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Examining the Effectiveness of Social Intervention in Relation to Resiliency, Social Skills, and Mental Health in Young Adults with High Functioning Autism Spectrum Disorder

by

Marian Claire Coret

A THESIS

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Abstract

The present study examined resiliency, mental health, and social skill outcomes in young adults with High Functioning Autism Spectrum Disorder (HFASD) following completion of the Program for the Education and Enrichment of Relational Skills for Young Adults (PEERS-YA; Laugeson & Frankel, 2015). PEERS-YA is a 16-week manualized, evidence based, and caregiver-assisted social skills intervention designed to help young adults with HFASD to develop and maintain relationships. Measures of anxiety, depression, and social skills were examined 16 weeks prior to beginning of the program (T1), one week prior (T2), and one week after completion of PEERS-YA (T3). Additionally, measures of resiliency were examined at T2 and T3. The results indicated significant improvements in parent-reported social skills; however there were no significant improvements in anxiety, depression, resiliency, or self-reported social skills following completion of PEERS-YA.

Keywords: Adults, HFASD, resiliency, mental health, social skills.

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List of Abbreviations

ABAS-II	Adaptive Behavioural Assessment System – Second Edition
ADOS-2	Autism Diagnostic Observation Schedule – Second Edition
ADI-R	Autism Diagnostic Interview-Revised
AISH	Assured Income for the Severely Disabled
ANOVA	Analysis of Variance
APA	American Psychological Association
ASD	Autism Spectrum Disorder
BAI	Beck Anxiety Inventory
BDI-II	Beck Depression Inventory – Second Edition
CDC	Centers for Disease Control and Prevention
DSM-III	Diagnostic and Statistical Manual of Mental Disorders –Third Edition
DSM-IV	Diagnostic Statistical Manual of Mental Disorders –Fourth Edition
DSM-5	Diagnostic Statistical Manual of Mental Disorders – Fifth Edition
FSCD	Family Support for Children with Disabilities
FSIQ	Full Scale Intelligence Quotient
HFASD	High Functioning Autism Spectrum Disorder
ID	Intellectual Disability
IQ	Intelligence Quotient
LD	Learning Disability
LFASD	Low Functioning Autism Spectrum Disorder
PDD	Persons with Pervasive Disabilities
PDD-NOS	Pervasive Developmental Disorders – Not Otherwise Specified
PEERS	Program for the Education and Enrichment of Relational Skills
PEERS-YA	Program for the Education and Enrichment of Relational Skills for Young Adults
PRI	Perceptual Reasoning Index
RSCA	Resilience Scale for Children and Adolescents
RSYA	Resiliency Scale for Young Adults
SCI	Social Communication and Interaction
RRB	Restrictive and/or Repetitive Patterns of Behaviour
SSIS	Social Skills Improvement System
SSRS	Social Skills Responsiveness Scale
SST	Social Skills Training
TD	Typically-developing
TYASSK	Test of Young Adult Social Skills Knowledge
VCI	Verbal Comprehension Index
WAIS-IV	Wechsler Adult Intelligence Scale – Fourth Edition
WASI-II	The Wechsler Abbreviated Scale of Intelligence – Second Edition
WISC-IV	Wechsler Intelligence Scale for Children – Fourth Edition

CHAPTER 1: STUDY OVERVIEW

Young adults with Autism Spectrum Disorder (ASD) exhibit social, emotional, and behavioural challenges that place them at significantly greater risk for poor developmental outcomes (Lugnegård et al., 2011; Shtayermman, 2007). ASD is a neurodevelopmental disorder characterized by deficits in social interaction and communication, and engagement in repetitive and restrictive behaviours (American Psychiatric Association [APA], 2013). Moreover, individuals with ASD that present with average to above average cognitive abilities (i.e., intelligence quotient [IQ]>70), typically referred to as "high functioning" (HFASD), are more aware of their social inabilities and often report that these challenges prevent them from developing and maintaining peer relationships (Humphrey & Lewis, 2008). These characteristics are especially detrimental during the transition to adulthood when friendships and romantic relationships become more important and social interactions become increasingly complex (Berndt, 1982; Vickerstaff et al., 2007). In addition to the unique circumstances associated with the transition to adulthood for this population (e.g., limited funding, services, and supports and increasingly complex social, academic, and occupational environments; Liptak, Kennedy, & Dosa, 2011), adults with HFASD often have a long history of peer rejection, isolation, and mental health issues (Cappadocia et al., 2012). Recently, epidemiological studies have provided evidence for a high prevalence of co-occurring depression (i.e., 35% to 62%) and anxiety (30% to 68%) among young adults with HFASD (Hofvaner et al., 2009; Lai et al., 2011; Mazefsky et al., 2008). Moreover, the core social deficits associated with HFASD may lead to negative social interactions resulting in avoidance of social situations and isolation, thus consequently exacerbating social deficits and anxious and depressive symptoms (Bellini, 2006; Myles et al., 2001).

Despite the deleterious impact of HFASD and mental health issues on interpersonal, occupational, and academic functioning of young adults with HFASD, there is a paucity of research examining resiliency among this population (Montgomery et al., 2008). Resiliency is defined as a set of personal characteristics that contribute to an individual's ability to flexibly apply strategies to adapt to a dynamic environment (Block & Block, 1980). Importantly, social competence and a sense of relatedness are key factors within the construct of resiliency (Luthar, 1991; Prince-Embury, 2011; Shaffer et al., 2009). In this regard, it has been proposed that social intervention may be an effective tool for enhancing competencies related to resiliency within young adults with HFASD (Montgomery et al., 2008). Recently, Laugeson and Frankel (2014) developed the Program for the Education and Enrichment of Relational Skills for Young Adults (PEERS-YA), which is a 16-week, evidence-based, manualized, and caregiver-assisted social intervention designed to help young adults with HFASD learn how to develop and maintain friendships and romantic relationships. Preliminary findings from research on PEERS-YA have indicated significant improvement in multiple domains (e.g., improved social skills and empathy) following program completion (Gantman et al., 2012; Laugeson, Gantman, Kapp, Orenski, & Ellingsen, 2015). PEERS-YA aims to improve social skills through the development of more effective social behaviors and cognitions. Thus, PEERS-YA may enhance personal characteristics (i.e., social competence and sense of relatedness) associated with resiliency (Luthar, 1991; Prince-Embury, 2011; Shaffer et al., 2009).

Despite the promising preliminary results, existing empirical studies on PEERS-YA have not yet examined the impact on resiliency or mental health outcomes. In addition, researchers examining the efficacy of PEERS-YA have not yet employed standardized diagnostic tools or

self-report social skills measures. Moreover, PEERS-YA treatment success has not been evaluated within a Canadian population.

Current Study

The purpose of the current study was to address the limitations of existing literature. The study examined resiliency, social skills, anxiety, and depression in a sample of Canadian young adults with HFASD following completion of PEERS-YA.

The current study is presented in four chapters. The first chapter presents a brief summary of the present study. Chapter two provides a review of resilience and resiliency followed by an overview of ASD and HFASD that includes a discussion of co-occurring psychopathology and social disability evident in individuals with HFASD, unique challenges associated with their transition to adulthood, and the relation between mental health, social deficits, adulthood, and resiliency. The chapter finishes with a review social interventions (i.e., PEERS-YA) that may promote resiliency within the HFASD population. Chapter three reviews the methodology for the current study. Chapter four presents the data screening and analysis of the outcomes following program completion. Lastly, chapter five provides an overview of the implications, limitations, future directions, and conclusions of the present study.

CHAPTER 2: LITERATURE REVIEW

Investigating and promoting resiliency within populations that are at-risk for unfavorable mental health outcomes is critical as such individuals are at greater risk for adverse outcomes and place a significant burden upon individuals, families, and communities (World Health Organization, 2001). This issue is particularly important and relevant for individuals who struggle with social interactions as such impairments can exacerbate mental health issues in adolescence and adulthood (Allen et al., 2006; Wei, Russell, & Zakalik, 2005). For example, young adults with High Functioning Autism Spectrum Disorder (HFASD) experience significant challenges with social skills and often present with increased rates of internalizing disorders, such as anxiety and depression (Lugnegård, Hallerbäck, & Gillberg, 2011; Shtayermman, 2007; Sterling, Dawson, Estes, & Greenson, 2007; White, Oswald, Ollendick, & Scahill, 2009). Furthermore, the transition to adulthood for individuals with HFASD is often challenging in part due to the increasing complexity of social, educational, and occupational environments, and limited access to resources (Hillier, Fish, Siegel, & Beversdorf, 2011; White & Roberson-Nay, 2009). This experience of transition may exacerbate symptoms associated with HFASD and place young adults with HFASD at an even greater risk for developing co-morbid mental health issues (Hofvander et al., 2009). Thus, identifying interventions that promote resilient adaptation and positive mental health is imperative to improve quality of life for this population. Currently, there is a paucity of research examining the efficacy of evidence-based social skills programs for young adults with HFASD and the resulting impact on their mental health and resiliency (Hillier et al., 2011; Sharpley & Bitsika, 2014). However, a newly developed evidence-based program known as the Program for the Education and Enrichment of Relational Skills for Young Adults (PEERS-YA; Laugeson & Frankel, 2014) may improve social deficits and indirectly promote

resiliency and positive mental health outcomes for those with HFASD. The current study will examine the enhancement of social skills and explore mental health and resiliency outcomes in a population of young adults with HFASD following completion of PEERS-YA. This paper will provide a review of resilience and resiliency followed by an overview of autism spectrum disorder, the co-occurring mental health issues and social skill deficits apparent in individuals with the disorder, unique challenges associated with their transition to adulthood, and the relation between mental health, social disability, adulthood, and resiliency. Lastly, the paper will review social interventions that may promote resiliency within the HFASD population.

Resilience

Resilience is a dynamic construct that changes across the lifespan in response to environmental and/or biological stressors (Masten & Garmezy, 1985; Werner & Smith, 1982). The conceptualization of resilience has varied considerably among theorists. For example, "resilience" and "resiliency" are used interchangeably despite their considerable difference (Luthar, Cicchetti, & Becker, 2000). *Resilience* is defined as a dynamic developmental process that facilitates successful adaptation and positive outcomes despite experiencing adverse life events (Luthar et al., 2000). Thus resilience is composed of two key criteria: 1) exposure to significant adversity or risk and 2) successful adaptation despite serious threats to development (Garmezy, 1970; Rutter, 1993; Werner & Smith, 1982). In contrast, *resiliency* is a set of personal characteristics that contribute to an individual's ability to be resourceful and flexibly apply strategies to adapt to the changing environment (Block & Block, 1980). As such, resiliency does not necessitate exposure to "substantial adversity" (Luthar et al., 2000, p. 5). For the purposes of consistency and accuracy, this review will begin with an introduction to resilience and will subsequently provide a review of resiliency, which is the focus of the current study.

The construct of resilience evolved from early research within the field of developmental psychopathology (i.e., the study and prediction of maladaptive behaviours and processes over time; Masten, Best, & Garmezy, 1990; Sroufe & Rutter, 1984). The central tenet of developmental psychopathology involves the examination of etiology, nature, and course of psychopathology across development. Despite claims that complex adult psychopathology could not be predicted from childhood developmental processes (Sroufe & Rutter, 1984), developmental psychopathologists in the 1960s began research endeavors within the field of vulnerability. This area of research focused on the study of populations at-risk for maladaptation through examination of underlying developmental processes and risk factors that contribute to vulnerability (Masten et al.,1990; Mednick & Schulsinger, 1968). The term *at-risk* is defined as the experience of a negative life event (e.g., parental psychopathology, psychosocial disadvantage, and/or loss; Masten et al., 1999) that is associated with adverse outcomes (Lynch & Cicchetti, 1997). *Risk factors* are any characteristics or environmental exposure that may increase the likelihood of adverse outcomes such as mental health disorders or disease (Rutter, 1993). *Vulnerability* refers to susceptibility to adverse developmental outcomes in response to exposure to high-risk circumstances (Rutter, 1987).

The majority of vulnerability research has focused on the outcomes of children at risk for developing severe mental health issues (e.g., schizophrenia). The primary goals of this line of research involved identification of vulnerable populations and examination of etiology and prognosis to inform early intervention (Watt, 1984). In an early empirical study in 1968, Mednick and Schulsinger employed a unique methodology in which premorbid characteristics of at-risk populations were examined to augment early detection procedures. More specifically, the authors examined the development of 207 children born to mothers with schizophrenia over a

period of five years and in comparison to matched controls. The authors reported that only 20 of the high-risk children exhibited significant psychopathology. Moreover, the results indicated that certain characteristics such as high physiological arousal and maternal loss significantly distinguished this clinical subgroup from other high-risk peers, who did not exhibit symptomology at the time of data collection. This unique technique employed by Mednick and Schulsinger (1968) garnered increased interest in vulnerability research and further promoted the examination of associated risk factors contributing to the development of psychopathology. As a result, vulnerability researchers implemented these unique techniques and began to study high-risk children based on genetic predisposition, prenatal or neonatal hazards, and/or poor family or environmental conditions. Child developmental processes and outcomes were evaluated in comparison to their same aged peers and categorized as either maladaptive (i.e., poor academic or social abilities or presence of atypical or antisocial behaviours) or adaptive (i.e., competence and maturity in addition to absence of atypical behaviours; Garmezy, 1971; Sroufe & Rutter, 1984). However, as the body of vulnerability research began to grow, many researchers noted an unexpected finding that, despite considerably unfavorable circumstances, a subset of the high risk sample developed into adaptive and even successful adults (Heston & Denny, 1968; Karlsson, 1966; McNeil, 1969).

