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AN EXAMINATION OF MENTORING AS AN INTERVENTION FOR STUDENTS WITH
AUTISM SPECTRUM DISORDER

A Specialist Project submitted in partial fulfilment
of the requirement for the degree
Specialist in Education

Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

By
Candace Bone

May 2022

AN EXAMINATION OF MENTORING AS AN INTERVENTION FOR STUDENTS WITH
AUTISM SPECTRUM DISORDER

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Carl Myers, Ph.D.
Committee Chair

Sarah Ochs, Ph.D.
Committee Member

Regina Guthrie, Psy.D.
Committee Member

Ranjit T. Koodali, Ph.D.
Associate Provost for Research & Graduate Education

ABSTRACT

AN EXAMINATION OF MENTORING AS AN INTERVENTION FOR STUDENTS WITH AUTISM SPECTRUM DISORDER

Despite evidence demonstrating that mentoring may be an effective intervention for neurotypical students, there is limited literature investigating the impact of mentoring on outcomes for those with autism spectrum disorder (ASD). Using a comprehensive review of the available literature, the present specialist project provides a summary of available mentoring literature which implemented mentoring programs with students on the autism spectrum. After eliminating irrelevant literature from an initial search, a small sample of relevant articles were reviewed ($N = 8$). These studies demonstrated that ASD mentoring programs are often limited in scope to higher functioning young adults. Additionally, the reviewed articles most frequently implemented peer mentoring models. The available literature reported limited quantitative data, but the quantitative data reported indicated promising outcomes for mentees with ASD. These findings indicate that further research is needed to determine the efficacy and effectiveness of mentoring programs for mentees with ASD. Additional research is also needed to establish a framework for future mentoring programs to optimize mentee outcomes across ages, genders, levels of functioning, race/ethnicities, and more.

Keywords: autism spectrum disorder, mentoring, peer mentoring, evidence-based intervention

This specialist project is dedicated to Brad Smallwood whose friendship and lived experience with autism spectrum disorder (ASD) sparked my interest in ASD as an elementary school student. Brad showed me firsthand the powerful impact friendship and mentoring can have on one's life. Without Brad's friendship, influence, and love of the Lion King, I can confidently say

I would not be the individual I am today. Brad, this is for you.

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Introduction

In any school, students exhibit strengths and challenges that differ greatly from one student to another. In addition to typical differences, students with autism spectrum disorder (ASD) face many daily challenges that are unlike those faced by most of their neurotypical peers. Students on the spectrum often experience persistent difficulty understanding, establishing, and maintaining social relationships as well as difficulty with social verbal and non-verbal communication (American Psychiatric Association [APA], 2013). Although students with ASD may face these challenges and more, research has demonstrated numerous effective practices that can help students cope with and overcome these challenges (Steinbrenner et al., 2020; Wong et al., 2014). A commonly used program to improve outcomes for neurotypical students is mentoring (DuBois et al., 2011; Raposa et al., 2019). Despite the literature that demonstrates the effectiveness of mentoring programs with neurotypical and at-risk students, less is known regarding the effectiveness of mentoring as an intervention for students with ASD. This gap in the literature is the underlying reason for the current project that examines the existing literature and outcomes associated with mentoring students with ASD.

Autism Spectrum Disorder

Definition and Prevalence Changes

The prevalence rates of ASD have changed dramatically in recent years as the definition, understanding, and diagnosis of ASD has changed and evolved. Though first conceptualized as a form of childhood schizophrenia (Kanner, 1943), the understanding of autism developed into one type of a pervasive developmental disorder (APA, 1994), and then as a disorder that contains a broad spectrum of characteristics and severity levels (APA, 2013). Across Kanner's early observations of children with autism, he noted aloneness, obsessiveness, an insistence on

sameness, stereotypy, and echolalia as key features of autism. Later, the DSM-III (APA, 1980) identified a lack of interest in people, severe impairments in communication and abnormal responses to the environment beginning early in life as the diagnostic features. As autism became better researched and understood, it was determined that autism was much broader than initially believed. To reflect the broadness of autism and its various diagnostic behaviors, the release of the DSM-5 (APA, 2013) introduced the term ‘autism spectrum disorder’ and described the primary diagnostic criteria as deficits in social communication along with restrictive and/or repetitive behaviors. This shift in terminology condensed several other diagnoses (Autistic Disorder, PDD-NOS, Asperger’s Syndrome) into the broad spectrum of disorders known as autism spectrum disorder (ASD).

While the conceptualization and definition of autism evolved over the past several decades, the prevalence rates of the disorder have skyrocketed in just the last three decades. Forty years ago, the third edition of the Diagnostic and Statistical Manual of Mental Disorders (APA, 1980) reported that approximately 1 or 2 out of every 5,000 children had autism. Even in the early 1990s, the DSM-IV (APA, 1994) stated the prevalence rate was 2-5 cases per 10,000 individuals, which is essentially the same rate. However, the DSM-5 (APA, 2013) states that the current prevalence rate of autism spectrum disorder is 1% of the population across children and 1 in 100 adults. According to the Centers for Disease Control and Prevention ([CDC] 2020), the current rate of those identified with ASD is approximately 1 in 54 children based on their prevalence studies. The current prevalence rate demonstrates a stark contrast from previous reports. The CDC also reports that autism is present in all races, ethnicities, and socioeconomic groups and that ASD is four times more common among boys than among girls.

While there have been changes in the understanding of autism over the years as research

has advanced and developed, prevalence rates have increased more dramatically than would be expected if changes in the definition were the sole cause. Research has demonstrated that the rising prevalence of ASD may be influenced by several factors aside from the changing understanding and diagnostic criteria of ASD. Rice et al. (2012) identified the increasing availability of service providers and diagnosticians as being a potential explanation for the apparent rise in prevalence. Matson and Kozlowski (2011) describe the expanded diagnostic criteria, increased general awareness of the disorder, diagnosis at earlier ages, and the recognition that ASD is a life-long disorder as the primary factors influencing the increasing prevalence of ASD. King et al. (2009) described the rising prevalence of ASD as being at least partially due to diagnostic substitution. According to these researchers, diagnostic substitution is the process by which a student with a disability is re-evaluated and found to have a different disability than it was initially thought. With regard to ASD, King et al. described the frequent diagnostic substitution of students initially thought to have an intellectual disability but later identified as having ASD. King et al. identified that in the past several decades the rates of intellectual disability have decreased while rates of ASD have increased. Polyak et al. (2015) echoed the findings of King et al. and also identified that the decreasing prevalence in intellectual disability coincided with increasing prevalence of ASD and recategorization. Rice et al. (2012) indicated that although changes in understanding and identification play a large role in the rising prevalence of ASD, present research is unable to disprove a true rise in cases based on environmental factors. Because ASD has such a high prevalence rate and diagnosis is occurring at younger ages, effective and practical interventions to help students with ASD are necessary in the schools.

Diagnostic Characteristics

ASD is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interactions as well as restrictive and/or repetitive patterns of behavior, interests, or activities (APA, 2013; Ashburner et al., 2018). As indicated by the inclusion of “spectrum” in its name, ASD is characterized by numerous behaviors that vary across individuals in their presentation severity. Because of this variance between individuals, students are often identified using a functional severity level from a three-level scale that is determined by the clinician evaluating the individual (APA, 2013; Volkmar et al., 2014). Regarding this spectrum, students deemed as “requiring support” may present similarly to neurotypical students and may be able to successfully function independently with minimal supports in place. Students identified as “requiring substantial support” may function somewhat independently under significant supervision and with many supports in place. Students identified as “requiring very substantial support” frequently need significant supports and may be unable to function independently (Volkmar et al., 2014).

Deficits in social communication and social interactions are the primary characteristics of ASD and may manifest in any combination of ways. Students with ASD may exhibit deficits in social-emotional reciprocity, sharing in another’s interests, and initiating social interactions (Kronke et al., 2016). Kronke et al. went on to note that it is also common for these students to struggle with typical back-and-forth conversations. Oftentimes, conversations with students on the autism spectrum may feel one-sided with the student being non-responsive to the other person or the student seeking to discuss only their interests. Students with ASD often do not understand the perspectives of others or realize that the perspectives of others differ from their own. In addition to difficulty with reciprocity, students with ASD often exhibit deficits in non-

verbal communication that is helpful for understanding social interactions with others (American Psychiatric Association, 2013; Volkmar et al., 2014). A student with ASD may have limited or absent non-verbal behaviors such as eye contact, facial expressions and gesturing. Finally, students with ASD often exhibit deficits in developing, maintaining, and understanding social relationships (Kroncke et al., 2016). These students may have a hard time engaging with others to make friends or may not have an interest in peers or making friends. Students with ASD may be unable to explain or demonstrate an understanding of what it means to be a friend, roommate, or other social role.

