher-functioning individuals. Of those studies that looked at employment and factors that may predict work participation, IQ is consistently analyzed. Other studies have considered factors such as social skills, presence of a secondary disability, mental health, behavior problems, years of education, empowerment, intensity of support needs, and work expectations (Esbensen et al., 2013, Holwerda et al., 2013, Lawer et al., 2009, Martorell et al., 2008, Schaller & Yang, 2005, Wehman et al., 2014).

\(^2\)“Integrated employment: Integrated employment services are provided in a community setting and involve paid employment of the participant. Specifically, integrated employment includes competitive employment, individual supported employment, group supported employment, and self-employment supports” (Butterworth et al., 2011).
Holwerda and colleagues (2012) completed a systematic review of longitudinal studies that reported on factors predicting work participation for individuals with ASD (excluding intervention studies). Their literature search revealed 18 journal articles matching their inclusion criteria; 1) cohort, follow-up or longitudinal studies, 2) individuals with ASD between ages of 18-64, and 3) dependent variable is employment or an outcome measure that includes work. Of the 17 total factors identified throughout the studies, IQ was the only consistent significant finding. Holwerda and colleagues mention, however, that while IQs of <50 most always lead to poor outcomes, having an IQ of >70 does not always lead to having good outcomes (Holwerda et al., 2012). In addition, the variability of outcomes in adults with ASD who do not have an ID is so expansive that, “the clinical value of IQ in predicting individual outcomes is limited” (Holwerda et al., 2012). Other factors that were explored and had association with adult outcomes were autism severity, comorbid psychiatric disorders, gender, language abilities, maladaptive behavior, social skills, lack of drive, familial support, and living setting (Holwerda et al., 2012).

Since 2012, this author has identified two more articles that meet inclusion criteria set out by Holwerda and colleagues in 2012. These two articles (Chiang et al., 2013 and Howlin, et al., 2013) support the hypothesis that increased IQ is related to increased adult outcomes. Chiang and colleagues (2013) followed children with ASD leaving high school, and found that presence of ID, vocational skills training, high school graduation, parental income and education, and social skills all predicted employment after high school. Howlin and colleagues (2013) followed a cohort of 60 children with ASD into their late adulthood and found that childhood autism symptom severity,
childhood IQ and childhood language level all significantly predicted adult outcomes; of which, employment was a factor (Howlin et al., 2013).

Many of the identified factors relate to characteristics of ASDs, including language level, social skills, and comorbid psychiatric disorders. Adults with ASD may have a harder time gaining and maintaining employment than other adults with IDD because of barriers inherent to their diagnosis. Holwerda and colleagues comment that, “characteristics typical for ASD are factors which may, separately or combined, hinder individuals with ASD to participate in work in a sustainable way” (Holwerda et al., 2012). Characteristics Holwerda and colleagues are referring to include intensity of ASD symptoms, mental illness, language abilities, behavior problems, and social impairments (Holwerda et al., 2012). Tasks and requirements of employment, like traveling to conferences or working in groups, may be harder for individuals with ASD due to deficits in social communication or the presence of restricted and repetitive behaviors or interests. While these do pose threats to employment, many characteristics of ASD are also viewed by employers as beneficial, such as focus and attention to detail.

In addition to the ASD population experiencing lower rates of employment, there is evidence that this is a common experience among other disability groups (Cimera & Cowan, 2009, Holwerda, 2013, Kumin & Schoenbrodt, 2015, Lawer et al., 2009, Shattuck et al., 2012, Whitehouse et al., 2009). Esbensen and colleagues (2009) looked at predictive factors of overall outcomes for adults with ASD compared to adults with DS and found that the two groups differed on predictive factors. Both groups’ outcomes were predicted by functional abilities, but for those with DS, better adult outcomes were also associated with receipt of services, specifically speech/language, recreational, and
transportation services. For adults with ASD, however, receipt of services did not predict better outcomes, but lack of psychological services did predict outcomes.

Summary

Employment is an important goal for a majority of Americans, including those with IDD. The support systems have been increasingly trying to focus on consumer-led service delivery, which undoubtedly includes employment goals. Tailoring services to consumers could be informed by group differences that exist among disability groups. While rates of employment remain low among individuals with disabilities, it is important to analyze factors that may be associated with employment, in order to capitalize on those characteristics that can be targeted for intervention. Choice making is a popular skill to target when thinking about self-determination, but also may be intertwined with characteristics of people who are able to gain and maintain employment.

Aims

This research aims to study the differences among groups of people with an ASD, DS, and other etiologies of ID in regards of their employment status and the extent to which they make decision in their lives. The proposed research will answer the following research questions: Do age, ID severity level, behavior problems and/or use of psychotropic medications predict employment status in individuals with an ASD, DS, or other groups of ID? Do individuals with an ASD differ from those with DS or other groups of ID in their employment status when controlling for those variables that showed high correlations from the previous research question? Do individuals with an ASD differ from those with DS or other ID in regards to the extent to which they make short-term choices and long-term choices? Does the extent to which individuals make short-term and
long-term choices correlate with employment status in people with an ASD, DS, or other ID? Of the individuals with jobs, does making decisions about where you work relate to employment status in individuals with ASD, DS or ID?
Chapter 2: Methods

Data Source

The Human Services Research Institute (HSRI) and the National Association of State Directors of Developmental Disabilities Services (NASDDDS) created the National Core Indicator’s (NCI) Adult Consumer Survey as a system-wide quality assurance and outcome analysis measure for several indicators, including employment, choices, rights, service planning, community inclusion, and health and safety. The project began in 1997 with 15 states collaborating to develop a tool that could be used to assess system wide performance on indicators that were measurable, relevant, and important to the individuals they were serving. This resulted in two measures, a face-to-face Adult Consumer Survey, and a mail out Adult-Family Survey. Seven states participated to pilot test these measures, and since then, these measures have been improved upon in regards to administration procedures and content of indicators.

In 2014, 38 states, 22 sub-state regions, and Washington D.C. participated in data collection. The NCI also has added measures to their toolkit, including the Family/Guardian Survey and the Children Family Survey. All state participation in the NCI is voluntary and states can choose to participate in a variety of the surveys offered by NCI. For the Adult Consumer Survey, states are asked to randomly sample at least 400 individuals receiving public state services. Data used for the current project were taken from NCI’s Adult Consumer Survey from years 2011-2012 and 2012-2013.
Sample

National Sample

The NCI Adult Consumer Survey datasets consists of a de-identified random sample of adults who receive support from the public developmental disabilities service system in a total of 26 states and one sub-state region. In 2011-2012, 19 states and 1 sub-state region participated in the Adult Consumer Survey; these include AL, AR, AZ, CT, GA, HI, IL, KY, LA, MA, ME, MI, MO, NC, NJ, NY, OH, PA, SC and the sub-state region of Mid East Ohio Regional Council. The 2011-2012 year consisted of 12,236 surveys. Average age for respondents was 43.3 years, and 56.3% were male. In regards to ID severity level, 35% had mild ID, 29% had moderate ID, 14% had severe ID, and 13% had profound ID. The remaining percent either had no ID (2.9%), or had an unknown level of ID (6%) (National Core Indicators, 2013).

In 2012-2013, 26 states participated in the Adult Consumer Survey; these states include AL, AR, CT, FL, GA, HI, IL, IN, KY, LA, MD, ME, MO, MS, NC, NH, NJ, NY, OH, OR, PA, SC, TX, UT, VA, and WI. The 2012-2013 year consisted of 13,157 surveys. The average age of respondents was 42.4 years, and 58% were male. In regards to ID severity level, 34% had mild ID, 28% had moderate ID, 14% had severe ID, and 11% had profound ID. The remaining percent either had no ID (6%) or had an unknown level of ID (8%) (National Core Indicators, 2014).

Study Sample

Participants for this study were selected from the national sample based on identification of ID, ASD, and/or DS diagnoses from the background section of the NCI (see Measure section for information on diagnoses verification). The total sample of
valid responses includes 21,048 individuals. All individuals were limited to those with an ID. Research groups will be individuals who identified having an ASD diagnosis without a diagnosis of DS (n=2,298, 10.9% of study sample), individuals who identified having a DS diagnosis without ASD (n=1,966, 9.3% of study sample), and individuals who identified having a diagnosis of ID without comorbid ASD or DS (n=16,784, 79.7% of study sample). For more demographics of the study samples and diagnostic groups, see Table 2.

Measure

NCI Adult Consumer Survey

The Adult Consumer Survey consists of three sections; Background Information, Section 1, and Section 2. The Background section can be completed through a review of agency records, computer systems references by the interviewer, or through an interview with the consumer’s case manager. Information regarding diagnosis is found in this section. Even though states vary on what type of documentation is required for eligibility, all states require some form of diagnosis verification in order for individuals to receive services through the state. As a result, diagnoses reported in the NCI are perceived to be valid. Additional information gathered in the background section includes basic demographic information, type of residence, health care information, support needs, etc.