As a result, researchers in the early 1970s became interested in focusing on the unique subset of individuals who, even after exposure to significant risk factors, continued to thrive (Garmezy, 1970). This event marked a paradigm shift toward greater emphasis on investigating the role of protective factors (i.e., factors contributing to the success of those faced with adverse situations; Rutter, 1993). Founding resilience researchers such as Garmezy and Rutter focused on identifying protective factors associated with children who exhibited adaptive and positive

behaviours despite having a parent with schizophrenia. These research studies provided evidence that children with characteristics such as high competence, creativity, and effectiveness were more likely to experience positive outcomes despite having a parent with schizophrenia (Rutter, 1979). Anthony (1974) and Rutter (1979) termed these children as being *invulnerable*, which presupposed that individual characteristics possessed by the child would buffer them from any adverse experiences. Following the development of this terminology, empirical studies provided evidence that this phenomenon was not static but rather changed throughout development in response to the nature and severity of environmental and biological insults. As a result, researchers introduced the construct of resilience, which is a more suitable term to represent the multidimensional and dynamic process of adaptation (Luthar et al., 2000).

In one of the earliest and largest longitudinal studies focusing on resilience, Werner, Biermann, and French (1971) examined the development of 695 infants from the island of Kauai, Hawaii during several different time points (i.e., from prenatal period to 32 years of age). At each time point (i.e., prenatal period, early and middle childhood, adolescence, and adulthood), the authors examined exposure to differing levels of biological and psychosocial risk factors, adverse life events, and protective factors as well as the resulting impact on developmental outcomes. Initially, one-third of the sample was categorized as "high risk" due to exposure to perinatal stress, poverty, low maternal academic attainment, or poor quality family environment (i.e., characterized by discord, divorce, parental alcoholism, or psychopathology). However, when examined at age 18, results indicated that two-thirds of studied children who experienced four or more risk factors prior to the age of two exhibited learning or behavioural challenges, mental health issues, and/or experienced teenage pregnancy or legal issues. Notably, one-third of the sample, which was initially deemed as high risk, exhibited successful adaptation at 18 years

of age. Upon examination of factors impacting the development of these resilient children, the authors found that these children experienced protective factors such as those within intrapersonal, interpersonal, and sociocultural domains. For example, these children were described as having a more positive temperament (e.g., described as active, agreeable, affectionate, cheerful, good natured, and easy to deal with), better sleeping and eating habits, better social orientation, and better communication, coping, and motor abilities. As children, they developed strong and positive relationships with their peers, one or more caregivers, and other non-parental adults (e.g., teachers, family friends), engaged in extracurricular activities, demonstrated good academic performance (i.e., reasoning and reading skills) and motivation, and exhibited a positive self-concept and internal locus of control. Interestingly, when the maladaptive sample (i.e., the two-thirds of the sample who were categorized as high risk) was examined in middle adulthood, one-third developed into successful, competent, confident, and caring adults. These unique resilient individuals had several distinguishing influences and characteristics such as exposure to higher quality caregiver interactions, better social skills, problem solving, reading abilities, coping mechanisms, and social support. Overall, the results of the research conducted by Werner and colleagues (1971) provided evidence of the dynamic nature of resilience and subsequently attracted further research focusing on identification of risk and protective factors impacting development across the lifespan.

Subsequent to this research, robust findings have provided evidence for additional risk and protective factors within intrapersonal (i.e., personality, temperament, dispositional attributes) interpersonal (i.e., family cohesion, social skills, peer relationships), and sociocultural domains (i.e., socioeconomic status, school climate, work, church) which dynamically interact to impact physical, cognitive, and psychosocial development across the lifespan (Masten, 2001;

Werner et al., 1971). More specifically, researchers have found that low socioeconomic status (SES), exposure to maltreatment, or trauma and loss are associated with poorer developmental outcomes (World Health Oragnization, 2008; Graham-Bermann & Seng, 2005). In contrast, researchers have found that intelligence, social skills, sense of self efficacy, humor, positive goal setting behaviours (e.g., optimism and adaptability), coping mechanisms (i.e., internal locus of control, emotional regulation), family environment (e.g., at least one compatible, supportive, caring, and competent parent), and social supports (e.g., friends, peers, teachers, ministers, and other supportive adults) contribute to more favorable developmental outcomes (i.e., academic achievement, occupational attainment, and social success; Garmezy, 1971; Luthar & Ziegler, 1991; Masten et al., 1985; Wener & Smith, 1982).

From an ecological perspective, individuals develop within a complex network of interconnected systems (Bronfenbrenner 1986). Within this framework, the unique developmental outcome of an individual is determined by continuous and dynamic reciprocal interactions between protective and risk factors within a given microsystem (e.g., family relationships, friendships, and occupational/academic environment), mesosystem (e.g., interaction of home and occupational/academic environment), exosystem (e.g., parental employment), and macrosystem (e.g., socioeconomic status; Rutter, 1987). Additionally, risk and protective factors co-occur, change over time, exhibit bidirectional effects, and are cumulative in nature (Walker et al., 2011). As such, resilience can be understood as a multifaceted construct that allows for significant heterogeneity within cognitive, behavioural, and emotional spheres (Luthar et al., 2000; Masten, 2001). Resilience can be further investigated by examining the interaction between genetic, environmental, social, and/or biological factors and the resulting effects on development (Herrman et al., 2011; Luthar & Cicchetti, 2000).

Recent advancements in genetic research have led to the discovery of variant genotypes, that influence developmental processes and contribute to the risk of developing disorders (e.g., depression) and health conditions (e.g., diabetes). However, genetics alone cannot explain the development of complex disorders and thus risk and protective factors must be examined at multiple levels within an environmental context. For example, Kaufman and colleagues (2006) reported a significant three-way interaction between the presence of specific genotype (i.e., brain derived neurotrophic factor; BDNF, and serotonin transporter; 5-HTTLPR) and maltreatment history. These results indicate that children with exposure to maltreatment had significantly higher rates of depression and posttraumatic stress disorder. Moreover, of the children exposed to maltreatment, those with a specific genotype exhibited significantly higher levels of depression. Additionally, level of social support moderated the level of depressive symptomology for the children exposed to maltreatment with the specific genotype. Such findings provide evidence for genetic sensitivity to environmental influence and an interaction of genetic and environmental risk factors (i.e., maltreatment history), and social protective factors (i.e., social support). To this end, it follows that a complex interplay of bidirectional effects exists among social, environmental, biological, and genetic factors (Kaufman et al., 2006).

Assessment of Resilience. Despite a plethora of research identifying risk and protective factors, measurement of resilience in individuals has proved challenging (Luthar et al., 2000). As a result of the complexity of the reciprocal interactions among factors (e.g., biological, genetic, environmental, and social) and unique characteristics of individuals (i.e., intrapersonal, interpersonal, and sociocultural factors), researchers have struggled to identify which factors to measure when assessing resilience (Windle, Bennett, & Noyes, 2011). Additionally, researchers struggle to capture the multitude of adverse life events and defining what constitutes “positive

adjustment" (e.g., academic, vocational, or social success, and/or mental and/or physical health outcomes; Luthar et al., 2000). Moreover, researchers who primarily measure resilience focus on a multitude of risk and protective factors (i.e., genetic, biological, environmental, intrapersonal, and interpersonal factors) and thus often require complex multidisciplinary approaches and, in some instances, longitudinal study designs. In this regard, such methods may be labour intensive, time consuming, and costly, and thus may not be feasible (Windle et al., 2011).

Resiliency

In contrast to resilience, resiliency is conceptualized as personal characteristics that are associated with resilient outcomes. Thus, resiliency is an important factor that may contribute to a resilient outcome, but does not fully capture the dynamic process of resilience (Masten, 1994).

The study of resiliency can be traced back to early resilience research studies conducted by prominent researchers such as Garmezy, Rutter, and Werner. This research highlighted that in addition to external factors, certain internal characteristics are associated with more favourable outcomes (Garmezy, 1970; Rutter, 1979; Werner et al., 1971). Since the introduction of resiliency, it has been suggested that three waves of research have evolved over the past 50 years (Richardson, 2002). The first and initial wave focused on the identification of personal characteristics associated with resiliency (Gillespie, Chaboyer, & Wallis, 2009; Mrazek & Mrazek, 1987). This research has led to the understanding that social competence, achievement orientation, optimism, flexibility, self-efficacy, internal locus of control, and positive values (e.g., honesty, integrity, and responsibility) as well as planning, problem solving, and critical thinking skills are important predictors of successful adaptation (Benson, 1997; Garmezy, 1991; Rutter, 1979, 1985; Werner & Smith, 1992). Following this, the second wave of research has been dedicated to exploring the process and development of resiliency, and has led to the

development of several proposed theoretical models. For example, it has been suggested that the continual process of disruption and reintegration facilitates the growth of characteristics associated with resiliency (Richardson et al., 1990). Lastly, the third wave of research has begun to identify methods to help cultivate resiliency within individuals (Richardson, 2002).

The growing interest in the identification, process, and promotion of resiliency has led to the refinement of the conceptualization of resiliency. Based on the culmination of basic research findings, researchers such as Prince-Embury (2011) have conceptualized resiliency as being comprised of three core personal attributes including 1) sense of mastery (i.e., optimism, self-efficacy, adaptability), 2) sense of relatedness (i.e., trust, support, comfort, tolerance) and 3) emotional reactivity (i.e., sensitivity, impairment, recovery).

Assessment of Resiliency. Resiliency is typically examined via self-report measures to evaluate levels of personal attributes associated with resilient outcomes (Smith, Saklofske, Prince-Embury, Nordstokke, & Vesely, 2014). Thus, in comparison to the complex methods required for the measurement of resilience, self-report measures of resiliency may be a more time effective method for obtaining a snapshot of areas of intrapersonal protection and risk (Smith et al., 2014).

Self-report resiliency measures should be based on current empirical findings and theoretical foundations, and capture core areas of resiliency including both risk and protective factors across a variety intrapersonal characteristics for both clinical and typically developing populations. Currently, there are several self-report measures for children, adolescents, and adults that assess levels of resiliency (Prince-Embury, Saklofske, & Vesely, 2014). However, current measures designed to assess resiliency vary considerably in their reliability and validity within and across cultures (Hjemdal, Roazzi, Dias, & Friborg, 2015). Thus, there is no gold

standard measurement tool for the assessment of resiliency (Windle et al., 2011). However, the development of recent self-report resiliency measurement tools such as the Resilience Scale for Children and Adolescents (RSCA; Prince-Embury, 2006) has provided evidence of promising psychometric properties. The use of psychometrically appropriate measures is especially important for the development and evaluation of the efficacy of interventions designed to promote resiliency in at risk populations.

Resiliency in Atypical Populations. Early resiliency research has focused on examining the development of the construct in typical populations who experience adverse situations. In this regard, a plethora of research has examined the impact of stressful life experiences (e.g., exposure to war, terrorism, natural disasters, and other unexpected traumatic experiences) and chronic adversity (i.e., poverty, parental psychopathology, parental conflict, maltreatment) on typical developmental processes (Masten, 2001). This research has yielded evidence suggesting that resiliency encompasses several domains of personal characteristics and competencies including achievement motivation, social competency, and positive self-identity and values (Benson, 1997; Garmezy, 1991; Masten, 1993; Rutter, 1993). For example, social competence (i.e., the ability to appropriately and flexibly adapt to changing social demands; Bierman, 2004) as measured in childhood significantly predicts occupational, parenting, and romantic relationship success later in adulthood (Masten et al., 1995, 2010; Shaffer, Burt, Obradovic, Herbers, & Masten, 2009).

Historically, researchers conceptualized the absence of psychopathology as an indicator of resiliency (i.e., protecting against adverse circumstances; Luthar & Cushing, 1999). However, the focus has more recently shifted towards examination of successful adaptation under adverse conditions, which may include psychopathology (Climie, Mastoras, McCrimmon & Schwean,

2013). This change in focus is particularly important because there is considerable heterogeneity among individuals with psychopathology, suggesting that there are factors that promote resiliency within individuals with psychopathology. Principles of multifinality (e.g., different outcomes despite similar origins and/or developmental processes) and equifinality (e.g., similar outcomes despite different origins and/or developmental processes) highlight the notion that significant heterogeneity exists within clinical and non-clinical populations (Richters, 1997; von Bertalanffy, 1968). For example, some individuals with Autism Spectrum Disorder are significantly more impaired than others despite common challenges and behavioural symptoms. Therefore, it is well established that both risk and protective factors are at play and act as determinants of areas of strength or weakness within clinical and non-clinical populations (Climie et al., 2013; Curtis & Cicchetti, 2003). Thus, there must be some aspect of resiliency within clinical populations. Additionally, the presence of psychopathology can be examined as a risk factor in itself as it is associated with a multitude of adverse outcomes (e.g., psychiatric comorbidities, co-occurring health issues, and limited success within occupational, social, and academic environments; Climie et al., 2013; Shtayermman, 2007). Furthermore, research on resiliency within atypical populations is particularly important because processes associated with atypical developmental can inform typical development and vice versa (Fair, Bathula, Nikolas, & Nigg, 2012). Thus, the study of resiliency may elucidate the processes underlying successful adaptation despite adverse circumstances. It is imperative to identify and promote resiliency factors to increase the likelihood of attaining favorable life outcomes for vulnerable populations (Climie et al., 2013), which is one of the main aims of the research presented in this study.

Autism Spectrum Disorder

One population that exhibits considerable vulnerability for poor developmental outcomes is individuals with Autism Spectrum Disorder (ASD). ASD is a complex neurodevelopmental disorder characterized by deficits in social communication in the presence of repetitive and/or restrictive behaviours or interests (APA, 2013). Manifestation of ASD symptoms vary greatly in nature and severity within the two core domains both intra- (i.e., across the lifespan of an individual with ASD) and inter-individually (across individuals with ASD; APA, 2013). Additionally, there is considerable variability in verbal and cognitive abilities of individuals diagnosed with ASD. In this regard, ASD is characterized as spectrum disorder (APA, 2013). A comprehensive review of current DSM-5 criteria, history of ASD conception and diagnosis, assessment, prevalence, etiology, and comorbidities associated with ASD will be provided to inform the reader of current findings and issues within the ASD literature.