The secondary diagnostic component to ASD is restrictive and/or repetitive patterns of behavior, interests, or activities (Bauminger-Zviely, 2014). Many students with ASD exhibit an insistence on sameness that is deeply ritualized and can lead to students becoming distressed at small changes to the routine or norm (Kroncke et al., 2016). Examples of these distressing changes may include a change in the daily schedule at school or an interruption to the child's play. Additionally, students with ASD often develop and exhibit fixated interests and preoccupations that are unusual (APA, 2013; Volkmar et al., 2014). Another aspect of restrictive and/or repetitive behaviors is sensory characteristics (Kroncke et al., 2016). As examples, students with ASD may exhibit sensitivity to sensory input such as extreme over-reactions to loud sounds or refusal to wear certain clothing due to the way it feels. On the other hand, students with ASD may also exhibit no sensitivity to, or regard for, sensory input such as exhibiting no reaction at all to loud sounds (Baranek et al., 2014). Students with ASD may exhibit unusual interest in sensory aspects of the environment (Kroncke et al., 2016) such as seeking out or avoiding specific textures, sounds, and smells.

Other Characteristics of ASD

While there are many other common characteristics of those on the spectrum (e.g., strong memories, echolalia, interprets things literally), one significant difficulty demonstrated by persons with ASD is difficulty with generalization (Loomis, 2014). For many students with ASD, knowledge and/or skills taught in one setting do not easily become fluent in another setting (Powers et al., 2014) nor are they easily applied in a different way than was taught (Fouse & Wheeler, 1997).

Generalization issues are not simply limited to settings as some students with ASD may demonstrate difficulty applying a previously learned skill if a particular teacher is not there or in a context other than where and how the skill was learned (Loomis, 2014). It is important to note difficulty with generalization as a characteristic of ASD because of its importance in teaching any skill. Simple skills such as zipping up a coat, adding single-digit numbers, or using appropriate greetings each require skill generalization for the student to successfully master and utilize that they have learned. For example, a parent may demonstrate zipping up a coat when introducing zippers, and the neurotypical child may later recognize a zipper on a backpack and innately generalize their skill learned from their coat. On the other hand, a student with ASD may require explicit instruction on how to use zippers on various items even though the concept is the same. Additionally, generalization issues are important to note due to the number of skills being taught to students with ASD on a daily basis. Students with ASD often undergo extensive interventions; however, students with ASD may not be able to generalize their skills gained in interventions without intentional steps being taken to generalize the skills.

Though many students with ASD may struggle with generalization of skills, research has demonstrated numerous techniques and interventions that can effectively aid students in their

skill generalization (Loomis, 2014; Powers et al., 2014; Reichow & Barton, 2014). One technique that can be used to build a student's generalization ability is to teach and provide practice in the actual setting where the skill will be needed (Loomis, 2014). For example, if a teacher is working with a student with ASD to say please in the cafeteria, the teacher should avoid teaching the skill in an environment other than the cafeteria. Although the student may master saying please when practicing in the classroom, the skill may not generalize to the cafeteria and the student may not apply the skill despite demonstrating it in the classroom. Because of the clear importance of generalization of skills and the deficits often exhibited by students with ASD, the National Autism Center outlined three principles regarding the generalization of skills. First, use direct and natural consequences when possible; second, variety in materials and settings can lead to improvements in generalization; and third, materials used to teach new skills or concepts should be accessible in a variety of natural settings (Eren & Groskreutz, 2014). These three principles aid in the effectiveness of direct generalization instruction and the practice of learned skills across settings.

Students with ASD present specific challenges and opportunities with regard to academics. Research regarding academic achievement and students with ASD has reported a wide range in overall abilities with some students performing exceptionally well and others far below expected levels (Bauminger-Zviely, 2014). In addition to a wide range in achievement, research has also demonstrated great differences in patterns of strengths and weaknesses for students with ASD (Koegel et al., 2014). Generally, basic reading, encoding, and rote skills have been found to be less impaired than skills such as reading comprehension, written expression, graphomotor skills, processing of complex materials across domains, and problem solving for many students with ASD (Whitby & Mancil, 2009). Although research exists regarding reading

and writing performance of students with ASD, examinations of student math skills are understudied (Bauminger-Zviely, 2014). Academic skills are of importance in the current project due to the number of mentoring programs that use mentoring relationships to target academic outcomes such as attendance, grades, specific skills and academic attitudes (Herrera et al., 2013; Jekielek et al., 2002; McQuillin et al., 2015). Because mentoring programs for neurotypical students often target academic outcomes, mentoring related to academic outcomes for students with ASD are of interest of the current project.

Despite all the literature that outlines the deficits and challenges that face many students with ASD, students with ASD are still individuals. Each student with ASD is unique despite potential commonalities and should be treated as such. Students with ASD each exhibit their own strengths, creativity, personality, interests, and passions that are fundamental parts of who they are aside from their ASD status. Practitioners, researchers, and educators should keep this in mind when serving and working with students on the autism spectrum.

Evidence-Based Interventions

Although each student is different in their ASD behavior characteristics, there are some common interventions that have demonstrated effectiveness for students with ASD. In their review of the available literature, Steinbrenner et al. (2020) sought to identify evidence-based practices (EBPs) for children, youth, and young adults with ASD while also updating a previous review of evidence-based practices (Wong et al., 2014). In order to be included in their review, studies had to be behavioral, developmental, and/or educational in nature; practical for typical home, school, and/or community settings; compare treatment and control conditions; generate behavioral, developmental, or academic outcomes; and had to employ an experimental or quasi-experimental design. Following their analyses, Steinbrenner et al. identified 28 interventions for

ASD that had empirical support in either group or single case studies. Of the 28 empirically supported interventions identified by Steinbrenner et al., two interventions, social skills training and peer-based instruction and intervention, are viewed as most relevant to this project and will be reviewed here. Specifically, social skills training and peer-based instruction and intervention can be viewed as the evidence-based interventions for ASD that are most like mentoring interventions. Mentoring requires social interactions that can teach and reinforce appropriate interactions, similar to social skills training, and mentoring utilizes trained others to help the student grow in target areas, similar to peer-mediated instruction and intervention.

Social Skills Training

One intervention strategy that was identified by Steinbrenner et al. (2020) as an evidence-based intervention for students with ASD was social skills training (SST). Social skills training teaches students with ASD ways to appropriately interact with peers, adults, and other individuals either in an individual or group settings (Bellini et al., 2014; Steinbrenner et al., 2020; Wong et al., 2014, 2015). Students who undergo SST are taught and practice skills that are expected to generalize to other social settings. Typical SST activities include instruction on basic concepts, modeling, role-playing, and feedback (Bellini & Peters, 2008; Fettig, 2013). According to Krasny et al. (2003), essential components for successful social skills training include making abstract concepts concrete, providing structure and predictability, providing scaffolded language, including other student focused activities, fostering self-awareness and self-esteem, selecting relevant goals, programming in a sequential manner, and providing opportunities for generalization and ongoing practice. Table 1 summarizes SST outcomes by age as identified by Steinbrenner et al. (2020).

Although social skills training is an evidence-based intervention, social skills training

varies greatly across interventions in design and implementation. Evidence-based social skills training strategies include social narratives, video modeling, computer-based interventions, and pivotal response training among others (Bellini & Peters, 2008). As one example of a social skills training intervention, Kroeger et al. (2007) developed and implemented a social skills group for young children with ASD that used video-modeling to teach play and social skills. Children who viewed the video modeling exhibited large gains in their prosocial behaviors including increases in initiating behaviors, responding behaviors, and interacting behaviors. A second example of a social skills training intervention can be found in a study by Lopata et al. (2010) which implemented a manualized social treatment for high functioning students with ASD. Participants received daily intensive instruction and therapeutic activities with the goals of developing social skills, expanding the student's interests, developing face-emotion recognition, and interpreting non-literal language. Students who were in the treatment group demonstrated substantive effect size estimates at post-test in all seven outcomes measures. These studies are just two examples of how social skills training can improve outcomes for students with ASD despite their differences in intervention designs, specifically their differences in instructional delivery (i.e., video modeling and intensive instruction).

Table 1*Evidence-Based Interventions for Persons With ASD*

Outcome	Peer-Based Instruction and Intervention (PBII)	Social Skills Training (SST)
Challenging/Interfering Behavior		
0-5 years		
6-14 years		
15-22 years		
Communication		
0-5 years		
6-14 years		
15-22 years		
Mental Health		
0-5 years		
6-14 years		
15-22 years		
Play		
0-5 years		
6-14 years		
15-22 years		
School Readiness		
0-5 years		
6-14 years		
15-22 years		
Social		
0-5 years		
6-14 years		
15-22 years		

Note. Adapted from Steinbrenner et al. (2020). A shaded cell represents that at least one study demonstrated the efficacy of the intervention for the age identified in the column for the given outcome.