Section 1 requires that the consumer be interviewed in person, as it contains subjective material known only to the respondent. This section contains questions related to attitudes and preferences for work, residence, safety, friends/family, and supports. For example, questions about home include: “Do you like where you live?,” “Would you like to live somewhere else?,” “Do you ever talk with your neighbors?,” etc. At the end of
Section I, the interviewer indicates if the section could be completed in its entirety and has the opportunity to indicate reasons why it could not be filled out. The interviewer is also asked to judge the respondent’s understanding of the questions asked of him or her during Section I. Finally, the interviewer indicates if he or she thinks the respondent’s answers were valid.

Section 2 contains questions that can be answered by the consumer or an individual who knows the consumer well. The indicators addressed in Section II regard community inclusion, choices, rights, and access to needed services. Examples of questions pertaining to choices can be found in Appendix A.

Interviewers are given consistent training to increase standardization of this measure across states. States can utilize a variety of sources for their interviewers, including university students or state personnel. State agencies go through a training process consisting of detailed review of the tool at the question-level, interviewing technique tips, and mock-interviews. Interviewers were also provided with standardized scripts, frequently asked questions, and interviewing tips.

**ASD Diagnosis**

Information about diagnosis of an autism spectrum disorder was gathered through a review of an individual’s records, interview with the individual’s case manager/service coordinator, and verified by the individual/family member completing the survey. Information about the measures used by clinicians to diagnose ASD is unknown, but to qualify for state services under developmental disabilities, a formal diagnosis is required.
DS Diagnosis

Information about diagnosis of Down syndrome was gathered through a review of an individual’s records, interview with the individual’s case manager/service coordinator, and verified by the individual/family member completing the survey.

ID Diagnosis

Information about diagnosis of an intellectual disability was gathered through a review of the individual’s records, interview with the individual’s case manager/service coordinator, and verified by the individual/family member completing the survey. Level of intellectual disability was recorded and noted as none, mild, moderate, severe, profound, unspecified, or unknown. Information regarding assessment tools used by the diagnosing clinician and resulting IQ and confidence intervals is unknown.

Variables

Please refer to Appendix A for a list of relevant NCI questions and response categories.

Employment Status

Employment status was measured through information gathered in the background section of the NCI. Questions relating to employment (BI-39 through BI-42), differentiate based on paid or unpaid work status, and if the work was based in the community or in a facility. These questions from the NCI will be re-coded into a new variable (i.e. Employment Status) so that it could be used as an ordinal variable in later analyses (2 = Paid job in community-based setting, 1 = Paid work performed in a facility-based setting, 0 = No job or work). This variable will serve as one of the main dependent variables.
Latent Variables Identified in Exploratory Factor Analysis

Preliminary work was done performing EFA on a random half of the study sample, including all three study groups, resulting in n=9,929. EFA was completed with maximum likelihood factor extraction, Oblimin rotation with Kaiser normalization, and listwise deletion of missing values. There were a total of eight questions in the ‘Choices’ portion of Section II that remained consistent across years of the datasets. One of the variables pertained to making a decision about where one works, and was set aside from EFA to be correlated with employment status in later analyses for research aim #5. Another variable asked about decisions pertaining to day programs, and was dropped for two reasons: first, individuals not in day programs did not answer this question and we wanted to include these individuals in the analyses, and second, the model fit increased when excluding this variable. The final six variables included in the EFA were 1) choosing where you live, 2) choosing the people you live with, 3) choosing your case manager, 4) deciding your daily schedule, 5) choosing how to spend your free time, and 6) choosing what to buy with your spending money. Appendix A includes the wording of these questions and their response options. The total sample of responses after listwise deletion of missing data resulted in n=5,682. The EFA with these six variables revealed two latent constructs ($\chi^2=14.746$, df=4, RMSEA=0.0217). The table of factor loadings for the six variables is included in Appendix B. The model was determined to have good fit based on RMSEA (root mean square of approximation) values using the criteria set out by Browne and Cudeck (1989). Brown and Cudeck propose that in regards to RMSEA, smaller numbers equate to better fit. An RMSEA value in the range of 0.00-0.05
represents close fit, values between 0.05-0.08 represents reasonable fit, and values above 0.10 represent poor fit (Brown & Cudeck, 1989).

Short-Term Choices

The first latent construct identified in EFA includes the variables 1) deciding your daily schedule, 2) choosing how to spend your free time, and 3) choosing what you buy with your spending money. All three of these variables relate to decisions that are made on a daily basis, thus the latent variable was named “short-term choices”.

Long-Term Choices

The second latent variable identified in EFA includes the variables 1) choosing where you live, 2) choosing whom you live with, and 3) choosing your case manager/service coordinator. The variables of this second latent construct reflect decisions that impact the individual across a longer time frame than the first latent construct identified. Thus, this latent variable was named “long-term choices”.

Age

Chronological age was gathered in the background section of the NCI. Age was identified as a variable to be explored in statistical analyses because it was known that the sample of individuals with ASD was younger than the group average (ASD group average age = 34.48, SD = 12.60; Total group average age = 43.33, SD = 14.99).

Intellectual Disability

Presence of an ID was asked in the NCI in the background section. Severity of ID was then coded as mild ID, moderate ID, severe ID, profound ID, or none. Level of ID will then be statistically fixed across variable groups (ASD, DS, and other ID) when looking at employment status and employment type.
Support Needs for Behavior Problems

Information regarding the intensity of support needs associated with the individual’s problem behavior was gathered from the background section of the NCI Consumer Survey (BI-54 through BI-56). Data were collected based on the type of behavior that needs support; (1) self-injurious behavior, (2) disruptive behavior, and (3) destructive behavior. The level of support needed for each type of behavior was then indicated on a scale of one to three; “1” = no support needed, “2” = support needed and “3” = extensive support needed.

Number of Mental Health Conditions for taking Medication

Information was collected about the number of mental health conditions that an individual takes medication for. These mental health conditions include mood disorders, anxiety, behavior problems, and psychotic disorders. This variable will be included as an indication of underlying psychopathology, which may contribute to a person’s ability to gain and maintain employment.

Length of Employment

Length of current employment was asked in the Background Section of the NCI. Responses were originally coded in months and years, and were recoded to total in months for purposes of statistical analysis.

Procedure

Research groups were drawn from individuals in the NCI Adult Consumer Survey datasets. All cases were limited to those individuals who had an ID. One research group consisted individuals with ASD and no DS. A second group consisted of individuals with DS and no ASD. A third research group included individuals with an ID and no ASD or
DS. Following approval from the Ohio State University IRB, the de-identified data were obtained from HSRI/NASDDDS. Data were additionally changed from date of birth to age at time of survey before data were delivered from HSRI/NASDDDS. In compliance with HSRI/NASDDDS policy, all data will be returned to NCI at study completion.

**Data Analyses**

SPSS Statistics Version 22 (IBM, 2013) was used for descriptive statistics, median analyses, regression analyses, and exploratory factor analyses (EFA). SPSS Amos, Version 22 (IBM, 2013), was used for confirmatory factor analyses (CFA).

**Missing Data and Outliers**

Cases without responses to participation status in either paid community job or paid facility work were eliminated. Knowing the employment status for individuals is imperative across all analyses to better understand the characteristics of individuals at each level of employment status (i.e. paid community job, paid facility work, or no job). 1104 cases did not have information about employment status and were eliminated from the sample. The total number of cases with complete information on participation in either paid community job or paid facility work is 19,944.

Independent samples t-test was run between the cases excluded because of missing information on job status and the study sample on demographic variables, including age, ID severity level, number of mental health conditions for taking medication, and behavior support needs. Cases eliminated on the basis of incomplete job status information were not statistically different than the study sample on any of the tested variables.
Cases that reported values above four standard deviations of the mean for ‘hours spent in paid community job over last two weeks’, ‘two week gross wage in paid community job’, ‘hourly wage at paid community job’, ‘hours spend in paid facility work over last two weeks’, ‘two week gross wage in paid facility work’, and ‘hourly wage at paid facility work’ were eliminated. It was not possible to distinguish true outliers from entry error since the current author did not collect the data. Four standard deviations was selected as a cutoff point due to the skewed values and high variability of the sample. 68 cases were above four standard deviations of the mean for these six variables and were eliminated from the study sample. The total number of cases below four standard deviations of the mean for these six variables is 19,876.

Independent samples t-test was run between the cases excluded for being over four standard deviations on any of the referenced variables and the study sample on demographic variables, including age, ID severity level, number of mental health conditions for taking medication, and behavior support needs. The cases excluded were significantly different from the study sample on level of ID severity, with the cases excluded being less cognitively impaired than the study sample, t(18,366)=5.192, p<.001.

Analyses between Disability Groups

Kruskal-Wallis tests were run to determine significant differences in age, level of ID, number of mental health conditions for taking medication, needed behavior support, short-term choices, and long-term choices. Additional pairwise comparisons with Bonferroni adjustment of p-values were utilized to further investigate differences between pairs of research groups to understand the nature of the significant differences.
across the three groups. A non-parametric test was chosen for these analyses due to a violation of the assumption of normal distribution for independent variables.