DSM-5 Criteria for ASD Diagnosis. Impairment in social communication and interaction (SCI) is a hallmark feature of ASD across the lifespan (APA, 2013). More specifically, individuals with ASD experience deficits in 1) social-emotional reciprocity (i.e., the ability to interact with others and exchange thoughts and feelings), 2) non-verbal communication (e.g. use of gestures, facial expressions, eye contact, and tone of voice), and 3) developing, maintaining, and understanding friendships and other relationships (e.g., romantic relationships; APA, 2013). These symptoms must be pervasive and present in multiple contexts (APA, 2013). Specifically, individuals with ASD exhibit atypical speech including pronoun reversal (e.g., use of “me” rather than “I”), semantic and grammatical errors, idiosyncratic speech (i.e., speech that is odd or advanced for their age), and prosody abnormalities (e.g., monotone or sing-songy voice; APA, 2013; Tantam, 2003). Those with ASD also typically experience difficulty

understanding abstract speech such as metaphors and sarcasm (Tantum, 2003). ASD is also associated with impairment in interpretation and communication of non-verbal components of social interaction including eye contact, gaze, facial expression and gesture. As a result of these challenges, social pragmatics such as interpretation of social cues (e.g., teasing behaviours) and implementation of socially appropriate behaviours (e.g., providing appropriate personal space) may prove more challenging (Tantum, 2003). Those with ASD also exhibit challenges with reciprocal social interaction. Notably, individuals with ASD often experience deficits in social cognition (e.g., the ability to understand the perspective and emotions of others) that may limit their ability to process information about others and ultimately impact the nature and quality of their relationships. Individuals with ASD tend to engage in one-way conversation, perseverate on highly specific topics, and have difficulty responding to comments and/or questions from others (Elder, Caterino, Chao, Shacknai, & DeSimone, 2006; Volkmar & Klin, 2005). Collectively, social skills deficits associated with ASD may explain difficulty with initiating and maintaining friendships, which is a core feature of ASD (APA, 2013; Mundy & Sigman, 2006).

Individuals with ASD also exhibit restrictive and/or repetitive patterns of behaviour (RRB), interests, or activities. In accordance with DSM-5 criteria, individuals with ASD must exhibit at least two of the following symptoms: 1) stereotyped or repetitive motor movements (e.g., pacing, body rocking, or hand flapping), use of objects (e.g., lining up toys rather than animating them), or speech (i.e., immediate or delayed echolalia and/or idiosyncratic phrases), 2) insistence on sameness or compulsive adherence to routine (e.g., significant distress experienced if routine is altered), or ritualized patterns of verbal or nonverbal behaviour (e.g., bedtime routine must be conducted in a specific way and order), 3) restrictive and fixated interests that are atypical in intensity (e.g., preoccupation with specific objects or perseveration on highly specific

topics), or 4) sensory integration impairment (i.e., hypo- or hyper-reactivity to sensations such as touch, taste, temperature, smell, sound, and vision). Additionally, these symptoms must be present in early in life, significantly impact daily functioning in multiple environments (i.e., home, school, work, and/or social environments), and may not be better explained by intellectual disability or global developmental delay (APA, 2013). In addition to diagnosis of ASD, the DSM-5 guidelines require detailed specifiers that indicate level of impairment within the SCI and RRB domains (i.e., level 1 = requiring support, level 2 = requiring substantial support, level 3 = requiring very substantial support), presence and/or absence of intellectual and/or language disorder, as well as presence of catatonia (i.e., abnormal motor movement and behaviour) or any additional neurodevelopmental, mental, or behaviour disorders (APA, 2013).

History of ASD. The term *autism* (derived from the Greek word *autos* meaning self) was first used in 1910 by a Swiss psychiatrist, Eugen Bleuler, to describe symptoms associated with schizophrenia (e.g., inhibition of emotional expressions). Later in 1943, child psychiatrist Leo Kanner used the term *infantile autism* to describe several case studies of children who exhibited patterns of impairments in social interactions, language, and restrictive and repetitive interests. Shortly thereafter, in 1944, a pediatrician named Hans Asperger published the first definition of *Asperger's syndrome* based on a group of children who exhibited fluent language accompanied by a pattern of impairments in social communication and emotional reciprocity, and the presence of intense and fixated interests (Asperger, 1944, 1991). These findings led to further research on children with symptoms associated with ASD and the eventual introduction of diagnostic framework for "infantile autism" in the *Diagnostic Statistical Manual of Mental Disorders, Third Edition* (DSM-III; APA, 1980).

According to the DSM-III, infantile autism was characterized by symptoms such as a pervasive lack of responsiveness to others, deficits in language development, peculiar speech patterns (e.g., delayed and immediate echolalia, metaphorical language, and pronoun reversals), and atypical responses to environmental stimuli (e.g., challenges with environmental changes and abnormal interest in objects) with an onset before 30 months of age (APA, 1980). In 1987, the DSM-III-Revised replaced infantile autism with *autistic disorder*, which was characterized by impairments in reciprocal social interaction, verbal and nonverbal communication, and imaginative behaviours, and the presence of restricted activities and interests with an onset during infancy or early childhood (APA, 1987). With a greater understanding of the concept of autism, many children exhibited symptoms similar to those described by autistic disorder but failed to meet diagnostic criteria. As a result, the *Diagnostic Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) characterized three subtypes of pervasive developmental disorder including autistic disorder, Asperger's disorder, and pervasive-developmental disorder not otherwise specified (PDD-NOS) which encompassed a greater variety of symptoms associated with autism (APA, 1994). According to the DSM-IV, *Asperger's disorder* was characterized by impairment in social interaction and presence of restricted repetitive and stereotyped behaviours, interests, and activities (APA, 1994). Additionally*, PDD-NOS* was characterized by pervasive impairment in social interaction associated with deficits in verbal or non-verbal communication that are not better explained by another disorder (e.g., Autistic disorder, Asperger's disorder, or schizophrenia; APA, 1994). However, several large-scale studies using the DSM-IV diagnostic framework provided evidence that reliability of differential diagnosis of these subtypes was less than ideal despite high fidelity of diagnostic assessment procedures among clinicians (Lord et al., 2012). Moreover, research findings suggested that

diagnosis of ASD subtypes varied across development (e.g., a four-year-old child initially diagnosed with autistic disorder may be later diagnosed with PDD-NOS). In contrast, the overarching diagnosis of ASD exhibited significantly greater stability (Lord et al., 2006; van Daalen et al., 2009). As a result, the DSM-5 Task Force introduced a single, multidimensional disorder in which individuals are categorized as having ASD based on two symptom dimensions (i.e., SCI and RRBs; APA, 2013). As a result of the new classification system, individuals previously diagnosed with DSM-IV subtypes (i.e., autistic disorder, Asperger's syndrome, and PDD-NOS) may now be classified as having ASD (APA, 2013). Furthermore, the umbrella term of ASD represents considerable intra-individual and inter-individual variability within a single disorder that may allow for more valid and stable diagnosis across development (Rutter, 2011; Woolfenden, Sarkozy, Ridley, & Williams, 2012). In contrast to the DSM-IV, the DSM-5 does not specify an age of onset for ASD, but rather requires evidence of symptoms within the early developmental period (i.e., the first five years of life). Thus, individuals may be formally diagnosed at any time point during development (i.e., childhood or adulthood; APA, 2013).

Assessment of ASD. To date, there are no biological markers or medical procedures available to assist with the diagnosis of ASD. Thus, current diagnostic procedures rely on classification of behavioural symptoms and developmental history. As a result, differential diagnosis may be especially challenging due to symptom heterogeneity among the ASD population (Mannion & Leader, 2013). Currently, best practice standards have dictated that the use of "gold standard" standardized assessment tools such as the Autism Diagnostic Observation Schedule - Second Edition (ADOS-II; Lord et al., 2012) and the Autism Diagnostic Interview - Revised (ADI-R; Le Couteur, Lord, & Rutter, 2003) within the context of a multidisciplinary approach (i.e., assessment across multiple domains of functioning) is ideal for ASD diagnosis.

Prevalence. In 2010, the CDC estimated that 1 in 68 children were diagnosed with ASD, which represents a 29% and 123% increase in prevalence from 2006 (i.e., 1 in 88 children) and 2002 estimates (i.e., 1 in 150 children), respectively. However, current epidemiological studies in the United States estimate that one in 50 school-aged children have an ASD diagnosis (CDC, 2013); this statistic likely represents the Canadian population as well (French, Bertone, Hyde, & Fombonne, 2013). The CDC (2014) suggests that increasing prevalence rates may be in part due to increased awareness, improved diagnostic procedures, and revised ASD definitions. However, these factors may not provide a comprehensive explanation of this phenomenon (CDC, 2014). Importantly, robust epidemiological research indicates significant gender differences in ASD diagnosis such that a larger proportion of males are affected (i.e., 4:1, males: females; CDC, 2014; French et al., 2013).

Etiology and Risk Factors. The development of ASD is associated with a multitude of potential environmental and genetic/physiological risk factors. More specifically, twin and sibling studies indicate that multiple genetic risk factors contribute to the development of ASD (Hallmayer et al., 2011; Ozonoff et al., 2011). Currently, there are no single identified genetic mutations that cause ASD; however, it has been theorized that multiple genes may contribute to the overall ASD phenotype (Folstein & Rosen-Sheidley, 2001). Additionally, environmental factors such as prenatal and perinatal disturbances (e.g., maternal illness or drug exposure during pregnancy and birth complications; Gardener, Spiegelman, & Buka, 2011), older maternal and paternal age (Hultman, Sandin, Levine, Lichtenstein, & Reichenberg, 2011), and exposure to pollutants (e.g., living near a major highway; Volk et al., 2011) and pesticides (Roberts et al., 2007) have been associated with a higher risk for developing ASD. Importantly, epigenetic

research has suggested that cumulative and bidirectional gene-environment interactions may ultimately determine the risk for the eventual development of ASD (Newschaffer et al., 2007).

High Functioning Autism Spectrum Disorder (HFASD). Individuals with ASD are at a significantly greater risk for intellectual disability (ID), a neurodevelopmental disorder characterized by significant impairment in intellectual (i.e., ability to learn, reason, and problem solve; measured by intelligence quotient) and adaptive (e.g., social, communication, and independent living skills) functioning (APA, 2013). Results from large-scale epidemiological studies have revealed that approximately 50 to 70% of individuals with ASD also exhibit ID (Fombonne, 2003). Thus, a two dimensional model of intellectual abilities is often used further classify individuals with ASD as either high functioning (HFASD; IQ greater than 70) or low functioning (LFASD; IQ less than 70; Szatmari, 2000). Importantly, these two populations differ significantly in characteristics associated with ASD such as symptom severity, comorbid psychopathology, and response to intervention. Individuals with LFASD tend to exhibit more severe ASD symptoms (Szatmari, 2000). Comparatively, individuals with HFASD, who have greater intellectual abilities, may be more aware of their deficits and experience greater risk for developing mental health issues (e.g., anxiety and depression; Mayes et al., 2011). Additionally, due to their higher intellectual abilities, individuals with HFASD may be more responsive to treatment options such as social interventions (Laugeson & Frankel, 2014). For the purposes of consistency, the remainder of the paper will focus on the population of individuals with HFASD.

HFASD in Adulthood. Increasing ASD prevalence rates implies that a greater number of individuals with ASD and families are in need of effective treatments (CDC, 2013). Moreover, the rising prevalence also suggests that a growing number of individuals with HFASD will experience the transition to adulthood and its associated challenges, which may be particularly

difficult for this population. For example, young adults with HFASD must navigate the changing demands of increasingly complex social, educational, and occupational environments (Kapp, Gantman, & Laugeson, 2011). As a result of an increased need for self-advocacy and independence, young adults with HFASD often find it difficult to adjust to the increased demands associated with adulthood (Geller & Greenberg, 2010). Further, as a result of unique challenges associated with HFASD, young adults with HFASD exhibit greater risk for poor outcomes. For example, young adults with HFASD experience lower employment rates and post-secondary attendance, limited independent living, reduced quality and number of friendships and romantic relationships, and an increased likelihood of developing anxiety and/or depressive disorders (Hofvander et al., 2009; Howlin, 2000; Liptak, Kennedy, & Dosa, 2011; Shattuck et al., 2012). Adverse experiences and limited opportunities for this population (e.g., limited occupational opportunities) may further increase the likelihood of poor developmental outcomes such as long-term employment, economic status, and social competence (Dixon, Kruse, & Van Horn, 2003). Despite the importance of wellbeing (i.e., possessing the psychological, social, and physical resources necessary to overcome individual challenges; Dodge, Daly, Huyton, & Sanders, 2012), young adults with HFASD often have limited access to specialized supports and services (Shattuck et al., 2011).

Currently, children with ASD in Alberta are provided with mandated and provincially-funded services (e.g., Family Support for Children with Disabilities; FSCD). However, upon reaching 18 years of age, young adults with ASD are no longer eligible for FSCD and have limited access to transition planning and program coordination services (Gerhardt & Lanier, 2011). Instead, young adults with ASD may apply to receive provincial funding from Persons with Pervasive Disabilities (PDD; for those with an IQ < 70) or Assured Income for the Severely

Disabled (AISH; for adults with a disability in need of financial support; Alberta Health Services, 2014; Madore, 2006). Despite the limited availability of government funding, families of adults with ASD who receive such funding often report that this funding is insufficient to meet the needs characteristic of this population (Alberta Disabilities Forum, 2015).