Peer-based Instruction and Intervention

Another intervention strategy that was identified as an EBP was peer-based instruction and intervention (PBII; Steinbrenner et al., 2020). Peer-mediated instruction and intervention (PMII) had previously been identified as an evidence-based practice by Wong et al. (2015); however, the intervention was renamed to PBII in order to include adult-mediated interventions with peers (Steinbrenner et al., 2020). This intervention helps students with ASD acquire new social skills, communication skills, and/or behaviors and then practice the skills with neurotypical peers who have been taught specific ways to interact with students with ASD (Fettig, 2013; Koegel et al., 2014; Neitzel, 2008; Sperry et al., 2010). Following the initial instruction of the peers, the peers and students with ASD are given opportunities for social interaction within a natural environment. PBII is considered an effective strategy for “promoting positive transitions across settings” (Fettig, 2013, p. 91) as well as fostering inclusion in the school (Walton & Ingersoll, 2013). Additionally, Bellini et al. (2014) report that using peers in instruction of students with ASD results in less peer rejection, decreases in stereotypic behaviors, increases in the student’s friend network, and provides more opportunities to practice the acquired skills in naturalistic settings. Table 1 summarizes PBII outcomes by age as identified by Steinbrenner et al. (2020).

Peer-based instruction and intervention can be used to target numerous student outcomes. For example, a study by Lee et al. (2007) used a PBII interventions with students with ASD who had been identified as exhibiting high levels of stereotypic behavior. The researchers sought to determine if the PBII and the subsequent increased engagement in peer interaction decreased stereotypic behaviors in the students with ASD. The researchers found that students with ASD greatly increased their time engaged in peer interaction compared to baseline when PBII was

implemented and the stereotypic behaviors decreased for all three students. PBII can also be used to target academic skills in addition to social skills. Kamps et al. (1994) implemented a tutoring strategy as a type of PBII that sought to improve reading skills for neurotypical students and students with ASD. Students worked to improve reading fluency and comprehension and were provided unstructured free time following reading instruction. Results demonstrated that PBII could be used effectively to increase class-wide reading fluency and correct responses to reading comprehension questions for all students as well as increase the total duration of social interactions between neurotypical students and students with ASD.

PBII is of interest in this particular project due to its similarities to peer-mentoring programs which are discussed in the next section of this project. Both PBII and peer-mentoring rely on students to deliver and guide changes and outcomes; however, peer-based instruction and intervention can be viewed as a formalized content relationship rather than a connection-driven relationship such as typically found in mentoring. This distinction can be viewed in relation to the social-communication deficits associated with ASD in that students with ASD often have difficulty establishing meaningful relationships which is an essential component to mentoring. Rather than primarily focusing on establishing mentoring connections, PBII may be an alternative that appeals to many due to its focus on observable skill deficits.

Mentoring

Although many interventions have been identified as evidence-based for students with ASD, an area that is understudied with regard to autism is mentoring. Mentoring typically involves pairing a student with a volunteer from the school or community in a relationship that will foster the student's well-being and other positive outcomes (DuBois et al., 2011). Many mentoring programs use an intergenerational model wherein the mentor is an adult, and the

mentee is a student. Typically, mentoring pairs meet weekly for a total of 2-3 hours per month, but this commitment can vary greatly across programs and settings (Garringer et al., 2017). The most common youth mentoring agencies are nonprofits, though some schools do offer school-based mentoring programs (Garringer et al., 2017; Jekielek et al., 2002).

The participants of mentoring programs can vary greatly across programs and composition of the area in which the program occurs. Mentoring programs typically include more female mentors and mentees than male mentors and mentees as well as few transgender or gender-neutral mentors or mentees (Garringer et al., 2017). Unfortunately, research has demonstrated that there is a general disparity in the minority representation in mentoring programs. In their national survey of youth mentoring programs, Garringer et al. (2017) found that an average of 33% of mentees involved in mentoring programs identify as Black whereas only 15% of mentors do so. Additionally, despite the numerous racial and ethnic groups, 53% of all mentors are white which is representative of the current trends in the field of education (de Brey et al., 2019). With regard to goals, mentoring programs are most often developed for students who may be deemed at-risk for poor outcomes in a variety of areas, although mentoring is also used for students outside of this population.

Mentoring is often targeted to specific outcomes ranging from life and social skills to deterring risky behavior in youth (Eby et al., 2008; Garringer et al., 2017). For at-risk youth, participation in mentoring programs has been demonstrated as an effective means of reducing depressive symptoms and increasing social acceptance, academic attitudes, and grades (Herrera et al., 2013). Research has demonstrated that students involved in mentoring programs demonstrate better school attendance, a better chance of going on to higher education, and better attitudes toward school (Jekielek et al., 2002). Though results have traditionally been mixed,

more recent research has emerged that demonstrates significant gains in self-esteem for youths who are involved in a mentoring program (Marino et al., 2020). Research has also demonstrated that mentoring approaches are a promising means of preventing substance abuse as well as some negative youth behaviors (Jekielek et al., 2002).

Many mentoring programs may place the primary focus on building strong relationships; however, mentoring programs can also be used to enhance specific and communicated goals for students. This type of mentoring relationship, where the focus is on the goal or activity as the purpose of the relationship, is called instrumental mentoring (McQuillin et al., 2015). When in an instrumental mentoring relationship, the goals are accomplished through teaching and providing the supports necessary for the student to succeed. In their study of instrumental school-based mentoring, McQuillin et al. (2015) sought to improve academic and behavioral performance of 74 middle school students. Students were randomly assigned to either the mentoring group or the waitlist control group, and the students who were assigned to the mentoring group were matched with mentors based on self-reported interests. Mentors in this study were high-achieving undergraduate students of which 81% were female. The dyads met for eight 45-minute mentoring sessions over the course of 10 weeks wherein the mentees set goals and were taught academic skills. Following the mentoring, students who completed the mentoring program demonstrated better math grades, reduced behavioral office referrals, and increased life satisfaction compared to students in the waitlist control condition. Although the relational component and rapport was an important component of the mentoring relationship, the primary focus remained on the academic and behavioral performance.

Mentoring program efficacy has been largely researched due to the surge in mentoring programs across the United States in recent decades. Research has demonstrated the

effectiveness of mentoring for improving behavioral, social, emotional, and academic student outcomes (Dubois et al., 2011); however, such measurable positive outcomes are not guaranteed and vary greatly across mentoring programs. Research suggests that many mentoring programs may result in relatively modest results that could be improved with adjustments to current practices (Raposa et al., 2019; Wood & Mayo-Wilson, 2012). Overall, mentoring programs that target academic outcomes such as grades and school attendance, conduct problems, and attitudinal/motivational outcomes appear to have the largest effect sizes and most success with neurotypical students whereas programs that target physical health are least likely to be effective and result in small effect sizes (DuBois et al., 2011). A meta-analysis of mentoring literature by DuBois et al. (2002) also found that positive effects of mentoring generalized across backgrounds and demographics including gender, race, and age.

Research has also demonstrated that there are numerous characteristics associated with successful mentoring relationships and positive outcomes for the student involved. Although mentoring has demonstrated efficacy at some level for neurotypical and at-risk populations, research has also demonstrated that male students with male mentors demonstrate the longest lasting results (Raposa et al., 2019). The male mentee-mentor relationship is important to note due to the high prevalence of ASD in males. With regard to mentoring length, in their analysis of the Big Brothers Big Sisters program, Grossman and Rhodes (2002) found mentoring relationships that resulted in the most optimal outcomes were those that lasted at least one year. Relationships terminated after very short periods of time resulted in decrements in student outcomes. This optimal length of mentoring may be compatible with behavioral characteristics when implementing a mentoring program for students with ASD due to the restrictiveness that is associated with ASD. By having a consistent person in the student's life, it is less likely that the

student will exhibit distress with disruptions to the norm or routine that may be associated with individuals being inconsistently present in the student's life. Additionally, Jekielek et al. (2002) found that youths who are the most disadvantaged or at-risk seem to benefit the most from mentoring. This finding is consistent with the high prevalence of mentoring programs available that target at-risk students as well as the high population of at-risk students involved in mentoring programs (Garringer et al., 2017).