**Ordinal Logistic Regression**

Ordinal logistic regression analyses were run on each of the disability groups with independent variables of age, ID severity, behavior problems, and number of mental health conditions for taking medication. The ordinal dependent variable was employment status. These analyses uncovered demographic characteristics that contributed significantly to employment status, and revealed that disability groups differed in which variables were significantly associated with employment status. Wald chi-squared values and odds ratios are reported. Ordinal logistic regression requires that data possess proportional odds and be void of multicollinearity. Assumptions were independently tested on each of the three research groups. Analysis of separate binomial logistic regressions for each disability group revealed similar odds, therefore it was concluded that these data meet requirements of proportional odds. There were no observed multicollinearity, as evidenced by low VIF values.

An additional ordinal logistic regression analysis was run on the entire sample combined, with the added independent variable of disability group, to identify the effect that membership in a particular disability group had on job status. Wald chi-squared values and probabilities are reported. Odds ratios were compared to determine relative clinical effect between variables.

**Confirmatory Factor Analysis**

CFA was run on the second half of the dataset to determine model fit. CFA was used on an independent sample from the sample used in EFA to validate the factor
structure. Maximum likelihood estimation was used. Factor score weights for both latent variables across each of the six variables were generated in Amos and applied to the total sample on cases with observed data for all six variables in the model in SPSS (Total n=11,224; EFA n=5,682; CFA n=5,542). The factor score weights were applied to unstandardized, centered scores due to fact that Amos uses deviation scores to estimate factor score weights. Model fit for CFA was determined to be good by RMSEA criteria (Browne and Cudeck, 1989).

Correlations

Spearman’s correlations were used throughout analyses due to the non-normality of distributions. Three bivariate Spearman’s correlations between employment status and short-term choices, employment status and long-term choices, and short-term choices and long-term choices were run within each disability group. This totaled nine bivariate Spearman’s correlations. Spearman’s correlations were also run between the ordinal variable of picking where you work and the length of time in months at current employment, separately for each disability group.
Chapter 3: Results

Descriptive Statistics

Kruskal-Wallis Test was used to compare the three disability groups on number of mental health conditions for taking medication, behavior support needs, and age. Chi-square test for association was used to test independence between disability groups on the categorical variables of level of ID severity and job status. Table 1 shows the descriptive statistics on the three disability groups for ID severity level, number of mental health conditions for taking medication, and behavior support needs.

Number of mental health conditions for taking medication was significantly different across disability groups, $H(2)=665.71$, $p<.001$. Pairwise comparisons with adjusted $p$-values showed that each disability category was significantly different from the other with $p$-values of $p<.001$. The ASD group had the most number of mental health conditions for taking medication ($M=1.49$, $Md=1$), followed by the ID group ($M=1.04$, $Md=1$), and lastly the DS group ($M=0.46$, $Md=1$). In the ASD group, 28% were not on medications for mental health conditions, 19% were on medication for one mental health condition, 18% were on medications for two mental health conditions, 13% were on medications for three mental health conditions, and 9% were on medications for four mental health conditions. In the DS group, 68% were not on medications for mental health conditions, 13% were on medication for one mental health condition, 7% were on medications for two mental health conditions, 3% were on medications for three mental health conditions, 3% were on medications for three mental
### Level of ID

<table>
<thead>
<tr>
<th>Level of ID</th>
<th>Autism (N=2174)</th>
<th>Down Syndrome (N=1857)</th>
<th>Intellectual Disability (N=15845)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild ID</td>
<td>25.2%</td>
<td>21.8%</td>
<td>38.7%</td>
</tr>
<tr>
<td>Moderate ID</td>
<td>27.3%</td>
<td>46.0%</td>
<td>27.2%</td>
</tr>
<tr>
<td>Severe ID</td>
<td>20.1%</td>
<td>14.3%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Profound ID</td>
<td>14.2%</td>
<td>7.2%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Missing</td>
<td>13.2%</td>
<td>10.6%</td>
<td>7.2%</td>
</tr>
</tbody>
</table>

### Medications Taken for:

<table>
<thead>
<tr>
<th>Medications Taken for</th>
<th>Autism (N=2174)</th>
<th>Down Syndrome (N=1857)</th>
<th>Intellectual Disability (N=15845)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Disorders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41.3%</td>
<td>18.5%</td>
<td>36.9%</td>
</tr>
<tr>
<td>No</td>
<td>52.0%</td>
<td>77.8%</td>
<td>58.6%</td>
</tr>
<tr>
<td>Missing</td>
<td>6.7%</td>
<td>3.7%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41.5%</td>
<td>13.4%</td>
<td>27.0%</td>
</tr>
<tr>
<td>No</td>
<td>51.1%</td>
<td>82.3%</td>
<td>67.1%</td>
</tr>
<tr>
<td>Missing</td>
<td>7.5%</td>
<td>4.4%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Behavior Problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45.4%</td>
<td>10.3%</td>
<td>23.5%</td>
</tr>
<tr>
<td>No</td>
<td>49.2%</td>
<td>85.7%</td>
<td>71.2%</td>
</tr>
<tr>
<td>Missing</td>
<td>5.4%</td>
<td>4.0%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Psychotic Disorders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19.4%</td>
<td>5.7%</td>
<td>18.0%</td>
</tr>
<tr>
<td>No</td>
<td>71.8%</td>
<td>90.1%</td>
<td>76.7%</td>
</tr>
<tr>
<td>Missing</td>
<td>8.8%</td>
<td>4.2%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

### Support Needs

<table>
<thead>
<tr>
<th>Self-Injurious Behavior</th>
<th>Autism (N=2174)</th>
<th>Down Syndrome (N=1857)</th>
<th>Intellectual Disability (N=15845)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive Support Needed</td>
<td>13.9%</td>
<td>1.3%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Some Support Needed</td>
<td>28.7%</td>
<td>7.9%</td>
<td>16.7%</td>
</tr>
<tr>
<td>No Support Needed</td>
<td>55.2%</td>
<td>89.2%</td>
<td>76.8%</td>
</tr>
<tr>
<td>Unknown</td>
<td>2.1%</td>
<td>1.6%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Disruptive Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensive Support Needed</td>
<td>19.1%</td>
<td>3.8%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Some Support Needed</td>
<td>39.7%</td>
<td>22.0%</td>
<td>28.9%</td>
</tr>
<tr>
<td>No Support Needed</td>
<td>39.1%</td>
<td>72.8%</td>
<td>60.9%</td>
</tr>
<tr>
<td>Unknown</td>
<td>2.1%</td>
<td>1.4%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Destructive Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensive Support Needed</td>
<td>15.2%</td>
<td>2.3%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Some Support Needed</td>
<td>27.8%</td>
<td>11.6%</td>
<td>17.7%</td>
</tr>
<tr>
<td>No Support Needed</td>
<td>55.1%</td>
<td>84.5%</td>
<td>74.8%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1.9%</td>
<td>1.6%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

**Note:** Statistics presented as frequencies (percentages).

Table 1: Descriptive Statistics
health conditions, and 1% were on medications for four mental health conditions. In the ID group, 44% were not on medications for mental health conditions, 19% were on medication for one mental health condition, 14% were on medications for two mental health conditions, 8% were on medications for three mental health conditions, and 6% were on medications for four mental health conditions. Results are reported in Figure 1.

![Figure 1: Number of Mental Health Conditions for taking Medications by Disability Group](image)

Support needs for behavior problems also differed significantly across disability groups, $H(2)=857.33$, $p<.001$. Pairwise comparisons with adjusted $p$-values showed that each disability category was significantly different from the other at $p$-values of $p<.001$. The ASD group required the most support for behavior problems ($M=1.96$, $Md=2$), followed by the ID group ($M=1.00$, $Md=0$), then the DS group ($M=.56$, $Md=0$).

Level of ID severity was significantly associated with disability group, $\chi^2(6)=526.35$, $p<.001$, with the ID group being least impaired based on severity of intellectual functioning (basis for establishing level of ID), followed by the DS group, and finally the ASD group was most cognitively impaired. The ASD group was
The sample comprised of 29.0% Mild ID, 31.4% Moderate ID, 23.2% Severe ID, and 16.3% Profound ID. The DS group was comprised of 24.4% Mild ID, 51.5% Moderate ID, 14.7% Severe ID, and 14.3% Profound ID. The last group, ID, was comprised of 41.7% Mild ID, 29.3% Moderate ID, 14.7% Severe ID, and 14.3% Profound ID. Results are reported in Figure 2.

Age was significantly different across disability groups, H(2)=998.58, p<.001. Pairwise comparisons with adjusted p-values showed that each disability category was significantly different from the other with p-values of p<.001. The ID group had the oldest median age (Md=45), followed by the DS group (Md=41), and finally the ASD group was the youngest (Md=31). Table 2 reports age means, standard deviations, medians, and ranges for each disability group.
Table 2: Age Statistics by Disability Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>34.38</td>
<td>12.6</td>
<td>31</td>
<td>18—87</td>
</tr>
<tr>
<td>DS</td>
<td>40.89</td>
<td>12.01</td>
<td>41</td>
<td>18—75</td>
</tr>
<tr>
<td>ID</td>
<td>44.83</td>
<td>15.15</td>
<td>45</td>
<td>18—96</td>
</tr>
</tbody>
</table>

Due to the mean age differences between disability group, job status was examined across age categories of 21-30, 31-40, 41-50, 51-60, and 60 and over to identify trends in employment. Individuals that fell within 18-20 were excluded due to the fact that they may still be in school services, and therefore would cloud any job-related data. Twenty-one was the cut point in order to keep the age categories consistent.