In addition to limited funding, a scarce number of high-quality age-appropriate educational, vocational, and social programs are available for this population (Van Bourgondien, Dawkins, & Markus, 2014). Furthermore, in response to lack of funding and programs available, parents/caregivers often take on multiple roles including service provider, program coordinator, advocate, and caregiver (Van Bourgondien et al., 2014). As a result of the demands and stress associated with being a parent/caregiver to an adult with HFASD, parents may be limited in their ability to contribute to the workforce (Dudley & Emery, 2014). Taken together, the reduced productivity characteristic of this population and their parents/caregivers in combination with the increased cost of support services for this age group poses a significant financial burden to both individual families and society as a whole (Ganz, 2007). Given the substantial challenges faced by young adults with ASD and the associated cost, identifying effective interventions, enhancing resiliency, and optimizing potential for relational and vocational success is imperative.

Social Skills in HFASD

Social disability has been proposed to be the most prominent feature associated with HFASD (Laushley & Heflin, 2000). To examine the nature and quality of social deficits characteristic of HFASD, it is crucial to firstly provide an overview of relevant terminology related to social development. *Social skill* refers to a set of behaviours and cognitions that are necessary for developing and maintaining social interactions and relationships (Spence, Donovan, & Brechman-Toussaint, 1999). In contrast, *social ability* is defined as the degree to

which an individual can associate with peers and utilize tools within a social context to achieve a goal (Laffey, Lynn, & Lynn, 2006). *Social competence* is defined as the quality of social performance (i.e., as judged by peers, parents, and other adults) and is a direct consequence of social skill implementation (McFall, 1982). Thus, social competence is a higher order skill that requires both social skill and ability.

As mentioned previously, individuals with ASD exhibit challenges in verbal and non-verbal communication and reciprocal social interaction that impacts their ability to participate in fluid, dynamic social exchange (APA, 2013; Tantam, 2003). Despite similar core deficits among individuals across the autism spectrum, the behavioural patterns of individuals with LFASD and HFASD are considerably different as a result of functioning levels (i.e., represented by cognitive and language abilities). Given their language abilities, individuals with HFASD typically exhibit social impairment in the form of one-way conversations, overly formal speech, topic perseveration, unexpected topic switching, inappropriate level of detail, unresponsiveness to social cues from others, difficulty interpreting sarcasm, and general difficulty following the reciprocal nature of conversations (Elder et al., 2006; Ghaziddin & Gerstein, 1996; Paul, Orlovski, Marcinko & Volkmar, 2009; Volkmar & Klin, 2005). In this regard, it follows that individuals with HFASD exhibit deficits in social skills and subsequent higher order skills such as social ability and competence. As a result of these social interaction challenges, social exchange between individuals with HFASD and their same aged peers is often described as brief, socially awkward, and at times, invasive (Bauminger, Shulman, & Agam, 2003; Laugeson & Ellingsen, 2014). In this regard, individuals with HFASD may be perceived by peers as being strange and may be more likely to experience peer rejection and social isolation (Matthews, Ly, & Goldberg, 2015). In addition, many individuals with HFASD experience significant difficulty

with initiation of social interactions and rarely participate in social activities (Shtayermman, 2007). Moreover, despite their desire to develop friendships, many individuals with HFASD report having either no, few, or lower quality friendships (Attwood, 2000; Orsmond, Krauss, Seltzer, 2004). Taken together, the social skills deficits characteristic of individuals with HFASD may explain the difficulty experienced with initiating and maintaining high quality relationships (i.e., social competence; Mundy & Sigman, 2006).

Social Skills in Young Adults with HFASD. Social skill dysfunctions are especially debilitating during young adulthood when social interactions become increasingly complex and friendships and romantic relationships become more important and socially expected (Berndt, 1982; Vickerstaff, Heriot, Wong, Lopes, & Dossetor, 2007). Many young adults with HFASD are aware of their social challenges and report that these challenges prevent them from developing and maintaining peer relationships (Humphrey & Lewis, 2008). During the transition period, young adults with HFASD may also struggle to identify a suitable peer group and often report feeling socially isolated (Orsmond et al., 2004; Portway & Johnson, 2003; Ryan & Raisanen, 2008). Adults with HFASD typically experience a combination of poor quality friendships (i.e., more than 50% report having no close friendships; Liptak et al., 2011) and a desire for more meaningful relationships (Carrington, Templeton, & Papinczak, 2003). Young adults with HFASD report significantly lower frequency of social interactions including phone calls, e-mails, text messages, and get-togethers as well as fewer invitations to social gatherings when compared to same aged peers with other clinical challenges (i.e., adults with ID, learning disability (LD), or emotional and behavioural challenges; Liptak et al., 2011; Orsmond, Shattuck, Cooper, Sterzing, & Anderson, 2013). Collectively, these social challenges have important implications for mental health outcomes in young adults with HFASD.

Mental Health in HFASD

Psychiatric disorders are among the most common co-occurring disorders with HFASD (Ghaziuddin & Zafar, 2008). In the last decade, researchers have begun to examine the prevalence and presentation of anxiety and depression in individuals with HFASD. However, a vast majority of such research has primarily focused on mental health issues within child and adolescent populations (Magnuson & Constantino, 2011; White et al., 2009). Findings from this body of research have revealed several important findings. For example, when compared to same aged typically-developing peers and peers from many other clinical populations (e.g., individuals with ID or LD), children with HFASD are at a significantly greater risk for developing anxiety and depression and engaging in suicidal ideation or attempts (Mayes, et al., 2011; Mayes, Gorman, Hillwig-Garcia, & Syed, 2013; White et al., 2009). Moreover, within HFASD, children with higher intellectual abilities are at even greater risk for more frequent and severe depressive symptoms (Mayes et al., 2011; Sterling et al., 2008). More specifically prevalence estimates of depression among adolescents with HFASD range from 22.2% to 54% (Bradley & Boulton, 2006; Mayes et al., 2011), whereas co-occurring anxiety ranges from 11% to 84% (Lecavalier, 2006; Muris et al., 1998). Moreover, prevalence rates of mental health issues are significantly higher in adolescents with HFASD in comparison to same aged typically and atypically developing (e.g., youth with ADHD) peers (Mayes et al., 2011).

Mental Health in Young Adults with HFASD. To date, little research has examined the prevalence and presentation of psychiatric comorbidities for young adults with HFASD. More recently, Lugnegård and colleagues (2011) examined the prevalence of psychiatric comorbidities (i.e., mood, anxiety, eating, psychotic, and substance abuse disorders) in 54 young adults with HFASD with an average age of 26 years old (*SD* = 3.7). The authors reported that depression

was most prevalent among the sample; 70% experienced at least one major depressive episode and 50% experienced recurrent depressive episodes. Anxiety was the second most prevalent psychiatric comorbidity; 56% of the sample met criteria for at least one anxiety disorder (i.e., generalized anxiety disorder, social anxiety disorder, panic disorder, or agoraphobia), and 11% met criteria for two or more anxiety disorders. Additional epidemiological reports have revealed similar prevalence rates for depression and anxiety ranging from 35% to 62% and 30% to 68%, respectively (Hofvaner et al., 2009; Lai et al., 2011; Mazefsky et al., 2008). The discrepancy in mental health prevalence rates between adolescent and young adult populations may suggest that young adults with HFASD may be at even greater risk for developing mental health issues. Furthermore, when combined with deficits associated with HFASD, depression and/or anxiety have deleterious effects on the interpersonal, academic, and occupational functioning of young adults with HFASD (Gadow, DeVincent, & Schneider, 2008; White et al., 2009).

Social Skills and Mental Health in Young Adults with HFASD. Notably, core social deficits associated with HFASD often co-occur and interact reciprocally with mental health challenges such as anxiety and depression (Ghaziuddin, Ghaziuddin, & Greden, 2002). Importantly, young adults with HFASD are more likely to have a long-standing history of negative social experiences, bullying, and peer rejection (Cappadocia et al., 2012; Gadow et al., 2008). It has been suggested that poor social skill (characteristic of HFASD) may lead to negative social experiences resulting in avoidance of social situations and isolation, thereby exacerbating social deficits and symptoms of anxiety and depression (Bellini, 2006; Myles et al., 2001). Moreover, a recent study Rosbrook and Whittingham (2010) found that social problem solving ability and past teasing experiences significantly mediated the relation between depressive symptoms and ASD traits. Thus, social problem solving ability and experiences may

be particularly important to consider when selecting appropriate interventions to improve developmental and mental health outcomes for young adults with HFASD. As a result of multiple associated risk factors and lack of resources available to this population, it is imperative to examine methods that may promote resiliency within the HFASD population to optimize the psychological, interpersonal, academic, and occupational successes of young adults in this population.

Resiliency in HFASD

HFASD in adulthood is an intrapersonal risk factor in itself, as it is associated with a multitude of adverse developmental outcomes including psychiatric comorbidities and poorer academic, occupational, and social success (Hofvander et al., 2009; Howlin, 2000; Liptak et al., 2011; Lugnegård et al., 2011; Shattuck et al., 2012). Moreover, preliminary research examining resiliency within this population indicates that young adults with HFASD exhibit certain risk factors such as higher emotional reactivity and rigidity (Montgomery et al., 2008). When combined with social deficits and poor mental health, these characteristics negatively impact the ability of young adults with HFASD to adapt flexibly to the ups and downs of daily living. Taken together, characteristics associated with HFASD may negatively impact competencies central to resiliency (i.e., low emotional reactivity, social competence, sense of relatedness, and mastery), which may put this population at further risk for poorer developmental outcomes.

HFASD, Social Skills, and Mental Health within the Context of Resiliency. Social competence is a key factor within the multidimensional construct of resiliency and has been shown to lead to more positive outcomes including better educational success and reduced risky behaviours (Benson, 1997; Luthar, 1993; Meyer & Farrell, 1998; Wentzel, 1993; Wilson, Gottfredson, Najaka, 2000). Additionally, improved social competence may allow for higher

quality relationships, which helps to buffer against challenging life situations and may promote more positive mental health outcomes (Hodges, Boivin, Vitaro, & Bukowski, 1999). However, it is clear that many young adults with HFASD may not possess the social skills necessary to develop and maintain high quality friendships. Thus, direct social skill instruction and real-world practice may promote protective mechanisms (i.e., changing attitudes, cognition, and behaviours) within young adults with HFASD (Meyer & Farrel, 1998; Montgomery et al., 2008). Additionally, better social skill is related to improved self-efficacy and coping strategies as well as reduced mental health issues and high-risk behaviours (Bisschop, Kriegsman, Beekman, & Deeg, 2004; Holahan, Moos, Holahan, & Brennan, 1995; Rozanski, Blumenthal, & Kaplan, 1999). Taken together, improved social skills may promote resiliency across several domains within this vulnerable population (Hillier et al., 2011; Meyer & Farrel, 1998; Montgomery et al., 2008).

Social Interventions for HFASD

Social competence is a key domain across developmental trajectories and has been associated with more favourable outcomes in interpersonal, academic, and occupational environments (Masten et al., 1995, 2010; Shaffer et al., 2009). However, individuals from both atypical and typically developing populations may struggle to develop adequate social skills necessary to adapt successfully to the constantly changing social landscape (Strain & Odom, 1986). As a result, there has been an explosion of social skills training (SST) programs over the past 50 years designed to promote positive social behaviours in both clinical and non-clinical populations (White, Keonig, & Scahill, 2007). In particular, numerous SST programs have been developed to target social skill deficits associated with HFASD in children and adolescents

(Laugeson, Frankel, Mogil, & Dillon, 2009). However, many of these programs are criticized for their lack of evidence-base, generalizability, and parental involvement (White et al., 2007).

The PEERS Program. Recognizing the need for an empirically based and evaluated SST program, Laugeson and Frankel (2010) developed the Program for the Education and Enrichment of Relational Skills (PEERS) for 13- to 18-year-old adolescents with HFASD. The 14-week program is an evidence-based, manualized, and parent-assisted social intervention designed to help teens initiate and maintain peer relationships. The program is rooted in cognitive behavioural therapy and was based on an extension of an evidence-based friendship training program for elementary aged children (Frankel & Myatt, 2003). PEERS teaches ecologically valid social skills (i.e., skills that are regularly used by socially successful individuals) that are central to successful social processes and interactions. More specifically, PEERS focuses on topics such as appropriately using conversational skills (i.e., reciprocal conversation, finding common interests, using humor, and entering and exiting conversations), identifying a suitable peer group, using electronic forms of communication (e.g., phone calls, texting, e-mailing and instant messaging on social media websites), being a good sport, hosting and organizing social gatherings, improving a bad reputation, and handling peer conflict (i.e., teasing, bullying, rumors, gossip, arguments, and disagreements). Each PEERS session consists of didactic instruction, role-playing and perspective taking, behavioural rehearsal and coaching, weekly practice assignments, and review of real-world practice opportunities. Concurrently, parents receive training on weekly lessons and how to support their teen in engaging in positive peer interactions and relations.

PEERS Research Findings. The impact of PEERS on the social development of adolescents with HFASD has been well documented. Results from randomized control trial

studies have indicated improvement in social skills (e.g., social communication, cognition, motivation, and awareness), quality of peer relationships, and number of social interactions and get-togethers upon completion of the program (Laugeson, et al., 2009; Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012; Laugeson, Ellingsen, Sanderson, Tucci, & Bates, 2014; Van Hecke et al., 2013). Moreover, the resulting improvements were maintained and further enhanced years later (i.e., one to five years; Laugeson et al., 2011; Mandelberg et al., 2013; Van Hecke et al., 2013). Additionally, researchers also report a reduction in the severity of ASD behaviours (e.g., improved social responsiveness), social anxiety, and problem behaviours (e.g., aggressive and impulsive behaviours; Schohl et al., 2013) following completion of PEERS. Moreover, Chang and colleagues (2014) found that the level of social skill improvement was significantly predicted by level of social skill impairment prior to starting PEERS (i.e., individuals with lower levels of impairment demonstrated the largest gains in social skills). In this regard, PEERS is effective in promoting positive outcomes in adolescents with HFASD. Despite the effectiveness of the program, it was designed for school-aged populations and as such is not appropriate for adult populations.