In addition to the numerous mentor and relationship characteristics associated with positive outcomes, Schwartz et al. (2011) highlight the importance of considering student characteristics when implementing and evaluating a mentoring program. Schwartz et al. analyzed mentee relationship profiles pre-mentoring to determine if there were differences between students in post-mentoring outcomes. After sampling participants recruited from 10 Big Brothers Big Sisters agencies across the country, participants were given baseline surveys to identify personal characteristics entering the program and then randomly assigned to the mentoring group or the waitlist control group. The mentoring dyads met weekly over the course of a year and a half. At the conclusion of the study, students who reported at baseline to have satisfactory, but not particularly strong, relationships benefitted from the mentoring the most. These students exhibited significant improvements in their overall academic performance and pro-social behavior compared to baseline. This analysis of mentee specific characteristics serves as an important reminder that individual students bring characteristics to a relationship that can impact the success or failure of a mentorship.

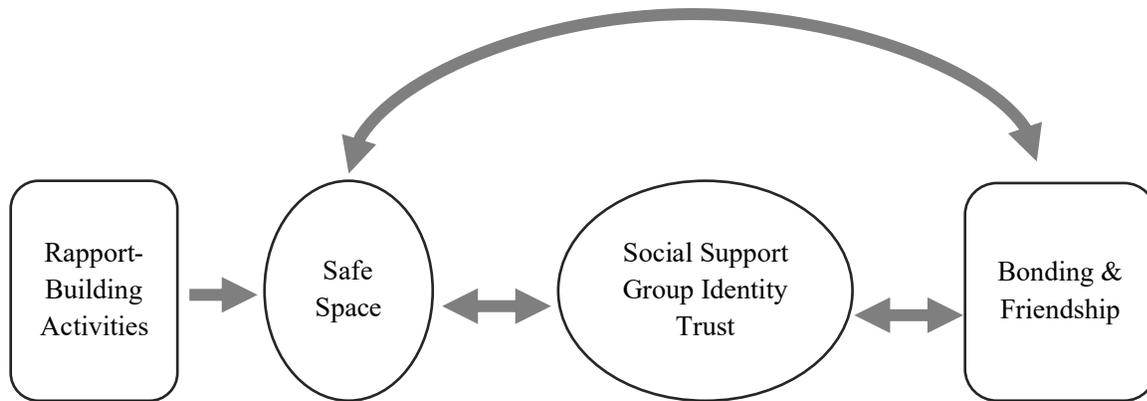
Those choosing to implement a mentoring program may seek to make a lasting difference in a student's life; however, the realistic long-term outcomes of mentoring are a subject of continuing research. For example, Herrera et al. (2011) found that despite mentored youth

performing better academically than their non-mentored peers at the end of the first school year of the mentoring program, their academic improvements were not sustained into the following school year. Although academic improvements were not sustained, the individual student characteristics that were unmeasured by the researchers cannot be known and the true, long-term impact of the mentoring could be yet to be realized. More longitudinal research is needed to understand the long-term outcomes and implications of receiving mentoring as a student.

Another mentoring model is peer mentoring. Peer mentoring uses a relationship between an experienced mentor such as an older student and an inexperienced mentee such as a younger student or student with a clearly defined skill deficit. Once a mentor and mentee match is created, the individuals work together to develop the abilities of the mentee (Osiname, 2014). Although peer mentoring is utilized less often than traditional mentoring models, it is still a commonly used mentoring model (Garringer et al., 2017). A study by Sánchez et al. (2018) implemented a peer mentoring program for African American and Latino male students with the hope of understanding the processes that make peer mentoring effective. Unlike many peer mentoring models, this program did not formally assign mentors to mentees and instead allowed the students to naturally adopt the roles based on age and experience. Based on the relationships developed and interviews with those involved, the researchers identified five key processes that were essential to the creation of the relationships: rapport building activities, a safe space, mutual support, a group identity, and trust. See Figure 1 for a visual representation of the peer mentoring model established by Sánchez et al.

Figure 1

Peer Mentoring Model for Boys of Color



Note. Adapted from Sánchez et al. (2018).

Similar to the outcomes found in general mentoring research, peer mentoring is associated with a variety of positive student outcomes. Research has demonstrated that elementary school students with academic and behavioral risk factors who were paired with a high school peer mentor exhibited improved grades, teacher perceptions, self-rated self-efficacy, and social validity (McDaniel & Besnoy, 2019). In their profile of cross-age peer mentoring programs, the National Institute of Justice (2015) reported that mentored children demonstrated a significant improvement on measures of spelling achievement and connectedness to the school and parents compared to the control group. A study by Karcher (2005) found that students who received developmental mentoring with a high school student demonstrated changes in their self-esteem, social skills, and connectedness. Specifically, students whose mentors were present experienced positive outcomes whereas students whose mentors were inconsistent in their attendance demonstrated declines in self-esteem and behavioral competence. This study demonstrates both the harm and good mentors are capable of in the lives of the student they work with as well as the importance of exposure and quality time rather than specific curriculum.

Many peer mentoring models pair an elementary school student with a high school student; however, Destin et al. (2018) sought to determine how slightly older peer mentors influence the school motivation and persistence of mentees. In their study, the researchers randomly assigned 8th grade students to either the mentoring or tutoring control group. The 8th grade students who were assigned to the mentoring condition were paired with a high school student. The results of the study demonstrated that students with peer mentors exhibited an increase in their tendency to value and persist through academic difficulty (Destin et al., 2018). This study exhibits the importance of a mentor's presence rather than a specific age-gap necessary to facilitate mentoring. The participants in this study were within a few years of each other in age, yet the mentees still made meaningful improvements as a result of the mentoring experience.

Statement of Problem

Although many interventions have been demonstrated as effective and evidence-based for students with ASD, few studies have sought to determine the effects of mentoring on student outcomes for students with ASD. Because mentoring and peer mentoring have been demonstrated to be effective for neurotypical students, the possibility exists that mentoring may reap benefits for students on the autism spectrum that is not yet widespread in research. The purpose of this specialist project is to complete a comprehensive, systematic review of the literature on mentoring programs as interventions for students with autism spectrum disorder. Specifically, the present project seeks to answer the following questions: (a) What is the student age range being targeted by mentoring programs? (b) What mentoring models or programs are being used for students with ASD? (c) What outcomes are mentoring models targeting? (d) How effective are the mentoring programs at addressing the target outcomes?

Method

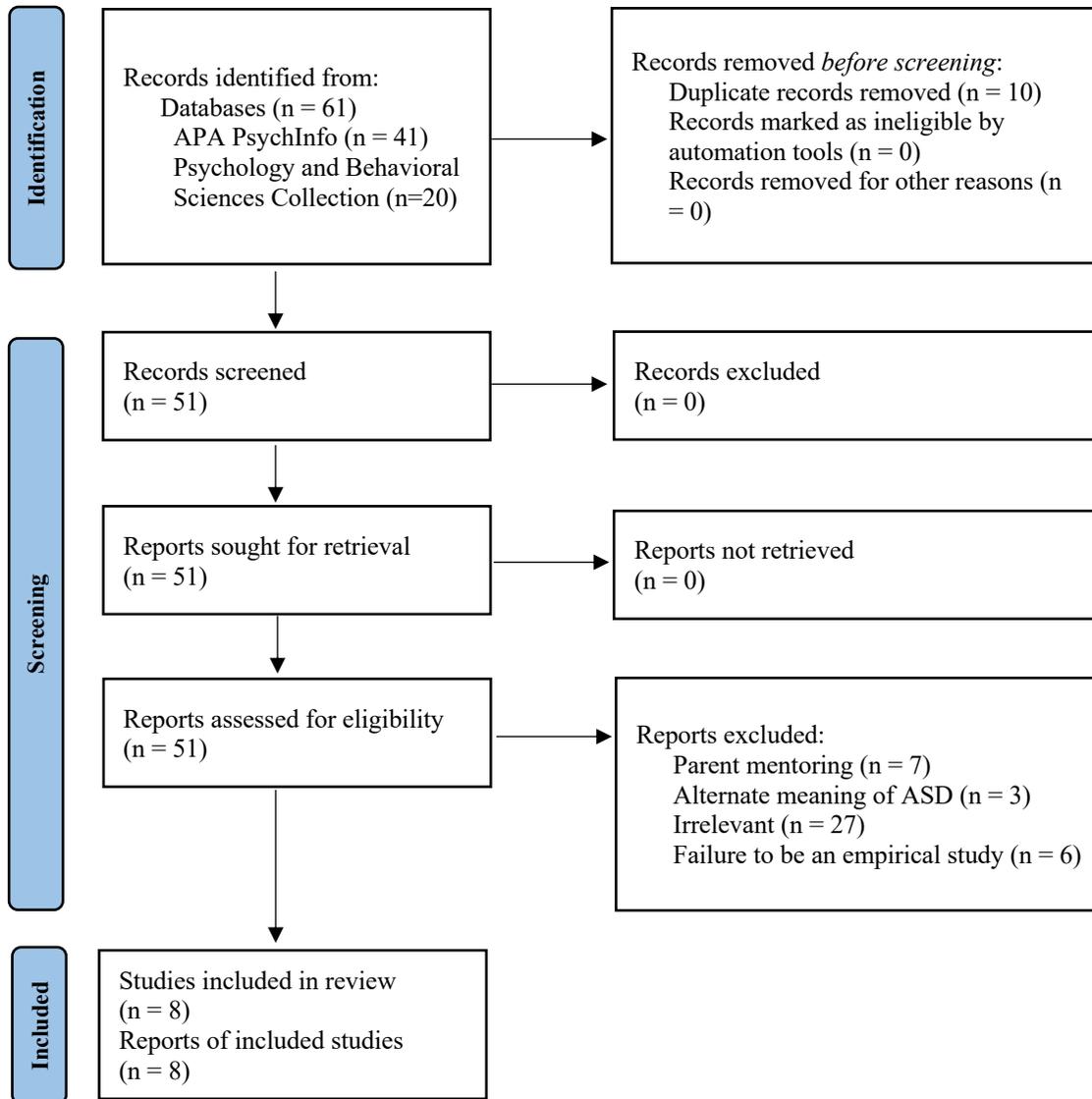
This specialist project includes an analysis of existing, peer-reviewed literature regarding mentoring as an intervention for students with ASD. Literature was examined for their methodology; developmental, chronological, and mental age of target student population; use of mentoring; and outcomes for students with ASD. The electronic library database EBSCOhost was used to identify published, peer-reviewed articles regarding mentoring and ASD. Within EBSCOhost, PsychINFO, PsycARTICLES, and Psychology and Behavioral Sciences Collection were selected as target databases. The following keyword combination was entered into the database to ensure a comprehensive search of the literature: autism spectrum disorder or autism or ASD and mentoring. Studies found to be peer-reviewed and published between 1990 and 2020 were examined for inclusion. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Page et al., 2020) flow diagram was used as a visual representation of the inclusion and exclusion of articles that are identified from the database search.