Figure 3 and Figure 4 show the age trends for paid community jobs and paid facility work, respectively. In paid community jobs, it is clear that the 21-30 group shows the highest rates of employment, and this trend holds into the 31-40 age group, but rates of paid community employment decline until the 60+ age group. The decline is most rapid for the DS group, specifically between the age groups of 30s to the 50s. Paid community employment rates converge between disability groups in the 60+ age group.
In paid facility work, the age trends tell a different story. Rates of paid facility employment seem to peak for DS and ID groups in the 41-50 age group, and then decline until the 60+ age group. For the ASD group, however, rates of paid facility employment demonstrate a steady increase from the 21-30s group to 60+. Rates of paid facility employment at 60+ are similar to the rates in the 21-30 age group. Similar to paid community employment, all disability groups converge on rates of paid facility employment in the 60+ age group.
Analyses on Job Statistics

Job Status was significantly associated to disability group, $\chi^2(4)=120.56$, $p<.001$. The DS group was most employed, followed by the ID group, then the ASD group. The ASD group was comprised of 72.0% in no employment, 18.3% in paid facility work, and 9.8% in a paid community job. The DS group was comprised of 55.4% in no employment, 29.9% in paid facility work, and 14.7% in a paid community job. The ID group comprised of 62.7% in no employment, 24.2% in paid facility work, and 13.1% in a paid community job. The DS group is the closest group in this study to the community paid employment rate cited by Butterworth and colleagues of 20.3 percent in the fiscal year of 2009 (Butterworth et al., 2011).

![Figure 5: Percent of Individuals at Each Level of Employment by Disability Group](image)

The number of hours worked during a two-week period in a paid community job differed significantly across disability group, $H(2) = 14.57$, $p=.001$. Pairwise comparisons with adjusted $p$-values showed that there were significant differences between the DS ($M=21.58$, $Md=18.00$) and ID ($M=25.74$, $Md=20.00$) research groups, $p=.001$. There
were not significant differences between the ASD group (M=23.73, Md=20) and either the DS or ID groups.

The amount of gross wages earned in a two-week period in a paid community job was significantly affected by disability group, H(2) = 14.55, p=.001. Pairwise comparisons with adjusted p-values showed that there were significant differences between the DS (Md=116.00) and ID (Md=150.00) research groups, p=.001. There were not significant differences between the ASD group (Md=134.28) and either DS or ID groups.

Hourly wage in a community paid job was not significantly different between disability groups. The number of hours worked during a two-week period in paid facility work was not significantly different between disability groups. Please refer to Table 2 for means and medians.

The amount of gross wages earned in a two-week period in paid facility work was significantly different across disability groups, H(2) = 12.156, p=.002. Pairwise comparisons with adjusted p-values showed that there were significant differences between the DS (Md=25.48) and ID (Md=32.84) groups, p=.008. There were not significant differences between the ASD group (Md=29.42) and either DS or ID groups.

Hourly wage in paid facility work differed significantly across disability group, H(2)=14.968, p=.001. Pairwise comparisons with adjusted p-values showed that there were significant differences between the DS (Md=1.11) and ID (Md=1.50) research groups, p<.001. There were not significant differences between the ASD group (Md=1.35) and either DS or ID groups.
Ordinal Logistic Regression for the Three Research Groups

Ordinal logistic regressions were performed for each of the three research groups separately, with job status as the dependent variable and age, severity of ID, number of mental health conditions for taking medication, and support needs for behavior problems as independent variables. Forced entry was used to add all independent variables into the models at once. To check the assumption of proportional odds necessary for these
models, separate binomial logistic regressions were run and the odds ratios examined. These models revealed similar odds ratios comparing pairs of job status categories, therefore it was concluded that these data meet requirements of proportional odds. Additionally, there were no observed multicollinearity.

In the ASD group, the final model showed good fit, with $\chi^2(4)=225.90$, $p<.001$. An increase in 10 years of age was related to an increase in the odds of paid community employment with an odds ratio of 1.16, $\chi^2(1)=10.60$, $p=.001$. A one category decrease in severity of ID was associated with an increase in the odds of community employment, with an odds ratio of 2.25, $\chi^2(1)=145.88$, $p<.001$. Lastly in the ASD group, a decrease in one number of mental health reason for taking medication was associated with an increase in the odds of community employment, with an odds ratio of 1.20, $\chi^2(1)=12.15$, $p<.001$.

In the DS group, the final model showed good fit, $\chi^2(4)=146.72$, $p<.001$. A one category decrease in severity of ID was associated with an increase in the odds of community employment, with an odds ratio of 1.97, $\chi^2(1)=89.01$, $p<.001$. Secondly in the DS group, a decrease in one number of mental health reasons for taking medication was associated with an increased odds of community employment, with an odds ratio of 1.15, $\chi^2(1)=4.03$, $p=.045$. Lastly, needing a decreased amount of support for behavior problems was associated with an increase in the odds of community employment, with an odds ratio of 1.18, $\chi^2(1)=6.92$, $p=.009$.

In the ID group, the final model showed good fit, $\chi^2(4)=1822.11$, $p<.001$. All tested variables were found to be significant for the ID group. A decrease in 10 years of age was associate with an increase in the odds of community employment, with an odds
ratio of 1.06, \( \chi^2(1)=22.23, p<.001 \). A one category level decrease in severity of ID was associated with an increase in community employment, with an odds ratio of 2.22, \( \chi^2(1)=1342.43, p<.001 \). A decrease in one mental health reason for taking medication was associated with an increase in the odds of community employment, with an odds ratio of 1.10, \( (1)=26.95, p<.001 \). Lastly, a decrease in the need for behavior supports was associated with an increase in the odds of community employment, with an odds ratio of 1.05, \( \chi^2(1)=8.61, p=.003 \).

Ordinal Logistic Regression on Total Study Sample

Using all three research groups together, an ordinal logistic regression was performed on the dependent variable of job status, with independent variables being disability group, age, severity of ID, number of mental health conditions for taking medication, and support needs for behavior problems. The independent variables were entered using forced entry. The purpose of this analysis was to determine if disability group was significantly associated with employment status when other variables, including age, ID severity level, number of mental health conditions for taking medication, and support needs for behavior problems were held constant. Results of this analysis reveals that disability group was a significantly associated with employment status, \( p<.001 \) when controlling for the other factors. Membership in the DS group compared to the ID group increases odds of community paid employment by 33% (odds ratio = 1.333), \( \chi^2(1)=26.360, p<.001 \). Membership in the ASD group compared to the ID group decreases the odds of being in a paid community job, with an odds ratio of .783, \( \chi^2(1)=15.002, p<.001 \).
Confirmatory Factor Analysis

A CFA was run on the second half of the dataset using SPSS AMOS 22 to confirm the factor structure determined in exploratory factor analysis. The model was reported to have good fit; $\chi^2(8)=119.13$, p<.001, RMSEA=.037. Factor score weights were determined for each of the six variables in the analyses across the two latent variables and applied to the respective centered, observed variables in SPSS. Factor score weights are shown in Table 4. Only cases with non-missing values across all six variables were used when applying factor score weights (n=11,224). A table of correlations between items used in factor analysis can be found in Appendix C. Descriptive statistics of the new variables of short-term choices and long-term choices, when pooled form the total sample, are presented in Table 5. Frequency distributions of the new variables short-term and long-term choices are in Appendix D.

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Choices</td>
<td>0.34</td>
<td>0.297</td>
<td>0.087</td>
<td>0.058</td>
<td>0.072</td>
<td>0.042</td>
</tr>
<tr>
<td>Short-Term Choices</td>
<td>0.045</td>
<td>0.039</td>
<td>0.012</td>
<td>0.216</td>
<td>0.269</td>
<td>0.157</td>
</tr>
</tbody>
</table>

Table 4: Factor Score Weights for the 6 Variables in CFA

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Choices</td>
<td>0.00</td>
<td>0.10</td>
<td>0.42</td>
<td>-0.98</td>
<td>0.50</td>
</tr>
<tr>
<td>Long-Term Choices</td>
<td>0.00</td>
<td>-0.11</td>
<td>0.55</td>
<td>-0.73</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Table 5: Descriptive Statistics for Factor Score Weights Applied to Complete Cases

Due to the small range of these variables, regression estimates, and subsequently odds ratios, were calculated using a one standard deviation change, to aid in ease of
interpretation. Therefore, instead of an odds ratio representing one unit increase in either of these variables, the odds ratio will represent an increase in one standard deviation of these variables. The CFA diagram can be found in Appendix E.