PEERS-YA Program. More recently, Laugeson and Frankel (2014) developed PEERS for Young Adults (PEERS-YA), which is a 16-week, evidence-based, manualized, and caregiver-assisted, social skills program designed to teach 18- to 28-year-olds with HFASD how to develop and maintain friendships and romantic relationships. PEERS-YA was developed based on adult appropriate revisions to the adolescent program and utilizes the same methods of instruction (i.e., use of didactic lessons, interactive role-plays, and behavioral practice among group members). In addition to the topics covered in the teen program (e.g., communication skills and handling peer conflict), PEERS-YA provides instruction on romantic relationships

(e.g., interpreting and communicating verbal and non-verbal indications of romantic interest) and dating etiquette (e.g., how to organize and conduct a romantic date). Parents and/or caregivers also concurrently participate in separate sessions that provide them with tools and strategies for providing support to their young adult throughout the program.

PEERS-YA Research Findings. Preliminary research has revealed that PEERS-YA is an effective tool for promoting social skills and improved developmental outcomes among young adults with HFASD. In 2012, Gantman and colleagues conducted an RCT pilot study to examine on the effectiveness of PEERS-YA for 17 young adults with HFASD, ages 18 to 23 years old. The authors reported that participants exhibited improved social abilities (e.g., social responsiveness, assertiveness, and behaviours), number of social invitations, and levels of empathy upon program completion. Moreover, the participants also demonstrated a reduction in repetitive and restrictive interests/behaviours and self-reported levels of loneliness (Gantman et al., 2012). Following this, a 2015 replication study conducted by Laugeson and colleagues examined the effectiveness of PEERS-YA and the maintenance of treatment gains 16 weeks after program completion (Laugeson, Gantman, Kapp, Orenski, & Ellingsen, 2015). Results from 22 young adults with HFASD indicated overall improvements in social knowledge and functioning, and increased frequency of social interactions and gatherings as well as a reduction in RRBs (e.g., topic perseveration). Additionally, the authors reported that the noted treatment gains were maintained when examined at follow-up (i.e., 16 weeks later).

Limitations of PEERS-YA Research. Despite the preliminary success and effectiveness of PEERS-YA, the efficacy of the program has yet to be replicated by researchers unaffiliated with the developers or within differing geographical or cultural contexts. Moreover, existing empirical studies examining PEERS-YA have not employed standardized diagnostic tools (i.e.,

the ADOS-2 and/or ADI-R) to confirm ASD diagnosis or standardized self-report social skill measures (e.g., SSIS). In addition, no research has been conducted on PEERS-YA in relation to resiliency or mental health outcomes.

Summary

ASD is a neurodevelopmental disorder characterized by impaired social communication in the presence of repetitive and/or ritualistic behaviours, interests, or activities (APA, 2013). Individuals with HFASD have intact intellectual abilities and may be at increased risk for experiencing poor developmental outcomes (Mayes et al., 2011). In addition, the transition to adulthood may be especially challenging individuals with HFASD as they experience a changing environment characterized by a combination of reduced resources and supports as well as limited social, vocational, and academic opportunities (Dixon et al., 2003). Additionally, young adults with HFASD are at a higher risk for developing depression and anxiety as a result of the core social deficit associated with HFASD. Such mental health challenges may compound the negative effects of HFASD symptoms and put adults with HFASD at increased risk for poorer outcomes (Hofvaner et al., 2009; Lai et al., 2011; Mazefsky et al., 2008). Notably, young adults with HFASD experience a multitude of risk factors (i.e., diagnosis of ASD, social disability, and increased risk of mental health issues) to some extent; however, it cannot be assumed that all individuals with HFASD experience "substantial adversity" (Luthar et al., 2000, p.5). Thus, it is ideal to examine resiliency (i.e., rather than resilience) among this population. More specifically, as social disability is the core deficit associated with HFASD, it has been proposed that social intervention may be an effective tool for promoting competencies associated with resiliency (Montgomery et al., 2008). Currently, few evidence-based programs are available to address social dysfunction among young adults with HFASD and even fewer have examined the

resulting impact on their mental health and resiliency (Sharpley & Bitsika, 2014; Hillier et al., 2011). However, more recently Laugeson and Frankel (2014) developed PEERS-YA, which may improve social abilities and indirectly promote resiliency and reduced mental health issues.

The Present Study

The current study aims to explore mental health outcomes and resiliency and to replicate initial findings of social skill improvement in young adults with HFASD following completion of PEERS-YA. In addition, the study is the first to examine the effectiveness of PEERS-YA with a Canadian sample of young adults with HFASD. The outlined study will also utilize standardized tools for ASD confirmation (i.e., the ADOS-2). The results of the proposed study are expected to provide valuable information regarding potential intervention areas to the ASD community, which may help to promote resiliency and positive mental health outcomes in young adults with HFASD.

Research Questions and Hypotheses

The proposed study aims to address the following research questions (hypotheses in italics):

1) Will completion of PEERS-YA improve social skills? *Participants will have greater self- and parent-reported social skills upon completion of the intervention.*
2) Will completion of PEERS-YA lead to lower self-reported mental health symptomology? *Participants will have less self-reported depression and anxiety upon completion of the intervention.*
3) Will completion of PEERS-YA lead to improvements in resiliency scores? *Participants will have greater self-reported resiliency upon completion of the intervention.*

CHAPTER 3: METHODOLOGY

Participants

The participants included 14 young adults between the ages of 18 years 8 months to 28 years 3 months (*M* = 22.91, *SD* = 3.00) and one parent and/or caregiver per young adult. Participants were recruited through community-based agencies and organizations that provide support and services to individuals with ASD and their families within an urban Canadian setting. Data from an additional 11 young adults and parents and/or caregivers were initially collected but were not included in the final sample due to low cognitive abilities (FSIQ<70; *n* = 4), failure to meet ADOS-2 criteria (*n* = 2), or intervention (*n* = 3) and research (*n* = 2) drop out. Data about socioeconomic status and ethnicity were not collected. Participant demographic information is shown in Table 1.

Table 1.

Demographic and Clinical Information.

	Mean (*SD*)	Minimum	Maximum
Age (years)	22.91 (*3.00*)	18.67	28.25
Gender (% male)	78.57		
VCI	94.36 (*12.65*)	75.00	129.00
PRI	102.14 (*16.07*)	71.00	135.00
FSIQ	97.64 (*14.84*)	71.00	135.00
GAC	69.71 (*7.29*)	59.00	84.00

Note: Participant age is presented in decimalized format. VCI, PRI, and FSIQ scores from the WASI-II and the GAC score from the ABAS-II are presented are as standard scores.

All interested participants completed an online screening form and attended a brief intake interview to determine their fit with the program. Participants that met criteria for the study (i.e., a previous diagnosis of ASD from a physician or psychologist) were invited to participate in the intervention and four related research sessions.

Measures

Autism Diagnostic Observation Schedule-Second Edition. The ADOS-2 is a level C, semi-structured standardized observational assessment tool that evaluates social communication, imagination/creativity, and repetitive behaviours/interests related to ASD symptomology. The ADOS-2 is often cited as the "gold standard" assessment tool for direct assessment of symptoms associated with ASD diagnosis across chronological ages and verbal abilities. The ADOS-2 is comprised of four different modules, one of which is selected based on the examinee's chronological age and verbal abilities. In accordance with the standardized instructions outlined in the ADOS-2 manual, Module 4 was selected and administered to all participants in the current study. Module 4 is designed for assessment of verbally fluent adults (i.e., ages 16 and older) and consists of 10 core and 5 optional activities which altogether lasts approximately 45 to 60 minutes. Behaviours from each activity are coded and classified into five core areas: 1) language and communication, 2) reciprocal social play, 3) play, 4) stereotyped behaviours and restricted interests, and 5) abnormal behaviours. The revised Module 4 diagnostic algorithm (Hus & Lord, 2014) was used to characterize overall scores and severity of core ASD symptoms. All measures were administered and scored by research reliable administrators.

In 2007, Gotham and colleagues examined the validation of a revised scoring algorithm to improve the diagnostic validity of modules 1 through 3 for clinical and research utility (Gotham, Risi, Pickles, & Lord, 2007). More specifically, the authors developed an algorithm comprised of two domains including Social Affect (SA) and Restricted and Repetitive Behaviours (RRB) which better align with the DSM-5 ASD criteria (APA, 2013). In 2014, Hus and Lord conducted a validation study examining the reliability and validity of a newly revised algorithm (i.e., with two domains including SA and RRB) for module 4. Using a sample of 393

individuals, aged 9 to 62 years, the authors revealed that the revised algorithm improved sensitivity and specificity of the module. More specifically, analyses of internal consistency revealed Coefficient alpha values of 0.84 and 0.61 for SA and RRB domains, respectively.

Wechsler Abbreviated Scale of Intelligence- Second Edition (WASI-II; Wechsler, 2012). Intelligence quotients, verbal comprehension, and perceptual reasoning scores were obtained through administration of the WASI-II. The WASI-II is a level C, brief intelligence measure that is designed to assess cognitive ability of individuals 6 to 90 years of age. The WASI-II is comprised of four subtests (i.e., Vocabulary, Similarities, Block Design, and Matrix Reasoning) that take approximately 30 to 45 minutes to administer. Raw scores for each subtest were converted to T scores (M = 50, SD = 10), which differentially combine to provide a Full Scale Intelligence Score (FSIQ-4; when all four subtests are used), Verbal Comprehension Index (VCI; a measure of verbal ability), and Perceptual Reasoning Index (PRI; a measure of non-verbal ability), each of which are reported as standard scores (M = 100, SD = 15). All measures were administered by trained graduate students in accordance with the manual.

The WASI-II utilized a standardization sample of 2,300 individuals with a representative proportion of the population based on age, sex, race/ethnicity, education level, geographic location, and special populations (e.g., individuals with clinical diagnoses). Test-retest reliability coefficients for the adult sample (i.e., 17 to 90 years of age) fell within the good to excellent range for subtests (0.83 to 0.94) and within the excellent range for composite scores (0.9 to 0.96). Internal consistency fell within the excellent range for both subtest (0.9 to 0.92) and composite scores (0.94 to 0.97). Similarly, interrater reliability scores also indicated excellent reliability (0.94 to 0.99) for scoring of subtests. Validity scores from the WASI including internal structure, concurrent validity with other measures of cognitive ability, and special group

studies indicated acceptable to excellent validity (0.71 to 0.92; Wechsler, 2003; Wechsler, Coalson, & Raiford, 2008).

Social Skill Improvement System Rating Scales (SSIS; Gresham & Elliott, 2008). The SSIS was used to measure social skill development in young adults with HFASD. The SSIS is a 46-item multi-rater (i.e., parent-report, teacher-report, and self-report) standardized questionnaire used to assess social skills strengths and weaknesses of children 3 to 18 years of age in comparison to norm-referenced data. Additionally, the measure is often used to monitor progress of individuals following participation in interventions. Each item is rated based on 4-point frequency scale (i.e., *Never*, *Seldom*, *Sometimes*, *Often*, *Always*) as well as 3-point rating of importance (i.e., *Not Important*, *Important*, or *Critical*). Raw scores from 15 subtests are converted to standard scores (M = 100, SD = 15) and differentially combine to form three overall scales including Social Skills, Competing Problem Behaviours, and Academic Competence. Overall subscale scores are represented by behavioural levels (i.e., below average, average, and above average) and percentile ranks in comparison to normative data. For the purposes of the current study, only the Social Skill domain was examined.

The SSIS was developed based recent updates to its predecessor, the Social Skills Rating System (SSRS; Gresham & Elliott, 1990). The revisions included the addition of 4 subscales, updated norm-reference data, improved psychometric properties, and user friendliness. In 2008, Gresham and Elliott conducted a standardization study with 4,700 children 3 to 18 years of age living in the United States. The selected sample population included a representative proportion of the population based on race/ethnicity, socioeconomic status, geographic location, and special populations (e.g., special education students). In regards to reliability, internal consistency of each scale was excellent (i.e., Coefficient alpha > 0.9) for self-, teacher-, and parent-report

forms. Similarly, analyses of test-retest reliability revealed good to excellent reliability scores for each scale (i.e., range from 0.81 to 0.92).

Despite the limited age range for the SSIS (i.e., 3 to 18 years of age), previous studies have used this tool as primary outcome measure for young adults with ASD due to lack of available assessment tools for this age group (Gantman et al., 2011; Laugeson et al., 2015). As a result, the current study used this tool to examine social skills in this unique population.

Resiliency Scale for Young Adults (RSYA; Smith, Saklofske, Prince-Embury, Nordstokke, & Vesely, 2014). The RSYA is a 53-item self-report questionnaire that assesses resiliency in young adults. Each item represents either something that may happen to an individual or what an individual might think, feel, or do in a given situation, and is rated on a five-point scale (0 = *Never*, 4 = *Almost Always*). Three global scale scores may be obtained (i.e., Sense of Mastery Scale, Sense of Relatedness Scale, and Emotional Reactivity Scale) when raw scores are differentially summed together.

The RSYA was developed based on adult updates to the Resilience Scale for Children and Adolescents (RSCA; Prince-Embury, 2006). Preliminary estimates of internal consistency, convergent validity, and construct validity are good and confirmatory factor analysis provided support for the three-factor model (Prince-Embury, Saklofske, & Nordstokke, 2016; Smith et al., 2014). Notably, the RSYA report form used in the current study was a beta version of the RSYA and was provided by the developers. Since the time of its provision, the RSYA is in the process of being published and the final version has slight differences.

Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report questionnaire used to assess presence and severity of depressive symptoms experienced over a period of two weeks for individuals 13 and 80 years of

age. Each item represents a specific depressive symptom as indicated in the DSM-IV and is rated on a four-point scale ranging from 0 to 3 (0 = *Not Present*, 3 = *Severe*). An overall depression score is calculated based on summation of individual items, with clinical cutoff for different age groups and higher scores indicating more severe symptoms.

The BDI-II utilized a normative sample of 500 clinical (i.e., diagnosed with mood disorders, anxiety disorders, adjustment disorders, and other psychiatric illnesses using DSM-III or DSM-IV criteria) and 120 non-clinical individuals (i.e., Canadian college students). The BDI-II demonstrates high internal consistency (Coefficient alpha = 0.92 and 0.93, respectively; Storch, Roberti, & Roth, 2004) and test retest reliability (r =0.93). In regard to validity, the BDI-II has sufficient concurrent validity (i.e., when compared with the Hamilton Psychiatric Rating Scale of Depression-Revised r=0.71; Hamilton, 1960) and discriminant validity (i.e., when compared to the Hamilton Psychiatric Rating Scale of Anxiety Revised r =0.41; Hamilton, 1959)

Beck Anxiety Inventory (BAI; Beck & Steer, 1993). The BAI is a 21-item self-report questionnaire used to assess the presence and severity of anxiety in individuals 17 to 80 years old (Beck & Steer, 1993). Each item represents a specific symptom of anxiety and is rated on a four-point scale ranging from 0 to 3 (0 = *Not at All*, 3 = *Severe*). When summed together, scores on each item yield an overall anxiety score where higher scores indicate greater symptom severity. Age-based clinical cutoffs are provided for summed raw scores.

The BAI utilized a standardization sample of 393 clinical (i.e., diagnosed with an anxiety disorder using DSM-III or DSM-IV criteria) and 243 non-clinical individuals. Estimates of internal consistency and test-retest reliability range from 0.90 to 0.94 and 0.62 to 0.93, respectively (Fydrich, Dowdall, & Chambless, 1992). When compared to other measures (i.e., Hamilton Anxiety Rating Scale and the State-Trait Anxiety Inventory), the BAI demonstrated

good concurrent validity (r = 0.51) and discriminant validity (i.e., when compared to the BDI-II r = 0.48; Beck & Steer, 1993).

Adaptive Behavioural Assessment System – Second Edition (ABAS-II; Harrison & Oakland, 2003). Parent reported data from the ABAS-II was collected to provide additional information on the characteristics of the sample population. The ABAS-II measures adaptive functioning for children and adults from birth to 89 years of age and is available in five multi-rater, age-specific forms (i.e., teacher report forms for ages 2 to 5 and 5 to 21, parent report forms for ages 0 to 5 and 5 to 21, and an adult form for individuals 16 to 89 years of age). For the purposes of the present study, the adult form was completed by parents of each participant.

The ABAS-II adult form is comprised of 239 items which differentially contribute to four domain scores: Conceptual, Social, Practical, and a General Adaptive Composite (GAC). Additionally, each item contributes to one of 10 skill area scores (i.e., Communication, Community Use, Functional Academics, Health and Safety, Home or School Living, Self-Care, Self-Direction, Social, and Work) and is rated on a four-point scale ranging from 0 to 3 (0 = *Is Not Able to*, 3 = *Always or Almost Always When Needed*). Raw scores are converted to standard scores for the 10 skills areas (*M* = 10, *SD*=3) and composite scores for domains. For the purposes of the current study, only the GAC score was examined.

The ABAS-II was standardized on a sample of 5,270 individuals 0 to 89 years of age living in the United States. Results indicated that the internal consistency and test-retest reliability for the adult form was excellent (i.e., Coefficient alpha >0.9).

Procedure

The present study is a part of a larger research project. For the larger project, testing took place at four times points for each cohort; the first assessment point occurred 16 weeks prior to

the intervention (T1); the second assessment occurred one week before the intervention (T2); the third assessment occurred one week after the intervention (T3); and the fourth session (T4) was 16 weeks following the intervention. The current study will focus on data collected from testing sessions T1, T2, and T3. As a result, the data was analyzed using a within subject, repeated measures design with a total of three assessment points. The research project was approved by the local university ethics review board.

Treatment. Each young adult and a caregiver participated in the 16-week PEERS-YA intervention. In accordance with instructions outlined in the PEERS-YA manual, lessons were led by a trained facilitator once a week, for 16 weeks, and lasted approximately 90 minutes. Young adults participated in didactic lessons led by the facilitator, which involved didactic instruction on lessons such as how to enter and exit a conversation, engage in reciprocal conversation, host a get together, engage in appropriate dating behaviours, as well as how to handle teasing, bullying, arguments, and disagreements. Each young adult session began by reviewing weekly practice assignments and providing any feedback necessary to improve practice behaviours. The group facilitator then provided didactic instruction on the weekly lesson and facilitated behavioural roles plays which demonstrated inappropriate and appropriate use of the social skill being taught. Following an appropriate role play, young adults practiced using appropriate social behaviours with other group members and were provided with constructive feedback from behavioural coaches (i.e., graduate students providing support to participants in the intervention).

Parents and/or caregivers participated in a separate parent-focused session that involved troubleshooting previously completed homework assignments, teaching the weekly lesson, and

providing supports and suggestions to help increase effective social skill implementation within real-world situations.

Data Collection. Upon receiving consent, young adults with HFASD participated in several research sessions, each lasting approximately 3 hours. During each session, young adult participants completed several paper and pencil tasks including, but not limited to, measures of depression, anxiety, social skills, and resiliency. After providing separate consent, parents also completed several measures at all three time points. At T1, young adult participants also completed the WASI-II to ensure that they met criteria to be characterized as HFASD (i.e., PRI and VCI ≥ 70). Participants also completed the ADOS-2 to confirm their ASD diagnosis. As a token of appreciation, young adults were provided with a $25 gift certificate and parents were provided with a $10 gift certificate at the end of each testing session.

CHAPTER 4: RESULTS

This chapter provides an overview of missing data, descriptive statistics of the sample population, and data analysis techniques and results.

Data Screening

All young adult participants completed measures of depression (BDI-II) and anxiety (BAI) at time points T1 (n = 14), T2 (n = 14), and T3 (n = 14). For the self-reported social skills, 13 of the 14 participants completed the SSIS at T1 (n = 13), T2 (n = 14), and T3 (n = 14). Additionally, the RSYA was still in the process of development at the beginning of the study; as such, it was not introduced until later in the process. Thus, only 9 participants completed the RSYA at time points T2 (n = 9) and T3 (n = 9). In terms of parent-reports, 13 of the 14 parents completed the SSIS at T1 (n = 14), T2 (n = 13), and T3 (n = 14).

An examination of the data revealed two missing data points (i.e., self-reported SSIS at T1 and parent reported SSIS at T2) which were excluded from analyses for that measure. The data was analyzed for descriptive statistics.

Descriptive Statistics

Table 2 outlines the means, medians, and standard deviations for the SSIS, BDI-II, BAI, and RSYA.

Table 2.

Means, Medians, and Standard Deviations for all Primary Analyses

			Young Adult		Parent	
Measures		Time	Mean (*SD*)	Median	Mean (*SD*)	Median
SSIS		T1	95.31 (*20.08*)	96.00	76.79 (*13.77*)	77.00
		T2	94.57 (*23.40*)	98.50	79.46 (*18.75*)	81.00
		T3	100.36 (*17.74*)	105.00	86.64 (*17.19*)	87.00
BDI-II		T1	14.79 (*10.86*)	13.50		
		T2	18.21 (*15.84*)	15.00		
		T3	12.36 (*12.00*)	8.00		
BAI		T1	14.69 (*8.50*)	17.00		
		T2	13.93 (*10.11*)	11.50		
		T3	11.50 (*8.50*)	11.00		
RSYA	Mastery	T2	41.89 (*6.29*)	44.00		
		T3	42.89 (*8.70*)	44.00		
	Relatedness	T2	55.06 (*15.32*)	63.00		
		T3	57.50 (*11.85*)	61.00		
	Emotional Reactivity	T2	76.67 (*10.58*)	78.00		
		T3	71.11 (*10.73*)	71.00		

Note: SSIS scores are presented as standard scores. BDI-II, BAI, and RSYA scores are presented as raw scores.

Analysis of Outcomes

To determine whether the data (i.e., data from each measure at T1, T2, and T3) met the assumptions of normality, a progressive examination of results from 1) the Shapiro Wilk's test 2) calculated z-scores for skewness (i.e., $z_{skewness}$ = skewness / $SE_{skewness}$) and kurtosis (i.e., $z_{kurtosis}$ = kurtosis / $SE_{kurtosis}$) and 3) visual examination of histograms, Q-Q plots, and box plots was conducted. Results indicated that social skills scores were normally distributed for both parent

and self-reported data at T1, T2, and T3 as assessed by the Shapiro Wilk's test ($p > 0.05$) and visual inspection of their histograms and normal Q-Q plots. Upon further examination of the box plots for SSIS self- and parent-reported data at T1, T2, and T3, four outliers were identified and transformed (i.e., winzorized). Subsequently, a parametric one-way repeated measures analysis of variance (ANOVA) was conducted on both parent and self-reported social skills.

In contrast, data from the BDI-II, BAI, and RSYA violated the assumption of normal distribution and thus non-parametric statistical analyses including the Friedman's test and Wilcoxon sign-ranked repeated measures test were conducted. The Friedman's test is a non-parametric analogue to a one-way repeated measures ANOVA and can be used to determine if any statistical difference exists between distributions at three or more time points (Friedman, 1937). The null hypothesis of a Friedman's test states that the distribution of scores at each time point is the same, whereas the alternative indicates that at least two of the groups differ in their distributions. The Friedman's test was used to determine if any significant differences existed on the BDI-II and BAI at T1, T2, and T3. The Wilcoxon signed-rank test is a non-parametric approach that examines whether a population differs significantly on their mean ranks (Wilcoxon, 1945). It is an analogue to a paired samples t-test and is described as providing greater power with non-normal data sets (Zimmerman & Zumbo, 1993). The null hypothesis of a Wilcoxon signed-rank test states that the median difference between paired values is equal to zero, whereas the alternative hypothesis states that the median paired difference is greater than zero. The Wilcoxon signed rank test was conducted to determine if any significant median paired differences existed between T2 and T3 for data on the RSYA.

Social Skills Following Completion of PEERS-YA. A one-way repeated measures ANOVA was conducted to determine whether there was a statistically significant difference in

self-reported social skills at T1, T2, and T3. The assumption of sphericity was met, as assessed by Mauchly's test of sphericity, χ^2 (2) = 0.799, p = 0.671. Although the results approached significance, there was no statistically significant difference in self-reported social skills, F (2, 24) = 3.151, p = 0.061, partial ω^2 = 0.21.

An additional one-way repeated measures ANOVA was conducted to determine if there was statistically significant difference in parent-reported social skills between the three time points. Mauchly's test of sphericity indicated that the assumption of sphericity was met, χ^2 (2) = 2.288, p = 0.319. The results indicate that completion of PEERS-YA resulted in statistically significant changes in parent reported social skills over time, F (2, 24) = 9.99, $p < 0.01$, partial ω^2 = 0.454. Post hoc analysis with a Bonferroni adjustment revealed that parent-rated social skills significantly increased from T1 to T3 (M = 11.77, 95% CI [4.248, 19.291], $p < 0.01$) and T2 to T3 (M = 9.08, 95% CI [0.024, 18.13], $p < 0.05$), but not from T1 to T2 (M = 2.70, 95% CI [-3.470, 8.854], p = 0.744).

Depression Symptomology Following Completion of PEERS-YA. A Friedman test was conducted to examine differences in BDI-II scores across the three time points. Results indicated no significant differences across the three time points, χ^2 (2) = 4.353, p = 0.113.

Investigation of the data revealed that many participants (n = 7) fell below the clinical threshold for depression prior to the intervention in accordance with the BDI-II manual. In contrast, seven participants reported symptomology that fell within the moderate ($n = 4$) to severe (n = 3) range at T2. As a result, a Friedman's test was conducted to examine if the subgroup of young adults with higher levels of depression prior to starting PEERS-YA demonstrated a reduction in depression symptoms following completion of the program. Results indicated no significant differences, χ^2 (2) = 3.714, p = 0.156.

Anxiety Symptomology Following PEERS-YA. A Friedman's test was run to examine differences in self-reported anxiety across the three time points. Results indicated no significant differences, χ^2 (2) = 3.96, p = 0.138.

Further investigation of the BAI data revealed that nine participants fell below the clinically significant threshold at T2 according to criteria outlined in the BAI manual. Comparatively, five participants reported anxiety symptomology that fell within the moderate (n = *4*) to severe (n = 1) range at T2. Thus, a subsequent analysis was conducted on this subgroup of young adults with higher anxiety levels to determine if a significant reduction in symptomology occurred following intervention completion. Results indicated no significant differences, χ^2 (2) = 4.50, p = 0.105.

Resiliency Following PEERS-YA. As the resiliency data collection occurred only at from T2 and T3, a Wilcoxon signed-rank test was conducted. The results indicated that no significant median paired difference emerged on any of the RSYA global scales (i.e., Sense of Mastery scale, z (9) = 0.298, p = 0.766); Sense of Relatedness scale, z (9) = 0.634, p = 0.526; Emotional Reactivity, z (9) = -1.246, p = 0.213).

CHAPTER 5: DISCUSSION

The current study explored mental health outcomes and resiliency and examined social skill enhancement in young adults with HFASD following completion of an evidence-based social intervention. Importantly, this is the first known study to explore these factors within this population in the context of a social intervention.