In order to be eligible for final inclusion and subsequent examination, it was required that studies (a) examined a mentoring program which was implemented for mentees on the autism spectrum, and (b) evaluated the impact the program had on the student through measurable outcomes. Articles were excluded if they implemented a mentoring program for parents of students with ASD, utilized a different meaning of ASD aside from autism spectrum disorder, failed to be empirical studies, or were simply irrelevant (e.g., regarding staff views on supporting evidence-based practice, covert audio coaching, speech language treatment). An initial search of the selected databases resulted in 61 records identified; however, only 51 articles were screened for inclusion after removing duplicate articles. During the screening, 43 articles met exclusionary criteria resulting in 8 articles that will be included in this analysis. The PRISMA flow chart that

illustrates the process of identifying, screening, and selecting peer-reviewed articles that are included in this literature review is found in Figure 2.

Figure 2

The PRISMA Flow Diagram (Page et al., 2020)



Results

Results from the literature review are presented by reviewing findings from each article. The information from the studies is summarized one-by-one with an emphasis on the age of the participants, mentoring model used, and the specific student outcomes measured. To summarize information across studies, the frequency of each mentoring model used (i.e., peer-mentoring, intergenerational, instrumental, or other) is presented to determine what model is the most used in the literature. In addition, common student outcomes are identified along with the effectiveness of the outcomes.

Only eight studies were identified that met the search criteria. Despite searching the literature as far back as 1990, the earliest article found was published in 2016. Given there is no chronological development of mentoring programs for persons with ASD, the articles will be reviewed in no particular order.

Study 1

Hillier et al. (2019) implemented and evaluated Horizons, a college preparation program for students with ASD. The program aimed to improve the mentee's understanding and preparedness for college as well as their eagerness to attend college and confidence. Utilizing a peer mentoring model, students with ASD interested in attending college were paired with current college students for weekly mentoring sessions following a structured curriculum. The 47 mentees consisted of 39 males and eight females, ranging in age from 16- to 22-years old ($M = 18$ years). Of the mentees, 38 identified as European American or White, four identified as Latino or Hispanic, four identified as Asian or Pacific Islander, and one identified as African American. The program was divided into sessions with nine separate cohorts of mentees. The pairs met for one hour, once a week for six weeks.

Mentees completed a questionnaire pre- and post-intervention and parents completed a semi-structured interview to gain qualitative insight into the effectiveness and feasibility of the mentoring program. Mentees completed the Horizons Program Questionnaire which utilized Likert scale questions and open-ended questions to assess mentee college preparedness, confidence, and eagerness. The parent interview consisted of two broad questions: “In what ways do you think the Horizons program has benefited your son/daughter?” and “What can we do to improve the Horizons program?” Parent interviews were recorded and transcribed to analyze emergent themes across parents.

Based on the analysis of the quantitative data, several significant changes were noted. Mentees demonstrated a significant improvement in their understanding of what to expect at a college, looking forward to attending a college, improved knowledge about how things worked at a college, accessing on-campus support services, and what lectures will be like (all significant at $p < 0.001$). Despite their growth in understanding and preparedness, mentees did not demonstrate any significant changes in their worriedness ($p = 0.12$) or concerns about academic performance ($p = 0.07$). Mentees reported that understanding logistics of college and understanding academics were the two biggest things they learned from their time in the program. Mentees also reported that their favorite part of the mentoring program was the activities, such as the campus tour, visiting a dorm, and attending a lecture. According to the program mentees, enjoying the friendship/relationship with their mentor was a key component of the program. Mentee responses regarding their least favorite part of the program demonstrated that mentees found the program to have inadequate coverage including the program being too short, some of the topics were irrelevant, and/or the program was too basic.

An analysis of the semi-structured parent interviews revealed several emergent themes.

First, parents reported that their children grew in their confidence/comfortability about attending college. Parents also reported that their children formed meaningful relationships with their mentor and emphasized the importance of having someone with whom to connect. Parent interviews also revealed that their children developed greater independence and moved outside of their usual routine and environment. When asked about how to improve the program, parents suggested increasing the length of the program and expanding the program model by covering more topics and using targeted skill development.

Regarding the social validity of the program, the mentees reported overall high satisfaction, with 94% of mentees reporting that they would recommend the program to others. The analysis of the parent interviews did not reveal any barriers to participation, and most of the parent responses supported the program model.

Study 2

Ames et al. (2016) evaluated a mentoring program for college students on the autism spectrum in Canada which aimed to help students develop their social network and allow the students to develop their own skills. The ASD Mentorship Program (AMP) utilized a peer mentoring model wherein undergraduate students with ASD were paired with a clinical psychology graduate student mentor for weekly or biweekly meetings in addition to group events. The individual meetings were designated as a place for the mentors and mentees to formulate and work on personal goals, problem-solve together, and develop the mentee's individual skill areas. The program also offered group social events, such as karaoke nights, and group workshops, including topics such as relationships and sexuality.

This study ran across four years resulting in a total of 23 participants with ASD, 15 of which were males. Most of the participants were between the ages of 18 and 27. Although there

were 23 total program participants, only 12 students completed the year-end evaluation and therefore were included in the analysis of the study's results. Due to the survey being anonymous, demographic variables of age, gender, and race/ethnicity of the respondents is unknown.

As an evaluation of the program's effectiveness, semi-structured interviews and brief surveys were used to gain mentee insight. Data collection consisted of an initial interview, a year-end evaluation, mentee reported participation, mentee reported satisfaction with the program, mentee feedback, and mentee indicated goals and topics covered. In the initial interview, researchers learned more about the student as well as the university supports they were presently utilizing. Post-mentoring, the mentees reported whether they attended the mentoring sessions and group events as well as how satisfied they were with the program overall. Mentees also answered open-ended questions regarding what they were enjoying the most about the program and what they would like to change about the program. At the beginning of the program, mentees were provided a list of potential goals and indicated which goals they were interested in achieving during their time in the program. At the conclusion of the program, the students were provided the list of goals and asked to indicate if they felt the program helped them achieve the goals.

Of the students included in the final results, seven met with their mentor weekly, four met biweekly, and one met monthly. Additionally, eight of the participants reported attending at least one group event. When rating their satisfaction, students reported high levels of overall satisfaction with the program ($M = 4.25$ on a 5-point Likert scale), with higher satisfaction of the individual meetings ($M = 4.25$) than the group meetings ($M = 3.75$). The mentees reported the most enjoyment regarding their individual meetings with their mentors. Students also noted that

they would have liked more group events, given that there were only four offered per year. Regarding individual goals, 80% of the mentees reported that the AMP program helped them achieve their goals. The mentees indicated having an average of 5.58 goals (range 1 – 12). The most endorsed goals were developing social skills (reported by 75% of mentees), and those related to dating and romantic relationships and sexual health (reported by 58% of mentees). Although mentees were asked to report if they felt the program helped them accomplish their goals, the study did not conduct an evaluation of whether the goals were accomplished nor did the researchers measure progress toward the goals.