Analyses on Short-Term and Long-Term Choices

A Kruskal-Wallis test was used to compare across the three disability groups on levels of short-term and long-term choices. The extent to which individuals make short-term choices differed significantly across disability groups, $H(2)=202.00$, $p<.001$. Pairwise comparisons with adjusted $p$-values showed that there were significant differences between each of the disability groups with $p$-values of $p<.001$. The ID group exercised most short-term choices ($Md=.15$), followed by the DS group ($Md=.05$), and lastly, the ASD group made the least amount of short-term choices ($Md=-.13$).

The extent to which individuals make long-term choices differed significantly between disability groups, as well, $H(2)=180.62$, $p<.001$. Pairwise comparisons with adjusted $p$-values showed that there were significant differences between each of the disability groups with $p$-values of $p<.001$. The pattern of medians is identical to that of the short-term choices, with the ID group making the most long-term choices ($Md=-.06$), followed by the DS group ($Md=-.18$), and lastly, the ASD group making the least amount of long-term decisions ($Md=-.39$).

Further analyses were run on the six variables that comprise the two latent variables to validate the between-group findings. The variables comprising long-term choices included 1) choosing where you live, 2) choosing roommates, and 3) choosing your case manager. For the variables choosing where you live, each group differed
significantly on the extent to which they make this decision independently, H(2)=147.38, p<.001. Pairwise comparisons with adjusted p-values showed that there were significant differences between each of the disability groups with p-values of p<.001. The ID group made this choice independently most often (M=.72, Md=1), then the DS group (M=.67, Md=0), and finally the ASD group made choices about where to live least often (M=.46, Md=0).

The extent to which disability groups made choices about who they live with differed significantly, H(2)=93.31, p<.001. Further pairwise comparisons with adjusted p-values revealed that there was not a significant difference between the ID (M=.66, Md=.00) and DS (M=.58, Md=.00) groups, but that both differed significantly from the ASD (M=.41, Md=.00) group at p<.001.

The variable of choosing your case manager had similar results to choosing your roommate, with significant differences between groups, H(2)=15.71, p<.001, but only in relation to the ASD group. Pairwise comparisons with adjusted p-values revealed that there was not a significant difference between the ID (M=.70, Md=1) and DS (M=.71, Md=1) groups. The ID group differed from the ASD (M=.64, Md=1) group at p=.001, and the DS group differed from the ASD group at p=.002.

Three variables comprised short-term choices; 1) choosing how to spend free time, 2) choosing your daily schedule, and 3) choosing how to spend your spending money. The extent to which the three disability groups made choices about how they spend their free time differed significantly, H(2)=142.89, p<.001. Pairwise comparisons with adjusted p-values revealed that the ID group (M=1.57, Md=2) and the DS group
(M=1.57, Md=2) did not differ significantly, but that both of them differed from the ASD group (M=1.40, Md=2) at p<.001.

The three disability groups also differed on the extent to which they chose their daily schedule, H(2)=145.22, p<.001. Pairwise comparisons with adjusted p-values revealed that the ID group (M=1.31, Md=2) did not differ from the DS group (M=1.34, Md=1), but that both differed from the ASD group (M=1.11, Md=1) at p<.001.

Lastly, the extent to which the disability groups make decisions about how to use their spending money differed significantly from one another, H(2)=203.79, p<.001. Pairwise comparisons with adjusted p-values indicated that, again, the ID group (M=1.42, Md=2) and DS group (M=1.43, Md=2) did not differ, but both made choices about spending money more than the ASD group (M=1.19, Md=1) at p<.001.

Correlations between Long-term Choices, Short-Term Choices, and Job Status

Spearman’s correlations were used on short-term choices, long-term choices, and job status to show associations. Spearman’s correlation was chosen due to the non-normality of short-term choices and long-term choices. Three bivariate correlations were estimated for these variables separately for each disability group, and all nine correlations were found to be significant at the 0.01 level. The correlation matrix is in Appendix C.

Ordinal Logistic Regression with Short-term and Long-term Choices Variables

Further regression analyses were done on each of the three research groups to explore the significance of short-term and long-term choice-making on job status. Short-term and long-term choices were added as independent variables to the ordinal logistic regression of age, ID severity, number of mental health conditions for taking medication,
and support needs for behavior problems on job status for each disability group. These data met the assumptions of proportional odds and did not display multicollinearity.

In previous analyses, the ASD group’s job status had significant associations with age, ID severity, and number of mental health conditions for taking medication. The two new variables of short-term and long-term choices were added to the regression model, \( \chi^2(6) = 134.78, p < .001 \). However, results reveal that only level of ID severity and short-term choices were significant. A one level decreased in ID severity was associated with an increased odds of paid community employment with an odds ratio of 1.721, \( \chi^2(1) = 32.92, p < .001 \). Increasing short-term choices by one standard deviation corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.49, \( \chi^2(1) = 10.44, p = .001 \). After short-term and long-term choices were entered in the model, age and number of mental health conditions for taking medication became non-significant.

The DS group’s job status had previous associations with ID severity level, number of mental health conditions for taking medication, and support needs for behavior problems. Short-term and long-term choices were added to the regression model, \( \chi^2(6) = 120.03, p < .001 \). Similarly to the ASD group, only ID severity level and short-term choices were found to be significant. A one-level decrease in ID severity corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.89, \( \chi^2(1) = 33.44, p < .001 \). An increase in one standard deviation in short-term choice-making resulted in an increase in odds of being in a paid community job with an odds ratio of \( \chi^2(1) = 10.51, p = .001 \). After short-term and long-term choices were added to the regression model, age and number of mental health conditions for taking medication became non-significant.
model, number of mental health conditions for taking medication, and support needs for behavior problems became non-significant.

The ID group showed different results. Short-term and long-term choices were added to the model, $\chi^2(6)=1414.12$, $p<.001$. All independent variables except needed supports for behavior problems were found to be significant. An increase in 10 years of age corresponded to an increased odds in being in a paid community job, with an odds ratio of 1.16, $\chi^2(1)=75.48$, $p<.001$. A decrease in the level of ID severity related to an increase in the odds of being in a paid community job, with an odds ratio of 1.83, $\chi^2(1)=369.95$, $p<.001$. A decrease in the number of mental health reasons for taking medications corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.13, $\chi^2(1)=29.28$, $p<.001$. Increasing long-term choices by one standard deviation corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.18, $\chi^2(1)=24.58$, $p<.001$. Increasing short-term choices by one standard deviation corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.37, $\chi^2(1)=58.74$, $p<.001$.

Finally, a total sample ordinal regression analyses was performed with job status as the dependent variable, and age, ID severity level, number of mental health conditions for taking medication, behavior support needs, disability category, short-term choices, and long-term choices as independent variables. The independent variables were entered with force entry. This analyses was performed to understand how choice-making affects job status when controlling for disability group, age, ID severity level, number of mental health conditions for taking medication and behavior support needs. The results indicated that choice-making, both long-term and short-term, was statistically associated with job
status. Short-term choices was found to have the largest effect on job status, with a one standard deviation increase in short-term choices resulting in an increase in the odds of being in a paid community job, with an odds ratio of 1.39, \( \chi^2(1)=80.23, p<.001 \). Long-term choices had a smaller effect on job status, but was still a statistically significant correlate of job status. A one standard deviation increase in long-term choices corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.17, \( \chi^2(1)=25.30, p<.001 \).

The results also indicated that level of ID severity continues to be significantly associated with job status, with an effect size over and above that of choice-making or disability group membership. A one level decrease in ID severity resulted in an increase in the odds of paid community employment, with an odds ratio of 1.82, \( \chi^2(1)=434.61, p<.001 \).

Disability group membership was only significant for the DS group. Being in the DS group over being in the ID group corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.31, \( \chi^2(1)=9.60, p=.002 \). Being in the ASD group compared to the ID group did not significantly change the odds of employment status, with an odds ratio of .85, \( \chi^2(1)=3.16, p=.075 \).

Number of mental health conditions for taking medications continued to be significantly associated with job status. A decrease in one mental health condition corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.14, \( \chi^2(1)=38.84, p<.001 \).
Finally, age was significantly associated with job status for the total sample. A 10 year decrease in age corresponded to an increase in the odds of being in a paid community job, with an odds ratio of 1.15, $\chi^2(1) = 71.92, p < .001$.

Correlation between Length of Employment and Choosing Your Job

Spearman’s correlations were run on the subset of individuals who identified as having a paid community job (ASD n=80, DS n=104, ID n=702). Associations between length of time spent in current employment and whether or not the individual had any input in making a choice about employer were explored. There were no significant correlations found in any of the disability groups.
Chapter 4: Discussion

Group Comparisons

In this study, the NCI Adult Consumer Survey was used to analyze employment data across three disability groups: ASD, DS, and ID. Demographic information, including age, ID severity level, number of mental health conditions for taking medications, and behavior support needs were analyzed for differences across groups, as well as in their predictive validity for employment status. The factor structure of questions pertaining to choice-making were analyzed and revealed two latent variables; short-term choices and long-term choices. These latent variables were estimated, compared across groups, and then correlated with employment status.