The study examined three main hypotheses. The first predicted an improvement in social skills following completion of PEERS-YA based on preliminary research findings that indicate significant improvement in social skills among American young adults with HFASD (Gantman et al., 2012; Laugeson et al., 2015). Based on the current results, the first hypothesis was partially supported. With regards to self-reported social skills, PEERS-YA participants did not report a change in social skills following completion of the intervention. However, the self-reported SSIS results approached significance ($p = 0.061$) and thus may have been significant with a larger sample size. Contrastingly, parents reported significant improvements in social skills following PEERS-YA completion such that young adults improved from T1 to T3 and T2 to T3. This finding is consistent with previous research (Gantman et al., 2012; Laugeson et al., 2015), and provides further support for the effectiveness of PEERS-YA in promoting social skill development within a Canadian adult HFASD population.

It is important to consider these findings within the context of the present study design and current research findings. Firstly, the lack of significant self-reported social skill improvement may be in part due to challenges characteristic of individuals with HFASD, including difficulties with self-awareness, self-reflection, and introspection (Berthoz & Hill, 2005; Happé, 2003). Furthermore, mixed findings currently exist regarding the reliability and validity of self-report data from individuals with HFASD (Lopata et al., 2010; Mazefsky et al.,

2011; Shipman, Sheldrick, & Perrin, 2011). To this end, this study further highlights the importance of collecting information from parents and/or caregivers in addition to self-reports to provide a more comprehensive picture of skill development. Secondly, the present study only examined immediate gains following completion of PEERS-YA. In this regard, the participants had limited opportunity to apply the comprehensive skill set and subsequently consider the resulting quality of social interactions and relationships. Thus, future research should strive to examine long term social skill outcomes following completion of the program. Lastly, it is also important to interpret these findings within the context of the measurement tools that were administered. As previously noted, the SSIS was the primary measure of social skills. However, the SSIS was developed for children and youth ages 3 to 18, and thus may not have captured important social skills unique to adulthood. However, no adult-appropriate social skills measure currently exists and the present study utilized the SSIS similar to previous peer-reviewed studies. Thus, the current study presented the important first steps in examining the effectiveness of PEERS-YA through the use of standardized measurement tools. Existing research on PEERS-YA has found significant improvement of self-reported social skill knowledge through the use of a criterion-referenced measure known as the Test of Young Adult Social Skills Knowledge (TYASSK; Laugeson & Frankel, 2010; Laugeson et al., 2015). Notably, the TYASSK is a multiple choice measurement tool that was developed to assess participant knowledge of specific social skills taught in the PEERS-YA program. Thus, significant improvement on the TYASSK indicates improved social skill knowledge, but may have limited implications for the application of social skills. Taken together, the shortcomings of previous studies and the current study may be addressed by an age-appropriate standardized self-report social skill measurement tool.

The second hypothesis stated that PEERS-YA participants would have less self-reported depression and anxiety symptoms upon completion of the intervention. The aforementioned hypothesis was based on previous research findings that adults with HFASD are at a significantly greater risk for developing co-morbid depression and anxiety (Hofvaner et al., 2009; Lugnegård et al., 2011; Mazefsky et al., 2008) and that poor social ability and problem solving may be related to adverse mental health outcomes for individuals with HFASD (Ghaziuddin et al., 2002; Rosbrook & Wittingham, 2010). However, the second hypothesis was not supported in the present study. Half the 14 participants reported high levels of depressive symptomology (i.e., moderate to severe) and five participants (36%) reported high levels of anxiety symptomology (i.e., moderate to severe) prior to starting PEERS-YA. This finding is consistent with previous research exploring the high prevalence of co-morbid depression and anxiety among young adults with HFASD (Lugnegård et al., 2011; Sterling et al., 2007). Examination of the high depression and the high anxiety groups revealed a non-significant post-treatment reduction in symptomology. These findings suggest that PEERS-YA may not be an effective tool for indirectly reducing depressive or anxious symptomology among adults with co-morbid depression and/or anxiety. Notably however, these findings may be in part due to a small sample size of the high depression and anxiety group.

Importantly, the 5 five participants who reported high anxiety also reported high levels of depressive symptomology. Given the complex bidirectional interaction among anxiety and depression (Dobson, 1985), these individuals may have experienced a compounded effect of multiple psychiatric conditions. In addition, it has been suggested that individuals with HFASD and co-occurring psychopathology may experience a complex negative cycle; core social deficits associated with HFASD may lead to negative experiences (e.g., peer rejection and victimization)

and subsequent withdrawal from social situations and increased risk for adverse mental health outcomes, which further exacerbates symptoms associated with HFASD (Wood & Gadow, 2010). Thus, as PEERS-YA targets social deficits, it may not sufficiently address the complex mental health issues of these individuals. More recently, it has been suggested that a transdiagnostic treatment approach (i.e., a single treatment designed to address several forms of psychopathologies) rather than a disorder-specific approach (i.e., separate and sequential treatments for each presenting psychiatric concern; Rohde, 2012) may be most effective in addressing comorbidity among individuals with HFASD and co-occurring anxiety and depression (Weiss, 2014). Thus, given the limited treatments available, future social interventions for young adults with HFASD should strive to address the multiple and complex areas of need (e.g., social deficits, internalizing and externalizing challenges) to optimize the success and wellbeing of this population. Additionally, future research should examine outcomes for individuals with HFASD and co-occurring anxiety without depression and those with co-occurring depression without anxiety to better elucidate the unique relation between social skills and mental health.

The third hypothesis predicted that participants would have greater self-reported resiliency upon completion of the intervention. This hypothesis was based on research findings that social competence and a sense of relatedness are key factors within the construct of resiliency (Luthar, 1991; Prince-Embury, 2011; Shaffer et al., 2009). Additionally, it has been suggested that effective social intervention may act as a medium for promoting resiliency within young adults with HFASD (Montgomery et al., 2008). However, the prediction was not supported in the present study. Notably, the sample size was small (n = 9) for this portion of the research project and may have been significant with a larger sample.

However, the findings of the present study highlight important considerations regarding the promotion of resiliency through social development within this population. According to parent-reported findings on the SSIS, social skills significantly improved following the completion of PEERS-YA. However, the current study did not directly examine whether participants applied the newly learned social skills within everyday social interactions (e.g., within interpersonal, educational, or vocational environments) or experienced any resulting improvements in peer relationships. Such a method may have provided a more ecologically valid assessment of treatment success. In this regard, participants may have developed social skill knowledge but not exhibited improved social competence (i.e., "the development of effective interpersonal relationships with peers and adults"; Cotugno, 2009, p. 1270). As a central component of resiliency, measurement of social competency may have provided important information regarding the promotion of resiliency within this population. Thus, future research should strive to examine these interpersonal and intrapersonal factors and the link to resiliency to better elucidate these relations.

Implications

Preliminary results from the current study have several implications for research and practice. Firstly, the present study provides further support for the effectiveness of PEERS-YA in improving social skills in young adults with HFASD. This finding is especially important considering the current lack of available high quality interventions for young adults with HFASD (Van Bourgondien et al., 2014). Second, given that the present study was conducted within a Canadian context, the findings may better inform the Canadian ASD community on the availability of efficacious social skills interventions for young adults with HFASD. This is particularly relevant considering the high level of need characteristic of this population and the

current lack of available programs for young adults with HFASD (Alberta Disabilities Forum, 2008). Third, the present study highlights the high prevalence of mental health issues within the population of young adults with HFASD and the need for further examination of these challenges. Within typical populations, improved social ability has been associated with reduced mental health concerns as well as higher vocational, educational, and relational success among adult populations (Hodges et al., 1999; Wilson et al., 2000). Given that social dysfunction is proposed to be the most prominent feature of HFASD, effective social intervention may be a unique method for improving developmental outcomes for young adults with HFASD (Hillier et al., 2011; Laushley & Heflin, 2000; Montgomery et al., 2008). However, additional research with larger samples of depressed and anxious young adults with HFASD is required to determine if PEERS-YA is an effective tool for targeting mental health symptomology among this population. Moreover, a transdiagnostic treatment approach for adults with HFASD and comorbid mental health issues may help to address the multiple areas of need for this population (Weiss, 2014). Last, although the present study did not provide evidence for improved resiliency following PEERS-YA, significant results may be found with a larger sample size.

Limitations

One of the primary limitations of the present study was the small sample size. As a result, the assumption of normality was not met for many of the outcome measures and thus warranted the use of non-parametric statistical analyses, which may have impacted the robustness of the findings. In addition, there was a relatively high participant attrition and lack of a formal control group. Taken together, these limitations may impact the generalizability of the findings from the current study. Importantly, the present study only examined immediate gains following PEERS-YA and thus no conclusions can be made about long term outcomes.

Additionally, the measurement tools that were used to assess outcome variables may have presented unique limitations. First, the present study relied on self-reported mental health (i.e., BDI-II and BAI) and resiliency (i.e., RSYA) assessment tools. Notably, considerable disagreement exists regarding the validity and reliability of self-reports from individuals with HFASD, especially when rating mental health symptomology (Lopata et al., 2010; Mazefsky, et al., 2011; Shipman et al., 2011). It has been suggested that this finding may be due in part to core communication challenges and alexithymia (i.e., difficulty in identifying or describing emotional states) characteristic of individuals with HFASD (Berthoz & Hill, 2005). Thus, future research should strive to obtain more comprehensive information regarding mental health and resiliency outcomes through implementation of multi-informant methods (i.e., parent and/or caregivers) as well as observational and/or performance-based measurement tools. Second, the primary measure used to evaluate social skill development (SSIS) was developed specifically for use with child and adolescent populations (i.e., ages 3 to 18). As a result, this assessment tool may not have captured social skills unique to adulthood. Notably, the SSIS was selected for the current study due to its use within previous adult-focused research studies and the lack of available alternatives for this population (Gantman et al., 2012; Laugeson et al., 2015). In addition, the present study examined social skill outcomes; consequently, no inferences can be made regarding social ability or social competence following treatment completion. As improved social competence is the primary goal of PEERS-YA, future studies should strive to identify and utilize valid and reliable tools to measure social ability and competence. Third, as the RSYA was under development during the current research study, the format provided by the developer was slightly different from the finalized version (Smith et al., 2014). Thus, the reported resiliency findings should be interpreted with caution.

Future Directions

Future research should strive to measure resiliency in young adults with HFASD through carefully designed empirical studies with larger sample sizes. Such foundational research is critical for developing a better understanding resiliency within this population. Moreover, examination of the relation between resiliency, social skill development (i.e., social skill, ability, and competence), and co-occurring mental health concerns may identify important factors related to more favorable outcomes for young adults with HFASD. Additionally, future research should include observational and multi-informant (i.e., parents and/or caregivers, peers, and other adults) assessment methods to obtain more comprehensive and contextually relevant information not captured by self-report measures. To better examine the efficacy of PEERS-YA, future research should identify and utilize valid and reliable methods for measuring constructs such as social ability and competence. Such research would provide valuable information regarding the impact of PEERS-YA on the development of social skills, ability, and competence. Moreover, exploration of the development and maintenance of real-world interpersonal relationships following PEERS-YA completion would provide a more ecologically valid measurement of treatment effectiveness. Given that generalizability is a main criticism of SST programs, such a technique would help to determine whether PEERS-YA effectively promotes improved social competence within real-world settings (Frankel & Myatt, 2003; White et al., 2007). In addition, many participants shared valuable qualitative information that was not captured by standardized self- and parent-reported measures (e.g., one participant that had severe co-morbid anxiety was able to successfully stop taking anti-anxiety medication following completion of PEERS-YA). As a result, future research should strive to employ qualitative methodology (e.g., semi-structured interviews with participants, parents and/or caregivers, and peers prior to and

following treatment completion) to better elucidate unique developmental outcomes following program completion.

Conclusion

The present study intended to examine social skill development and explore mental health outcomes and resiliency in young adults with HFASD following completion of PEERS-YA. Previous research has indicated that individuals with HFASD face enormous challenges during the transition to adulthood. As a result of the challenges associated with HFASD (e.g., core social deficit) and the lack of available resources, young adults experience considerable difficulty adjusting to the increasingly complex social, educational, and occupational environments (Geller & Greenberg, 2010). Moreover, lower rates of employment, post-secondary attendance, independent living, and close interpersonal relationships combined with higher risk for depression and anxiety put this population at even greater risk for adverse developmental outcomes (Barnard et al., 2001; Liptak et al., 2011; Hofvander et al., 2009; Howlin, 2000; Shattuck et al., 2012). In addition, there are a scarce number of high quality interventions for this population and few studies that examine their efficacy (Van Bourgondien et al., 2014). Thus, it is clear that social skill development, mental health, and resiliency are all important issues that require further attention within research and practice.

It has been suggested that effective social intervention may be one route for improving resiliency among this population (Montgomery et al., 2008). Thus, the current study examined the impact of PEERS-YA, a newly developed social intervention, on developmental outcomes for young adults with HFASD (Laugeson & Frankel, 2014). Preliminary findings from the current study suggest that PEERS-YA may be an effective tool for improving social skills. However, based on findings from the present study, PEERS-YA may not be an effective tool for

indirectly improving resiliency and mental health outcomes. Importantly, these findings may provide insight into how to better support positive development within this population and identify worthwhile treatment avenues for future research endeavors. The results from this study will contribute to a growing body of literature examining the efficacy of adult-focused interventions and further highlights the importance of examining the resulting impact on resiliency within this population. Increased research efforts within this area would likely help to inform public policy on the importance of providing high quality support services for individuals with HFASD during their transition to adulthood. Taken together, it is imperative to further examine social skill interventions that may promote resiliency and improved mental health in this population to optimize the psychological, interpersonal, academic, and occupational successes of young adults with HFASD.

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Appendix A

ASERT

UNIVERSITY OF CALGARY

Social Skills Group for Young Adults with Autism Spectrum Disorders: PEERS-YA®

RESEARCH STUDY Researchers from the University of Calgary's Autism Spectrum Education, Research, and Training Group (ASERT) are currently recruiting young adults (ages 18 to 28) with autism spectrum disorders to participate in a research study designed to test the effectiveness of the PEERS-YA® program.