Mentees reported that the most discussed topics during their individual meetings with their mentors included dating and romantic relationships, social skills, family, and employment/careers (reported by 67% of mentees). Most mentees indicated that the topics covered at the group meetings were mostly useful; however, mentees indicated that they would have liked sessions dealing with disabilities, next steps after graduation, and working on communication skills.

Study 3

Another study also examined the ASD Mentorship Program (AMP) and student perceived social support (Ncube et al., 2019). Ncube et al. evaluated the AMP including measures of social support and friendship quality to examine changes because of program participation. As described in Study 2 by Ames et al. (2016), the AMP utilizes a peer mentorship model wherein undergraduate students with ASD are paired with a clinical psychology graduate student mentor for weekly or biweekly meetings in addition to group events. In Ncube et al., the 23 mentees consisted of mostly males (78.3%), with a mean age of 21.4 years. All mentees were enrolled in their first year of the AMP, despite varying in their year of study. Although most

mentees did not provide information on their race (48%), 35% identified as European-Canadian, 13% identified as Asian-Canadian, and 4% identified as African/Caribbean-Canadian. The mentors were to provide the mentee with support based on their individual needs. The pairs varied in their meeting frequency, with most pairs meeting biweekly (59%).

Several measures were used to evaluate the program. The Social Provisions Scale was used to measure perceived social support. The Cambridge Friendship Questionnaire was used to measure the degree to which the mentees enjoyed close, empathetic, and supportive friendships. Additionally, at the conclusion of the program, the mentees were provided the list of goals and asked to indicate if they felt the program helped them achieve the goals. The mentees also rated with overall satisfaction with the program as well as indicating the topics covered in their individual meetings from a provided list.

Although there were 23 total program participants, not all the students completed the year-end evaluation and therefore were included in the analysis of the study's results. Due to the survey being anonymous, the age, gender, and race/ethnicity proportions of the respondents is unknown. An analysis of the most discussed topics revealed that coursework and social skills were the most frequently discussed topics. An analysis of the Social Provision Scale revealed no significant differences in mean scores from the beginning of the program to the end of the program ($p = 0.40$). Similarly, there were no significant differences on the Cambridge Friendship Questionnaire ($p = 0.53$). Such results indicate that participation in the program did not result in significant gains in student perceptions of social support or quality of friendships. Students reported that they had set social goals for themselves including goals such as improving friendships and increasing their ability to make weekend plans at the beginning of the program. Of the participants, 77% felt that their involvement in the program helped them to achieve their

goals. When rating their satisfaction, students reported high levels of overall satisfaction with the program ($M = 4.22$ on a 5-point Likert scale), and high satisfaction with the individual meetings ($M = 4.52$).

Study 4

Ashburner et al. (2017) evaluated the outcomes associated with the Studio G Post-School Transition Program for students with ASD. Studio G aims to help adults and students with ASD develop relationships and skills and to help them transition to adulthood and further academic study or employment. Studio G is an organization that offers services for children and adults in England, and its sessions run for three hours, two times a week, for ten-week terms. Mentees are matched with mentors based on the mentee's interests, skills, and transition goals. Although Studio G is an organization that offers services for all individuals with ASD, the mentoring program itself specifies that it caters to individuals who can independently manage basic self-care, emotion and behavior regulation, and can understand instructions and express their needs. These criteria for participants suggest that individuals who attend Studio G are likely individuals with high functioning ASD. Studio G allows the participants to select their own activities from a broad array of interest areas, develop their own goals with their mentors, and work collaboratively to reach their goals. Following program completion, the Studio G staff connects with the family of the individual with ASD to aid in the transition process and gain feedback on the program.

For the present study, Ashburner et al. (2017) implemented an intergenerational mentoring model which included 11 mentees, 12 family members, and seven mentors who were hired by the program. The mentees with ASD consisted of eight males and two females, with an age range of 17-21 years old. The mentees were all verbal, capable of understanding and

developing digital art with mentor support, and they had all attended a school (except for one mentee who was homeschooled). Of the 11 mentees, four had a diagnosed mental health condition of anxiety or anxiety and depression. The mentors consisted of six males and one female, ranging from 21-30 years old. Of the six mentors, five possessed a college degree and one was in progress.

As indicators of the program's success, Ashburner et al. focused on four key target outcomes: (a) social participation and friendships, (b) emotional well-being, (c) project skills, and (d) awareness of and transition to further education/employment. The researchers conducted semi-structured interviews with the mentees and families to gather information on the mentee's interests, social participation, emotional well-being, future aspirations, goals and eventually their perception of their progress toward goals at the end of the program. The interviews were recorded and transcribed to identify any qualitative themes across mentees. It should be noted that no quantitative data were gathered or reported for this study.

Two major themes emerged from the mentee interviews: psychosocial outcomes and learning and development. Mentees and families reported positive psychosocial outcomes including mentee motivation to attend and enjoyment of the program itself, observable improvements in mentee emotional well-being including overall happiness and confidence, and improvements social participation and identified friendships. Mentees and families also reported positive learning and development outcomes including mentee skill development across a range of skills; increased awareness of, and research into, their options for their future; and mentor and program support to access further education/training and job opportunities. Mentees and families described program features that contributed to mentee growth and enjoyment as being the quality of the mentors, self-directed and low-pressure nature of the learning environment, and the

various social and vocational outing opportunities that were offered to the mentees. For a visual representation of Studio G's outcomes and features, see Figure 3.

Study 5

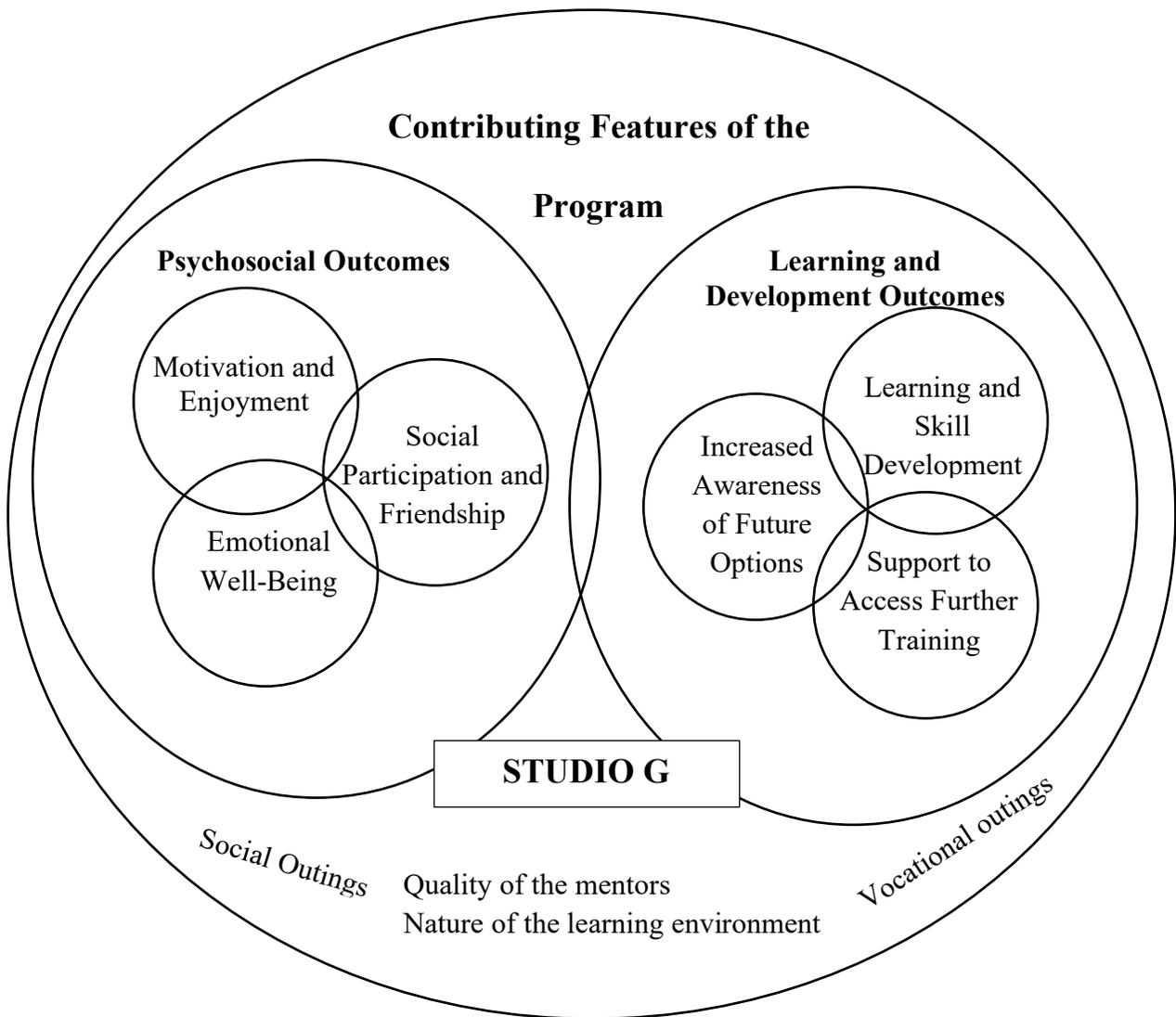
Siew et al. (2017) evaluated the pilot year of the Curtin Specialist Mentoring Program (CSMP) in Australia to determine the program's impact on student well-being, academic success, and retention. CSMP uses a one-on-one peer mentoring model which aims to target each individual mentee's needs and goals. The program encourages mentees to develop the skills needed to be successful and independently manage life's demands in the future. Mentees with ASD were undergraduate students who were paired with a graduate student mentor. The ten mentees consisted of seven males and three females, ranging in age from 17- to 20-years old ($M = 18$ years). Most of the mentees were first year college students. The mentors were to provide the mentee with support based on their individual needs. The dyads met for one hour, once a week and were encouraged to attend weekly, 90-minute group sessions.