In comparing groups on their demographic information, the DS group was significantly younger than the ID group. This finding was expected; due to the comorbid medical conditions associated with DS, this population has a life expectancy of approximately 60 years (Baird & Sadovnick, 1988, Yang, Rasmussen, & Friedman, 2002). In addition, the ASD group was significantly younger than either the DS or ID groups. This finding might be explained by the increased awareness surrounding this diagnosis in the last 15-20 years. Older adults who met criteria for an ASD diagnosis, but had received sufficient services and supports under a different diagnosis (i.e., ID) may not have felt there was added benefit in obtaining a formal ASD diagnosis. Therefore, it is possible that there exists a subset of older adults with ASD who have gone undiagnosed.
When job status was examined by age groups, different employment trends emerged. In paid community jobs, rates were highest in the youngest population and declined in the 60+ group. The rate of decline in percent of individuals in paid community employment was most rapid for the DS population. Presumably, the lower average age for life expectancy and higher rates of early onset of dementia for individuals with DS are limiting factors on the number of individuals in this group that can work into their 40s and 50s. In paid facility work for individuals with ID or DS, rates increased until the 41-50 age group and then declined towards the 60+ age group. For individuals with ASD, the rates of paid facility work were the lowest among the three groups, but did not share the same pattern across age groups. Instead, the rates steadily increased from 21-30 until 60+. Taken together, these trends indicate that the highest rates of paid community employment are in the youngest age group: the 21-30 year olds. As individuals with disabilities get older, rates of paid community jobs steadily decrease, while rates of paid facility work increase. This trend holds until individuals reach their 40s, and then both types of employment decrease. Since these data represent a single time point, information about individuals shifting from paid community employment to paid facility employment across time is unknown. Therefore, these age trends should be interpreted with caution.

ID severity levels showed differences across age groups. On average, the ASD group was the most impaired. This finding may be explained by the nature of the dataset. NCI represents people receiving services from state developmental disability systems, and a diagnosis of ASD is not always sufficient to receive state funded services. Therefore, the subset of individuals in the NCI dataset with ASD may represent a
population of individuals with other diagnoses and services needs beyond that of an individual with only an ASD diagnosis. This is supported by previous research indicating that the rates of ID found in this sample of adults with ASD are higher compared to other reported rates of ID in ASD found in the literature (Fombonne et al., 2003). Fombonne and colleagues (2003) surveyed epidemiological studies on rates of autism and found 30% to have no ID, 30% to have ID in the mild to moderate range, and 40% to have ID in the severe to profound ranges. When including all individuals with ASD in the NCI dataset from years 2011-2012 and 2012-2013, rates of ID are as follows: 11% had no ID, 48% had mild to moderate ID, and 32% had severe to profound ID. Levels of ID were unknown or unspecified for 9%. Thus, the NCI sample contains less individuals with no ID, and more individuals with mild/moderate ID. Furthermore, the notion that the NCI dataset may under-represent individuals from a higher IQ range due to a reduced need for publicly-funded services carries over into the DS and ID groups, as well.

In addition to differences between groups in age and ID severity levels, Figure 1 demonstrates the differences among groups in regards to the number of mental health reasons for taking medication. On average, the ASD group was taking medication for the highest number of mental health reasons, followed by the ID group. The DS group was medicated for the lowest number of mental health reasons. This finding was not surprising, considering the increased rates of co-occurring mental health problems in persons with ASD compared to individuals in the typically-developing population. Approximately 70% of individuals with ASD have at least one comorbid mental illness, and approximately 40% have two or more (Simonoff et al, 2008).
In regards to behavior support needs, the ASD group required the most support, and the DS group required the least support. This is consistent with previous literature reporting that adults with ASD and ID are more at-risk for behavior problems than individuals with ID alone (Matson & Rivet, 2008, Smith & Matson, 2010). Griffith and colleagues (2010) reported on behavior problems in children with ASD, DS and mixed etiology ID, and found that the ASD group had significantly more behavior problems than either DS or ID groups (Griffith, Hastings, Nash, & Hill, 2010). Finally, adults with DS in this study required less behavior supports than adults with ID alone, which is supported by previous literature. Esbensen and colleagues compared 150 adults with DS to 240 adults with ID of other etiology and found the group of adults with DS to have fewer behavior problems, and less externalizing problem behaviors overall, when assessed by the Scales of Independent Behavior-Revised (Esbensen, Seltzer, & Krauss, 2008).

The three groups were compared on their employment status and information about their wages, two-week gross income, and number of hours worked over the most recent two-week period. Results showed that on average, individuals with DS were more employed in either a community paid job or in facility paid work than both individuals with ID and ASD. When comparing other information about employment, however, results showed that the DS group worked fewer hours, and consequently earned lower gross wages, at the community paid level than those with ID. In addition, in a paid facility job, individuals with DS got paid a lower hourly wage, and therefore earned a lower gross wage, than individuals with ID. One reason for this finding may relate to financial issues, including purposefully earning a wage that is low enough to still quality
for state/federal medical benefits (i.e., Medicaid or Medicare) that are essential to individuals with DS facing costly health issues. Another possible reason explaining why individuals with DS worked fewer hours in a paid community job may be that they split their time with other daily activities (i.e., facility paid work, volunteering), that limit the available time they have for a paid community job.

Predictors of Employment

Age, ID severity level, number of mental health conditions for taking medications, and behavior support needs were explored in regards to their association with employment status.

When controlling for ID severity level, number of mental health conditions for taking medications, and behavior support needs, age was found to be significantly associated with employment status in ASD and ID. The effect of age, however, had a differential effect based on diagnosis. In individuals with ASD, being older was associated with increased probability of community paid employment, but for individuals with ID, being younger was associated with increased probability of community paid employment. One possible confounding factor for this finding may be the nature of the research groups; on average, the ASD group (M=34.38, SD=12.6, Md=31) was younger than the ID group (M=44.83, SD=15.15, Md=45).

Severity level of intellectual disability was significantly related to employment status. In all three groups, when controlling for age, number of mental health conditions for taking medication, and behavior support needs, having less severe ID was associated with increased probability of paid community employment. In addition, ID severity level had the highest effect size for employment status across all other variables tested (i.e.,
age, number of mental health conditions for taking medication, and behavioral support needs). This suggests that intellectual functioning, and probably corresponding adaptive skills, are highly correlated with employment, regardless of age, behavioral problems or mental illness.

Having a decreased number of mental health conditions for taking medication was significantly associated with employment status. In all three research groups, when controlling for age, ID severity level, and behavior support needs, reporting fewer reasons for taking psychotropic medications was related with an increased probability of paid community employment.

Lastly, support needs for behavior problems were significantly correlated with employment status in DS and ID groups, but not ASD. In individuals with DS and ID, when controlling for age, ID severity level, and number of mental health conditions for taking medication, having fewer behavioral support needs was associated with an increased probability of higher employment status. Employment in individuals with ASD, however, was not associated with level of behavioral support needs. Given that a more than two-thirds of individuals with ASD reported needing behavior supports (i.e., 67.8% of individuals with ASD in this sample needed support for at least one behavioral issue), it is possible that this variable was not able to sufficiently discriminate between individuals in order to account for differences in employment status.

Taken together, these data support the notion that different individual characteristics correlate with employment between the three disability groups. For the ASD group, age, ID severity level, and number of mental health conditions for taking medication correlated with employment, but not behavioral support needs. For the DS
group, ID severity level, number of mental health conditions for taking medication, and behavioral support needs correlated with employment, but not age. This finding of differential factors correlating with adult outcomes between individuals with ASD and DS is also found in the literature (Esbensen et al., 2009).

Disability group membership was the last factor examined in regards to its relationship with employment status. In order to answer if there are inherent differences in employability between disability groups, diagnosis was entered into an ordinal logistic regression as an independent variable. Results showed that disability group membership (ASD, DS or ID) significantly relates to employment status. This means that when controlling for those variables known to significantly differ between groups (i.e., age, ID severity level, number of mental health conditions for taking medication, and behavioral support needs), individuals with DS are still significantly more likely to be employed in a community paid job than individuals with ID or individuals with ASD. In addition, individuals with ID are significantly more likely to be employed in a community paid job than individuals with ASD. This finding implies that the inherent differences of diagnostic groups accounts for variability in employment status among those with disabilities, regardless of ID severity level, number of mental health conditions for taking medication, and behavioral support needs.

Choice-Making

After factor score weights were applied to the total sample of individuals with valid responses for the six choice-making variables, the two latent constructs could be calculated and used in analyses. These two new variables represented the extent to which individuals make short-term or long-term choices in their lives.
Median analyses showed that each disability group significantly differed from one another on the extent to which they make choices. The same pattern was found for both short-term and long-term choices: on average, the ID group exercised the most choice-making, followed by the DS group, and finally those individuals with ASD exercised least amount of choices in their lives.

In individuals with ASD, short-term choice-making significantly correlated with employment status when controlling for age, ID severity level, number of mental health conditions for taking medication, behavior support needs, and long-term choices. When controlling for short-term choice-making, the only other factor that is significantly correlated with employment status was ID severity level. Personal characteristics that previously correlated with employment status, including age and number of mental health conditions for taking medication, were no longer significantly correlated when controlling for short-term choices. This means that for individuals with ASD, exercising short-term choices in their daily life impacts employment regardless of age or number of mental health reasons for which they take medication.