WHAT IS PEERS-YA®? PEERS-YA® (Program for the Education and Enrichment of Social Skills for Young Adults) is a 16-week **evidence-based** social skills intervention for motivated young adults who are interested in learning ways to help them make and keep friends.

WHO? Adults ages 18 to 28 with autism spectrum disorders.

WHAT? Participation will involve completion of the PEERS-YA program as well as several questionnaires before and after completion (approximately 2 hours at each timepoint)

WHEN? Currently recruiting for Winter and Spring 2015 sessions.

WHERE? All 16 sessions (90 minutes each) will be held at The Ability Hub (*3rd floor, 3820 – 24th Ave NW*).

ASERT

FOR MORE INFORMATION, PLEASE CONTACT:

peers@theabilityhub.org

Additional program dates will be offered in the future. Please email us to be added to the waitlist even if you cannot make these dates.

THE ABILITY HUB

Young Adult PEERS Program
Contact: peers@theabilityhub.org

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Appendix B

UNIVERSITY OF CALGARY

Name of Researchers & Email:
Marian Coret, B.Sc. (marian.coret@ucalgary.ca)
Patricia Azarkam, B.A.
Mike Barrett, R. Psych

Supervisor:
Dr. Adam McCrimmon, R.Psych, Educational Studies in School Psychology, University of Calgary

Title of Project:
Evaluating the Effectiveness of the PEERS-YA Social Intervention Program for Young Adults with High Functioning Autism Spectrum Disorder

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This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board.

Purpose of the Study:
You have been invited to participate in a research project interested in understanding a variety of important gains that may be made through participation in a social intervention for individuals with high functioning autism spectrum disorder. Please read this form carefully and feel free to ask any questions you may have.

The goal of this research project is to better understand the social skills and improvements in related skills in young adults (aged 18-28) with high functioning autism spectrum disorder who complete the Program for the Education and Enrichment of Relational Skills for Young Adults (PEERS-YA). We are interested in exploring social skill development as well as indirect enhancement of related abilities such as social skills knowledge and implementation, emotional intelligence, and the mental health of participants.

What Will I Be Asked To Do?
Participation in this research project is purely voluntary and involves commitment to join in the PEERS-YA social intervention, which will be run at The Ability Hub in the Child Development Centre, Calgary, AB. The PEERS-YA program includes one 1.5 hour session per week, for 16 weeks. Adult participants will be asked to commit to attend all sessions, as lessons build upon each other over the course of the program.

If you choose to participate in this research project, you will be asked to participate in an interview, some gamelike tasks, questionnaires, and some computer-based tasks over 4 separate time points. Specifically, information will be collected 14 to 18 weeks before participation in PEERS-YA, immediately before and afterward your completion of the program, and 14 to 18 weeks after participation. The majority of adult

participants will complete these tasks in approximately 2 to 3 hours. Most adults find the tasks quite enjoyable, and the questionnaires simple to complete.

You will also be asked if you wish to participate and should you indicate unwillingness, you will not be required to complete any tasks you feel uncomfortable with.

What Type of Personal Information Will Be Collected?
Should you agree to participate, personal information pertaining to your age and gender, developmental history, as well as social, emotional, mental health, and cognitive abilities will be collected. Each adult participant will be assigned a participant number, and all information will remain anonymous. Data will be retained for a minimum of five years on an encrypted and password-protected computer (digital data) or in a locked cabinet (paper files) in a locked office in the Faculty of Education on the University of Calgary campus.

Are there Risks or Benefits if I Participate?
It is expected that the information collected in this research project will provide us with an improved understanding of the effectiveness and positive outcomes of the PEERS-YA program for the HFASD population, including its benefits and potential areas for programmatic improvement. Specifically, we hope to gain an understanding of how friendships and relationships can be improved through the learning and modeling gained through PEERS-YA. There is little research exploring additional abilities that may be improved through the social intervention, such as emotional intelligence and mental health. These abilities are also important to social and relational functioning, and understanding their contribution to gains through PEERS-YA will likely help in improving delivery of the program in the future. The information gathered via this project has the potential to help adults with HFASD cope and improve their skills in many areas that will increase their resilience in social relationships and friendships.

The research project involves simple tasks and paper-and-pencil questionnaires. There is the possibility that some adult participants may experience discomfort or embarrassment regarding their social challenges as the PEERSYA program progresses. However, this possibility is unlikely, and it is expected that participants and their caregiver(s) will find their involvement in the intervention program to be rewarding and beneficial. Should any participants demonstrate distress regarding completion of the PEERS-YA program, or should any participant or their caregiver(s) indicate that distress was experienced from participation, Dr. Adam McCrimmon will provide either brief intervention or refer the individual to a community agency where the participant and/or their family may obtain longer-term services (such as Access Mental Health).

As participation takes place at the University of Calgary campus, participants will be provided with a parking pass for each visit upon arrival. As well, adults participants will be provided with a $25 gift certificate (for venues such as Cineplex Odeon, Best Buy, or Chapters) to thank them for their time spent with us at each testing session.

Participation in this research will have no effect on services you receive from any agency or organization.

What Happens to the Information I Provide?
All materials will be stored in a locked facility by the primary researcher, Dr. Adam McCrimmon. While the information generated from this research project may be published and/or presented at academic conferences, you will be assigned a participant number when you arrive and the data will be reported as an aggregate, both of which ensures that individual participants are not identifiable. **Please understand**

that your participation will be kept confidential, and all reports will ensure anonymity. Data from this study may also be used to inform graduate student research projects.

It is important to acknowledge that a significant time commitment is likely necessary for participation in this research project. **Participation is voluntary and participants may withdraw from the research project for any reason, at any time, without penalty of any sort.** If participants do withdraw from the research project, the data contributed will be destroyed. Furthermore, participants will be informed if any new information arises that may affect the decision to remain in the research project. Additionally, psychological ethics and Alberta law dictate that steps be taken in the case that you disclose intent to harm yourself or others to a member of the research team, such as contact with authorities.

As the research questions we are interested in examining involve understanding young adults with HFASD as a group, **we will not have research project results for individual participants**. However, when the research project is completed and the data has been analyzed, participants should feel free to contact any of the researchers if they would like a summary of the group results.

Please return the consent form to the researcher. If you are interested in participating in this research project, as well as allowing your caregiver to participate in this research project, please complete the form (see following page) and return it to the researcher that you have been in contact with regarding the study.

Signatures (written consent)

Your signatures on this form indicate that you 1) understand the information provided to you about your participation in this research project, and 2) agree to participate as a research participant. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

I, _____hereby consent to participate in this study.

(adult name)

Signature: _____ Date: _____

I give my consent to be contacted after participation in this research project should the researchers have further questions regarding this research project **(check one) Yes ____ No ____**

I give consent to be contacted for a follow-up research project should there be one **(check one) Yes ____ No____**

Researcher's Name: _____

Researcher's Signature: _____ Date: _____

Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Dr. Adam McCrimmon, R. Psych.
Educational Studies in Psychology, Faculty of Education

If you have any concerns about the way you've been treated as a participant, please contact an Ethics Resource Officer at (403) 210-9863 or cfreb@ucalgary.ca.

A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

Appendix C

UNIVERSITY OF CALGARY

Name of Researcher & Email

Marian Coret, B.Sc. (marian.coret@ucalgary.ca)
Mike Barrett, R. Psych

Supervisor:

Dr. Adam McCrimmon, R.Psych, Educational Studies in School Psychology, University of Calgary

Title of Project:

Evaluating the Effectiveness of the PEERS-YA Social Intervention Program for Young Adults with High Functioning Autism Spectrum Disorder

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board.

Purpose of the Study:

You have been invited to participate in a research project interested in understanding a variety of important gains that may be made through participation in a social intervention for individuals with high functioning autism spectrum disorder. Please read this form carefully and feel free to ask any questions you may have.

The goal of this research project is to better understand the social skills and improvements in related skills in young adults (aged 18-28) with high functioning autism spectrum disorder (HFASD) who complete the Program for the Education and Enrichment of Relational Skills for Young Adults (PEERS-YA). We are interested in exploring social skill development as well as indirect enhancement of related abilities such as social skills knowledge and implementation, emotional intelligence, and the mental health of participants.

What Will I Be Asked To Do?

Participation in this research project is purely voluntary and involves commitment to join in the PEERS-YA social intervention as the caregiver of a young adult with HFASD. The intervention program will be run at The Ability Hub in the Child Development Centre, Calgary, AB. The PEERS-YA program includes one 1.5 hour session per week, for 16 weeks. As a caregiver of an adult participant in the intervention program, you will be asked to commit to attend all sessions, as lessons build upon each other over the course of the program.

If you choose to participate in this research project, you will be asked to complete several questionnaires over 4 separate time points. Specifically, information will be collected 14 to 18 weeks before participation in PEERSYA, immediately before and after completion of the program, and 14 to 18 weeks after completion. The majority of caregiver participants will complete these tasks in approximately 1 hour. Most individuals find the questionnaires simple to complete.

You will also be asked if you wish to participate and should you indicate unwillingness, you will not be required to complete any tasks you feel uncomfortable with.

What Type of Personal Information Will Be Collected?
Should you agree to participate, no personal information of yours will be collected. Each young adult participant will be assigned a participant number, and all information gathered from them and you will remain anonymous. Data will be retained for a minimum of five years on an encrypted and password-protected computer (digital data) or in a locked cabinet (paper files) in a locked office in the Faculty of Education on the University of Calgary campus.

Are there Risks or Benefits if I Participate?
It is expected that the information collected in this research project will provide us with an improved understanding of the effectiveness and positive outcomes of the PEERS-YA program for the HFASD population, including its benefits and potential areas for programmatic improvement. Specifically, we hope to gain an understanding of how friendships and relationships can be improved through the learning and modeling gained through PEERS-YA. There is little research exploring additional abilities that may be improved through the social intervention, such as emotional intelligence and mental health. These abilities are also important to social and relational functioning, and understanding their contribution to gains through PEERS-YA will likely help in improving delivery of the program in the future. The information gathered via this project has the potential to help adults with HFASD cope and improve their skills in many areas that will increase their resilience in social relationships and friendships.

The research project involves simple paper-and-pencil questionnaires. There is the possibility that some caregiver participants may experience discomfort or embarrassment regarding their loved one's social challenges as the PEERS-YA program progresses. However, this possibility is unlikely, and it is expected that all participants will find their involvement in the intervention program to be rewarding and beneficial. Should any participants demonstrate distress regarding completion of the PEERS-YA program, or should any participant or their caregiver indicate that distress was experienced from participation, Dr. Adam McCrimmon will provide either brief intervention or refer the individual to a community agency where the participant and/or their family may obtain longer-term services (such as Access Mental Health).

Caregivers will be provided with a $10 gift certificate for Starbucks at each testing session to thank them for their time and effort in completing the forms.

Participation in this research will have no effect on services you or your loved one receives from any agency or organization.

What Happens to the Information I Provide?
All materials will be stored in a locked facility by the primary researcher, Dr. Adam McCrimmon. While the information generated from this research project may be published and/or presented at academic conferences, your loved one will be assigned a participant number when you arrive and the data will be reported as an aggregate, both of which ensures that individual participants are not identifiable. **Please**

understand that your participation will be kept confidential, and all reports will ensure anonymity. Data from this study may also be used to inform graduate student research projects.

It is important to acknowledge that a significant time commitment is likely necessary for participation in this research project. **Participation is voluntary and participants may withdraw from the research project for any reason, at any time, without penalty of any sort.** If participants do withdraw from the research project, the data contributed will be destroyed. Furthermore, participants will be informed if any new information arises that may affect the decision to remain in the research project.

As the research questions we are interested in examining involve understanding young adults with HFASD as a group, **we will not have research project results for individual participants**. However, when the research project is completed and the data has been analyzed, participants should feel free to contact any of the researchers if they would like a summary of the group results.

Please return the consent form to the researcher. If you are interested in participating in this research project, as well as allowing your parent/caregiver to participate in this research project, please complete the form (see following page) and return it to the researcher that you have been in contact with regarding the study.

Signatures (written consent)

Your signatures on this form indicate that you 1) understand the information provided to you about your participation in this research project, and 2) agree to participate as a research participant. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

I, _____hereby consent to participate in this study for_____.

(caregiver name) (young adult name)

Signature: _____ Date: _____

I give my consent to be contacted after participation in this research project should the researchers have further questions regarding this research project **(check one) Yes ____ No ____**

I give consent to be contacted for a follow-up research project should there be one **(check one) Yes ____ No____**

Researcher's Name: _____

Researcher's Signature: _____ Date: _____

Questions/Concerns
If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Dr. Adam McCrimmon, R. Psych.
Educational Studies in Psychology, Werklund School of Education

If you have any concerns about the way you've been treated as a participant, please contact an Ethics Resource Officer at (403) 210-9863 or cfreb@ucalgary.ca

A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

Appendix D

PEERS: Initial Interview with Adults

What do you know about the program we're offering (PEERS) / What have others told you?

We have sessions that teach young adults how to make and keep friends. Is this something you might be interested in?

Have you done anything like this in the past?

What was that like?

Can you tell me about some of your interests?

Are there adults that you usually hang out with? (If YES – What are their first names / Are they older or younger / How do you usually meet up / What kind of things do you do with them?)

Have you had any difficulties that you have had with making or keeping friends – can you describe?

What sort of things would you like to work on in making / keep friends? Anything in particular?

Our structure (describe): Lesson, and then get to practice what you learn – homework/home practice. Would you be willing to do "homework" tasks, sometimes with your parents, sometimes with people that you know from school, work, or other places?

Attending all sessions is very important. Can you attend all of them?