Participants completed a battery of questionnaires pre- and post-intervention as well as semi-structured interviews to gain quantitative and qualitative insight into the effectiveness of the mentoring program. The battery included five standardized measures of mentee anxiety, social support, communication competence, and communication apprehension. The Adult Manifest Anxiety Scale, College Version measures general anxiety in college students. The Social Provision Scale measures the degree to which the individual's social relationships provide social support. The Situational Communication Apprehension Measure measures anxiety associated with real or anticipated communication in a specific context. The Self-Perceived Communication Competence Scale measures the individuals own perceived communication competence in various contexts. The Personal Report of Communication Apprehension measures an

individual's level of communication apprehension. Additional data was gathered using a researcher-created Student Satisfaction Survey based on The Client Satisfaction Questionnaire which allowed the students to report their overall level of satisfaction with the program and semi-structured interviews with the mentees five months post-program.

Figure 3

Studio G Program Features and Positive Outcomes



Note. Adapted from Ashburner et al. (2017).

Based on the analysis of the quantitative data, several significant changes were noted. There was no significant change in mentee reported anxiety, state communication apprehension, or perceived communication competence. Mentees did report a significant improvement in their social support scores ($p = .045$, $d = .68$) indicating that mentees felt more supported post-mentoring, as well as a significant reduction in general communication apprehension ($p < .025$, $d = .88$). Regarding the social validity of the program, the mentees reported high levels of satisfaction with the program ($M = 4.3$ on a 5-point Likert scale), and all mentees agreed or strongly agreed that they were satisfied and that the program was appropriate for their needs. Mentees also reported that they had an increased level of support, and most mentees reported the program helped them cope with, and feel happier about, university life. Because the researchers also sought to understand the impact of the program on student academics and retention, the researchers analyzed student assessment grades and semester retention. After one semester of program implementation, the mentees passed an average of 93.9% of their academic assessments, and all the mentees re-enrolled for the second semester; however, one student later withdrew from the university for an unspecified reason.

An analysis of the semi-structured interviews revealed several emergent themes. First, mentees identified several features that contributed to the positive experience they had with the CSMP: provision of constant, stable support; comfort of peer-to-peer support; and flexible and individualized support. The mentees reported that they felt confident that the program helped them when they encountered difficulties, and that having a peer helping them informally was helpful and made the relationship comfortable. Mentees also identified specific ways the program helped them throughout their participation including coaching and structured skill teaching, increasing motivation, provision of practical support, provision of group support, and

provision of emotional support. Because of the program's features and strategies, the mentees identified positive outcomes regarding their transition to university, ability to manage their academic work, ability to communicate their support needs, ability to manage their emotions, and overall quality and quantity of friendships inside and outside of the program. For a visual representation of CMSP's outcomes and features, see Figure 4.

Study 6

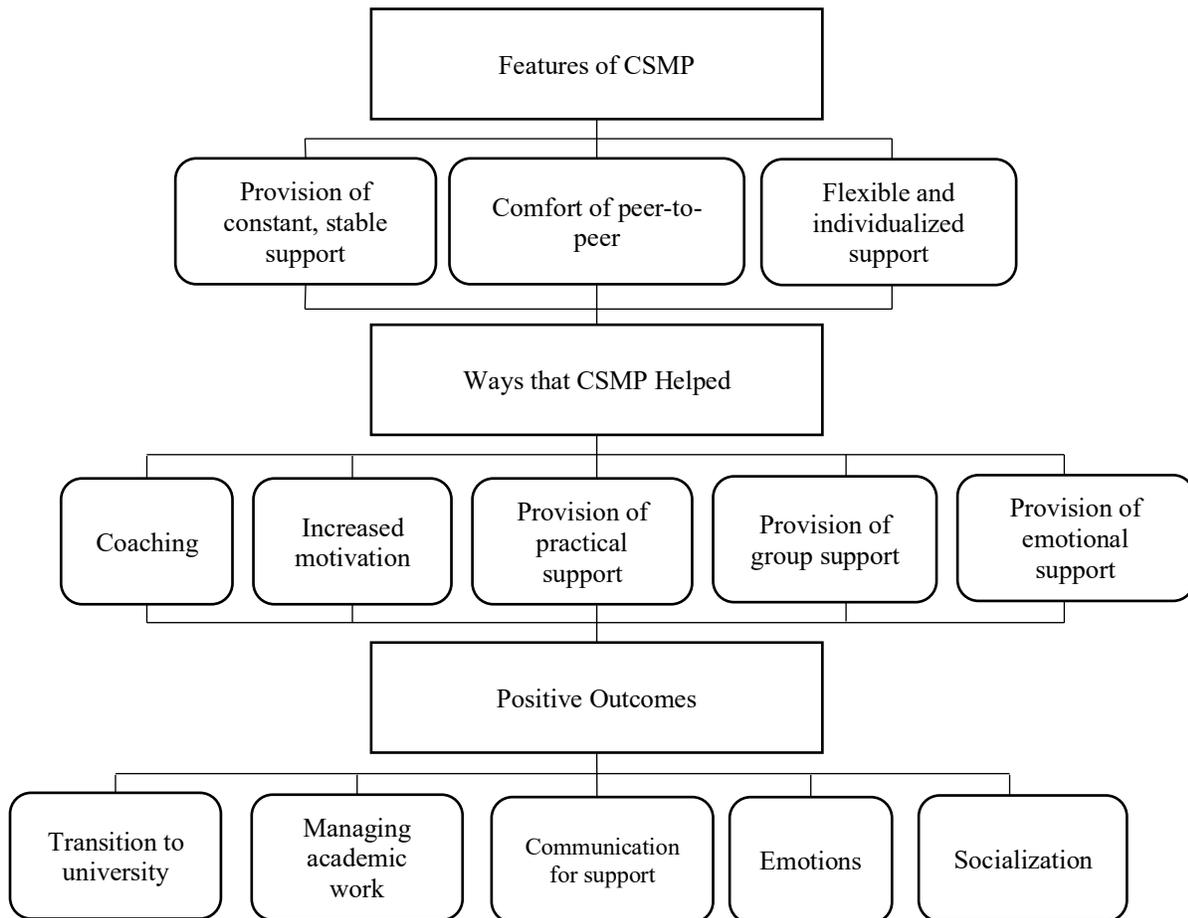
Bradley (2016) implemented a peer-mentoring program as a response to the lack of available literature that examines programs to improve outcomes for students with ASD. Bradley sought to determine if involvement in peer mentoring would raise student self-esteem and social satisfaction or reduce levels of bullying. Additionally, Bradley sought to learn more about the individual experiences of students with ASD in relation to their involvement in the peer mentoring program. The program included twelve students with ASD and 36 neurotypical students. The students with ASD were either 11 or 12 years old, with eight male students and four female students. Students were assigned to peer mentoring groups wherein three neurotypical students and one student with ASD comprised a group. The student with ASD was allowed to decide whether or how to disclose their ASD diagnosis to the group. The program ran for seven months before its conclusion.