Similar results were found when looking at individuals with DS. Short-term choice-making was significantly correlated with employment status when controlling for age, ID severity level, number of mental health conditions for taking medication, behavior support needs, and long-term choices. Personal characteristics that were previously significantly correlated with employment status, including number of mental health conditions for taking medication and behavior support needs, were no longer significant when controlling for short-term choices. This indicates that for individuals
with DS, making short-term choices is associated with employment regardless of number of mental health reasons for which they take medication or behavioral support needs.

Finally, regression analyses were performed to study the relationship between disability group membership and employment status when controlling for these new short-term and long-term decision-making variables. Results showed that having a diagnosis of DS compared to ID was significantly associated with increased paid community employment, even when controlling for age, ID severity level, number of mental health conditions for taking medication, behavior support needs, short-term choices, and long-term choices. Having a diagnosis of ASD versus ID-only, however, did not significantly affect the odds of being employed when controlling for choice-making variables. Previous analyses that did not control for choice-making variables indicated that being in the ID-only group significantly increased odds of employment over being in the ASD group. In addition, previous analyses revealed that the ID-only group exercised choice-making significantly more than the ASD group. Thus, the non-significant difference between the employment odds of the ASD and ID groups when controlling for choice-making variables indicates that choice-making, short-term choices specifically, is accounting for a large portion of the difference in employment status between these two groups, and not the diagnosis of the individual.

In addition, ID severity level continued to be significantly correlated with employment status, even when controlling for short-term and long-term choices. ID severity level had the largest effect size, over and above that of choice-making or disability group membership, on employment status. This indicated that intellectual
functioning had a strong correlation with job status, even when diagnosis and the extent to which individuals made choices in their lives were considered.

Job Choice and Employment Length

Finally, the 5th and last research aim of this paper explored the relationship between having chosen where you work and length of time at current employment. Contrary to a priori expectation, non-significant correlations were obtained between choosing your job on your own and length of employment. There are several reasons that may explain why this is not a significant association. First, having a short or long employment at an organization was assumed to reflect the individual’s enjoyment and satisfaction of his or her job, but could also reflect the performance quality of the individual, either good or poor. If an individual enjoys a job, but is not preforming up to employment standards, the length of employment may be short, regardless of the fact that the individual made an independent choice to work at that organization. In addition, reasons for staying or leaving a job could reflect factors unrelated to the individual’s abilities or preferences, including transportation, finances, work place culture, etc.

Limitations

The first limitation of this study, which has been previously mentioned, is the fact that these data come from individuals receiving state developmental disabilities services, which may reflect a more impaired population than if one were to randomly sample from all individuals with ASD, DS or ID.

A second limitation of this study is the nature of the variable “employment status”. This variable is a three point scale (0=no employment, 1=paid facility work, 2=paid community job), which may have less statistically sound metrics than if
regression analyses used a dependent variable with additional levels or was a continuous variable.

A third limitation to mention is in regards to the questions on the NCI pertaining to choice-making that eventually comprised the short-term and long-term choices variables. These questions, and thus their resulting latent variables, represent the extent to which all individual make these choices, and not whether or not they had the opportunity to make these choices, or whether or not these were “good” choices. Therefore, if an individual didn’t make choices for themselves, it may represent the fact that they did not have the opportunity to, rather than that they didn’t have the desire or capacity to. This reflects a broader issue of possible third-variables that affect the interpretation of results. Family attitudes and beliefs can either hinder or support an individual with a disability to be a successful independent adult, regardless of the individual’s desires to contribute to his or her community.

Finally, several choice-making questions from Section II of the NCI had to be thrown out of the analyses because the wording of the questions changed between the two NCI collection years, slightly changing the scope or meaning of the questions. Therefore, a reduced number of questions were available to use in EFA and CFA analyses.

Conclusions and Future Directions

This study has contributed to the literature through providing an in-depth snapshot of the current state of employment in adults with intellectual disability, with and without ASD or DS. Employment trends differ between these three developmental disability groups, but the overall employment rate is still considerably less than that of the non-disabled population. Butterworth and colleagues (2011) reported 20.3% of all individuals
with developmental disabilities were in integrated community employment in 2009, a percentage that had dropped from 25% in 2001 (Butterworth et al., 2011). Of our study sample, adults with DS were the closest group to approaching that percent of community-based employment with about 15% in paid community employment for the years 2011-2013. This study adds support to the overall trend of a decreasing proportion of individuals with developmental disabilities participating in paid community employment. While there have been recent efforts to adopt public policy surrounding efforts to increase employment participation (e.g., Employment First Executive Order), these efforts need to be increased and universally adopted across the nation.

This study also provides a target for vocational habilitation efforts to increase employment in adults with ASD, DS and ID. Choice-making, particularly short-term choice-making, is strongly associated with employment. This is an area that can be targeted for intervention. Future studies should look the relationship between choice-making interventions and successful employment. In addition, more studies need to include employment as a specific adult outcome of interest to better understand barriers to employment and explore different factors that may account for the wide variability of employment rates in adults with disabilities beyond simple demographic variables.
References


Appendix A: NCI Adult Consumer Survey Questions

**BI-9. Is this person diagnosed with mental retardation/intellectual disabilities (ID)?** (Note: we are now using the term “intellectual disabilities” to refer to “mental retardation.”)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>code BI-9a as NOT APPLICABLE</td>
<td>Yes</td>
<td>Don’t Know → code BI-9a as NOT APPLICABLE</td>
</tr>
</tbody>
</table>

**BI-9a. If BI-9 is answered ‘yes’, what level of ID?**

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT APPLICABLE – no ID diagnosis</td>
<td>Mild ID</td>
<td>Moderate ID</td>
<td>Severe ID</td>
<td>Profound ID</td>
<td>Unspecified level of ID</td>
<td>ID level unknown</td>
<td></td>
</tr>
</tbody>
</table>

**BI-32. Does this person currently take medications to treat...**

(Check one column for each):

<table>
<thead>
<tr>
<th>Don’t</th>
<th>No</th>
<th>Yes</th>
<th>Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood disorders?</td>
<td>[Includes any drug prescribed to elevate or stabilize mood (reduce mood swings), e.g., to treat depression, mania, or bipolar disorder.]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety?</td>
<td>[Includes any drug prescribed to treat anxiety disorders (including obsessive disorders and panic disorders) or to reduce anxiety symptoms.]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior challenges?</td>
<td>[Includes any drug prescribed for a behavior modification purpose (such as a stimulant, sedative, or beta-blocker), e.g., to treat ADHD, aggression, self-injurious behavior, etc.]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychotic disorders?</td>
<td>[Includes any drug (e.g., anti-psychotic “neuroleptic”) used to treat psychotic disorders such as schizophrenia or psychotic symptoms such as hallucinations]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of activity</td>
<td>a) Was this person engaged in this activity during the two-week period?</td>
<td>b) Number of hours worked or spent at this activity during the two-week period:</td>
<td>c) Total gross wages (before taxes or deductions) earned at this activity during the two-week period:</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>BI-40. Paid job in a community-based setting</strong> (e.g., competitive or supported employment, enclave, work crew)</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
</tr>
<tr>
<td><strong>BI-41. Unpaid activity in a community-based setting</strong> (e.g., volunteer activities, skills training, community experiences)</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
</tr>
<tr>
<td><strong>BI-42. Paid work performed in a facility-based setting</strong> (e.g., workshop, activity center)</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
</tr>
<tr>
<td><strong>BI-43. Unpaid activity in a facility-based setting</strong> (e.g., day habilitation, prevocational, seniors programs)</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
<td>_1 No  _2 Yes  _3 Don’t know</td>
</tr>
</tbody>
</table>
**Community Employment** – If BI-40a above is checked “Yes,” please answer BI-47 through BI-50:

| BI-47. Did this person work 10 out of the last 12 months in a community job? (Person may have changed jobs or had periods of unemployment/transition.) | __ 1 No  
__ 2 Yes  
__ 3 Don’t Know |
| --- | --- |
| BI-48. Does this person receive paid vacation and/or sick time at his/her job? | __ 1 No  
__ 2 Yes  
__ 3 Don’t Know |
| BI-49. How long has this person been working at his/her current job? (If multiple jobs, pick the job the person has worked at the longest). | __ __ years  
__ __ months |
| BI-50. What type of job does this person have? (check ONE - option that best fits) | __ 1 Food preparation and food service  
__ 2 Building and grounds cleaning or maintenance  
__ 3 Personal care provider  
__ 4 Retail job such as sales clerk or stock person  
__ 5 General office and administrative support  
__ 6 Farming, fishing, forestry worker  
__ 7 Construction or repair occupation  
__ 8 Assembly, manufacturing, or packaging  
__ 9 Materials handling, mail distribution  
__ 10 Management, business, or financial operations  
__ 11 Professional or technical occupation  
__ 12 Self-employed  
__ 13 Other |

**Does person need support to manage:**

<table>
<thead>
<tr>
<th>BI-55. Self-injurious behavior</th>
<th>Level of Support Needed (Check ONE)</th>
</tr>
</thead>
</table>
| Refers to attempts to cause harm to one’s own body, for example, by hitting or biting self, banging head, scratching or puncturing skin, ingesting inedible substances, or attempting suicide. | __ 1 No support needed  
__ 2 Some support needed; requires only occasional assistance or monitoring  
__ 3 Extensive support needed; frequent or severe enough to require regular assistance  
__ 9 Don’t Know |

<table>
<thead>
<tr>
<th>BI-56. Disruptive behavior</th>
<th>Level of Support Needed (Check ONE)</th>
</tr>
</thead>
</table>
| Refers to behavior that interferes with the activities of others, for example, by laughing or crying without apparent reason, yelling or screaming, cursing, or threatening violence. | __ 1 No support needed  
__ 2 Some support needed; requires only occasional assistance or monitoring  
__ 3 Extensive support needed; frequent or severe enough to require regular assistance |
### BI-57. Destructive behavior

Refers broadly to externally-directed, defiant behavior, for example, taking other people’s property, property destruction, stealing, or assaults and injuries to others.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>__9</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>__1</td>
<td>No support needed</td>
</tr>
<tr>
<td>__2</td>
<td>Some support needed; requires only occasional assistance or monitoring</td>
</tr>
<tr>
<td>__3</td>
<td>Extensive support needed; frequent or severe enough to require regular assistance</td>
</tr>
<tr>
<td>__9</td>
<td>Don’t Know</td>
</tr>
</tbody>
</table>

NCI Questions from Section II

**56) Who chose (or picked) the place where you live?** *(Did you help pick the place where you live?)*

*(Other respondent: Who chose the place where s/he lives? Did s/he have any input in making the decision?)*

If the person lives in their family home, please code Q56 as “8- NOT APPLICABLE”

<table>
<thead>
<tr>
<th>Respondent:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( ) 1-individual</td>
<td>( ) 2-family/friend</td>
</tr>
<tr>
<td>_8</td>
<td>NOT APPLICABLE – person lives in the family home</td>
</tr>
<tr>
<td>_2</td>
<td>Person made the choice</td>
</tr>
<tr>
<td>_1</td>
<td>Person had some input</td>
</tr>
<tr>
<td>_0</td>
<td>Someone else chose</td>
</tr>
<tr>
<td>_9</td>
<td>Don’t know, no response, unclear response</td>
</tr>
</tbody>
</table>

**57) Did you choose (or pick) the people you live with (or did you choose to live by yourself)?** *(Did anyone ask you who you’d like to live with? Were you given choices, did you get to interview people?)*

**Did you choose to live with ____________________________?**

*(Other respondent – Did this person choose any of the people s/he lives with? Or: Did this person choose to live alone?)*

If the person lives in their family home, please code Q57 as “8- NOT APPLICABLE”

63
58) **Who decides your daily schedule (like when to get up, when to eat, when to go to sleep)?**

(Other respondent – Who decides this person’s daily schedule, like when to get up, when to eat, when to go to sleep?)

<table>
<thead>
<tr>
<th></th>
<th>1-individual</th>
<th>2-family/friend</th>
<th>3-staff</th>
<th>4-other</th>
</tr>
</thead>
<tbody>
<tr>
<td>_8</td>
<td>NOT APPLICABLE – person lives in the family home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_2</td>
<td>Yes, chose people s/he lives with, or chose to live alone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_1</td>
<td>Chose some people or had some input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_0</td>
<td>No, someone else chose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_9</td>
<td>Don’t know, no response, unclear response</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

59) **Who decides how you spend your free time (when you are not working, in school or at the day program)?**

(Other respondent – Who decides how this person spends his/her free time?)

<table>
<thead>
<tr>
<th></th>
<th>1-individual</th>
<th>2-family/friend</th>
<th>3-staff</th>
<th>4-other</th>
</tr>
</thead>
<tbody>
<tr>
<td>_2</td>
<td>Person decides</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_1</td>
<td>Person has help deciding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_0</td>
<td>Someone else decides</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_9</td>
<td>Don’t know, no response, unclear response</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

62) **Do you choose what you buy with your spending money?**

Do not include things like rent or groceries.

(Other respondent – Does this person choose how to spend his/her money?)

<table>
<thead>
<tr>
<th></th>
<th>1-individual</th>
<th>2-family/friend</th>
<th>3-staff</th>
<th>4-other</th>
</tr>
</thead>
<tbody>
<tr>
<td>_2</td>
<td>Person chooses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_1</td>
<td>Person has help choosing what to buy, or has set limits (such as can buy small items, but not big items)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_0</td>
<td>Someone else chooses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_9</td>
<td>Don’t know, no response, unclear response</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Did you choose or pick your case manager/service coordinator?
Did you choose _______________________ to work with you?
(Other respondent – Did this person choose his/her case manager/service coordinator?)

<table>
<thead>
<tr>
<th>Respondent: ( ) 1-individual ( ) 2-family/friend ( ) 3-staff ( ) 4-other</th>
</tr>
</thead>
<tbody>
<tr>
<td>__8  NOT APPLICABLE - no case manager/service coordinator</td>
</tr>
<tr>
<td>__2  Yes, chose case manager/service coordinator</td>
</tr>
<tr>
<td>__1  Case manager/service coordinator was assigned but can be</td>
</tr>
<tr>
<td>changed if requested by person</td>
</tr>
<tr>
<td>__0  No, someone else chose case manager/service coordinator</td>
</tr>
<tr>
<td>__9  Don’t know, no response, unclear response</td>
</tr>
</tbody>
</table>
Appendix B: Table of Factor Loadings for EFA

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who decides your daily schedule (like when to get up, when to eat, when to go to sleep)?</td>
<td>.694</td>
<td>.088</td>
</tr>
<tr>
<td>Who decides how to spend your free time?</td>
<td>.864</td>
<td>-.099</td>
</tr>
<tr>
<td>Do you choose what you buy with your spending money?</td>
<td>.600</td>
<td>.086</td>
</tr>
<tr>
<td>Who chose (or picked) the place where you live?</td>
<td>.092</td>
<td>.661</td>
</tr>
<tr>
<td>Did you choose (or pick) the people you live with (or did you choose to live by yourself)?</td>
<td>-.080</td>
<td>.834</td>
</tr>
<tr>
<td>Did you choose (or pick) your case manager/service coordinator?</td>
<td>.029</td>
<td>.367</td>
</tr>
</tbody>
</table>

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.

Table 6: EFA Factor Loading Scores
Appendix C: Correlations between Variables in CFA

<table>
<thead>
<tr>
<th></th>
<th>ASD</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long-Term Choices</td>
<td>Short-Term Choices</td>
<td>Job Status</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>1</td>
<td>0.798**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=1102</td>
<td></td>
<td>0.258**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.28**</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>Long-Term Choices</td>
<td>Short-Term Choices</td>
<td>Job Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.749**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=783</td>
<td></td>
<td>0.235**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.287**</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>Long-Term Choices</td>
<td>Short-Term Choices</td>
<td>Job Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.807**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=9339</td>
<td></td>
<td>0.289**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.301**</td>
<td></td>
</tr>
<tr>
<td>ASD</td>
<td>Long-Term Choices</td>
<td>Short-Term Choices</td>
<td>Job Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.798**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=1102</td>
<td></td>
<td>0.258**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.28**</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

Table 7: Correlation Matrices between Short-Term Choices, Long-Term Choices, and Job Status across Disability Groups
Appendix: D: Frequency Distributions of New Variables Long-Term Choices and Short-Term Choices

Figure 6: Frequency Distribution of Long-Term Choices
Figure 7: Frequency Distribution of Short-Term Choices
Appendix E: CFA Structure and Regression Weights

Q1: Who chose the place where you live?
Q2: Did you choose the people you live with (or did you choose to live alone)?
Q3: Did you choose your case manager/service coordinator?
Q4: Who decides your daily schedule?
Q5: Who decides how you spend your free time?
Q6: Do you choose what to buy with your spending money?

<table>
<thead>
<tr>
<th></th>
<th>Long-Term Choices</th>
<th>Short-Term Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who chose the place where you live?</td>
<td>.765</td>
<td></td>
</tr>
<tr>
<td>Did you choose the people you live</td>
<td></td>
<td>.746</td>
</tr>
<tr>
<td>with (or did you choose to live</td>
<td></td>
<td></td>
</tr>
<tr>
<td>alone)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you choose your case</td>
<td></td>
<td>.341</td>
</tr>
<tr>
<td>manager/service coordinator?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who decides your daily schedule?</td>
<td></td>
<td>.750</td>
</tr>
<tr>
<td>Who decides how you spend your free</td>
<td></td>
<td>.765</td>
</tr>
<tr>
<td>time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you choose what to buy with your</td>
<td></td>
<td>.655</td>
</tr>
<tr>
<td>spending money?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: CFA Standardized Regression Weights