Bradley had four measures of mentee and program outcomes. The mentees completed the Harter Self-Esteem Questionnaire which provided both global and subscale level self-esteem. The subscales included were behavior, academic, social, appearance, and physical self-esteem. The Loneliness and Social Dissatisfaction Scale assesses how satisfied students feel with their social relationships as well as their perception of their own loneliness. The Anti-Bullying Alliance Survey is a measure that assesses the frequency and type of bullying experienced by

students. Each student also completed a semi-structured interview with a member of the research team. Students completed the questionnaires before the program began, and they completed both the questionnaires and interview within a month of the program’s conclusion.

Figure 4

CMSP’s Program Features and Outcomes



Note. Adapted from Siew et al. (2017).

The results demonstrated that the students made numerous significant improvements after their participation in the mentoring groups. Responses on the Harter Self-Esteem Questionnaire

demonstrated significant gains in student global self-esteem ($p < 0.05$) as well as significant gains in each of the five subscales: academic ($p < 0.01$), social ($p < 0.01$), athletic ($p < 0.05$), appearance ($p < 0.05$), and behavior ($p < 0.05$). Additionally, responses on the Loneliness and Social Dissatisfaction Scale showed an immediate and significant improvement in social satisfaction, with students reporting changes in both the quality and quantity of their friendships ($p < 0.01$). Responses on the Anti-Bullying Alliance Survey indicated that students experienced a significant decrease in experienced incidences of bullying ($p < 0.001$), with some students identifying internal factors (such as knowing who to tell if they experience bullying) as the causal factor and some identifying external factors (such as the mentors looking out for them).

Although semi-structured interviews were attempted with each student, only nine of the twelve participants completed an interview. The analysis of the interviews revealed that perspectives on inclusion and bullying were the major themes across mentees. Students reported that it was important to them that they were not excluded from the social and academic life of school. Students also reported that their experiences in the program helped them understand how others may have similar interests or may do things differently than them. Regarding bullying, the students reported that they can turn to peers and teachers for support with bullying. Interviews also revealed that of the nine students with ASD that participated in the program, eight of them chose to disclose their ASD diagnosis to their group. The students reported that disclosing their diagnosis helped others understand and accept them.

Study 7

Curtin et al. (2016) piloted the Partners Exploring Education and Recreation (PEER) mentoring program to determine the program's feasibility as well as measure participant self-esteem, quality of life, communication skills, and overall satisfaction outcomes. The PEER

program targeted nine students with ASD between the ages of 13 and 18. Of the nine participants, seven were male and two were female. Additionally, one student was Black/African American, five were White, non-Hispanic, and three were Asian/Asian American. Students who were chosen to participate did not have a history of aggressive behavior, running away, or psychosis. Students were matched with an undergraduate or graduate mentor based on personality type and common interests. The dyads then met for two hours a week over the course of 20 weeks. The program took place at a local boys and girls club which offered preplanned activities for the dyads to attend. The dyads worked together to establish the mentee's goals for the sessions. The goals had to be related to one of five areas: self-esteem, healthy relationships, independent living, community involvement, and/or education/vocation. Once the dyads identified a broad goal area, they worked together to break the goal into smaller steps. The project staff completed monthly follow-up support throughout the duration of the program.

The researchers had four measures of mentee and program outcomes. The mentees completed the Pediatric Quality of Life Scale as a measure of their reported quality of life in four domains: physical, emotional, social, and school functioning. The mentees also completed the Rosenberg Self-Esteem Scale and the Social Worries Questionnaire to measure student anxiety about typical social situations in which adolescents may find themselves. Students completed each rating scale within one month of beginning the program and within three weeks of completing the program. Program feasibility and acceptability were assessed using session attendance, student report of the extent to which goals were met, and the Youth Survey: Measuring the Quality of Mentor-Youth Relationship. Additional data was gathered through parent completed questionnaires regarding their satisfaction with the program and perceptions of the program and its activities.

Using comparisons of pre-intervention and post-intervention questionnaire means, student and parent responses demonstrated improvement in quality of life, self-esteem, and social worries. On the Pediatric Quality of Life Scale, mentees reported improvements in each of the four areas, with the largest improvements reported in the area of feelings (Pre $M = 61.7$, Post $M = 72.2$). Parent responses on the same scale demonstrated similar results with parent reported improvements in all areas and the greatest improvement in getting along (Pre $M = 47.5$, Post $M = 61.4$). Student reported self-esteem demonstrated small improvement (Pre $M = 20.2$, Post $M = 23.3$). Both parents and mentees reported small improvements in mentee social worries as a result of the program (Student Pre $M = 10.2$, Post $M = 7.2$; Parent Pre $M = 10.1$, Post $M = 8.8$) demonstrating a reduction in social worries. Due to the small sample size, no statistical tests were used as measures of effectiveness. Additionally, it was reported that in most cases the dyads worked on the goals that the mentees had set for themselves. Regarding program outcomes, program participation was high, with every dyad attending more than 80% of the sessions. Parents and students reported high levels of satisfaction with the program, their mentoring relationship, and progress toward goals.

Study 8

Lucas and James (2018) conducted an evaluation of a university's mentoring program for students with ASD and mental health conditions (MHC) wherein they sought to understand the expectations and experiences of those involved in the mentoring program. The mentoring program employed an intergenerational mentoring model wherein college students with an identified ASD ($n = 32$) or MHC ($n = 21$) were paired with a specialist mentor ($n = 12$) hired by the university for mentoring sessions. The mentors and mentees were encouraged to address the specific needs of the mentee rather than a manualized curriculum. The mentees completed

questionnaires regarding their expectations and experience as well as a semi-structured interview. The mentors also completed questionnaires regarding their experience as well as a mentor focus group.

The researchers used questionnaires and semi-structured interviews as data collection methods in order to gain qualitative and quantitative information on the participant experience. Of the 32 mentees with ASD, only eight (M age = 18.98) completed the expectations questionnaire at the beginning of the program. Seven mentees with a MHC (M age = 22.06) and five mentors (age range = 38-63; M age = 47.04) completed the expectations questionnaire. The mentee questionnaire consisted of 33 questions regarding academic skills and university life, social relationships and skills, and well-being. As a complement to the mentee expectations questionnaire, the researchers developed an experience questionnaire where the students rated the degree to which they experienced growth in their academic skills and university life, social relationships and skills, and well-being throughout the program. In addition to the experience questionnaires, three mentees with ASD and two mentees with a MHC participated in a semi-structured interview regarding their mentoring experience. Four mentors (M age = 44.20) participated in the mentor focus group. The interviews and focus groups were transcribed and analyzed for emergent themes to help identify central aspects of the mentoring program.

Based on an analysis of the expectations surveys, mentees with ASD and mentees with MHC both reported expecting the mentoring program to help with academic skills, university life, social relationships, social skills, and their overall well-being. Despite having similar expectations, the mentee experience varied across the groups over the course of the mentoring program. Mentees with ASD reported higher levels of satisfaction with the mentoring program than the mentees with MHC at the end of the spring term ($p = 0.91$; $d = 0.99$). By the summer

term, there were no between-group differences in overall program satisfaction ($p = 0.298$). To understand predictors of mentee satisfaction, Lucas and James (2018) ran multiple regression analyses with various predictor variables. Only one variable was a significant predictor of mentee satisfaction: the mentee-mentor relationship ($p = 0.008$).

In addition to satisfaction, both groups reported that the mentoring program helped them with academic skills and overall university life. The mentees with ASD reported that the program was helpful for increasing their confidence in their studies ($p = 0.035$; $d = 1.27$). When compared to students with MHC, mentees with ASD were more likely to report that the program had helped them develop time management skills ($p = 0.021$) as well as increased reported comfort in the university environment ($p = 0.031$; $d = 1.16$). Socially, the mentees with ASD reported non-significant improvements in the areas of developing and maintaining social relationships ($p = 0.086$; $d = 1.04$), meeting new people ($p = 0.064$), and feeling like they have a peer group where they belong and feel understood ($p = 0.060$) when compared to mentees with MHC. Mentees with ASD also reported higher improvements in their well-being compared to the mentees with MHC ($p = 0.038$; $d = 1.24$) including developing coping skills ($p = 0.019$; $d = 1.09$) and feeling positive about their future ($p = 0.012$; $d = 1.09$). Additionally, mentees with ASD reported higher levels of satisfaction with their mentee-mentor relationship ($p = 0.010$; $d = 2.38$) when compared to the satisfaction of mentees with MHC. Despite the differences between the mentees with ASD and the mentees with MHC, these differences decreased by the summer term as the MHC program satisfaction increased. Regarding exam support, students with ASD reported that the program helped them with exam stress ($p = 0.046$; $d = 1.18$) more often than their peers with a MHC.

Lucas and James (2018) also sought to understand the mentor experience and central

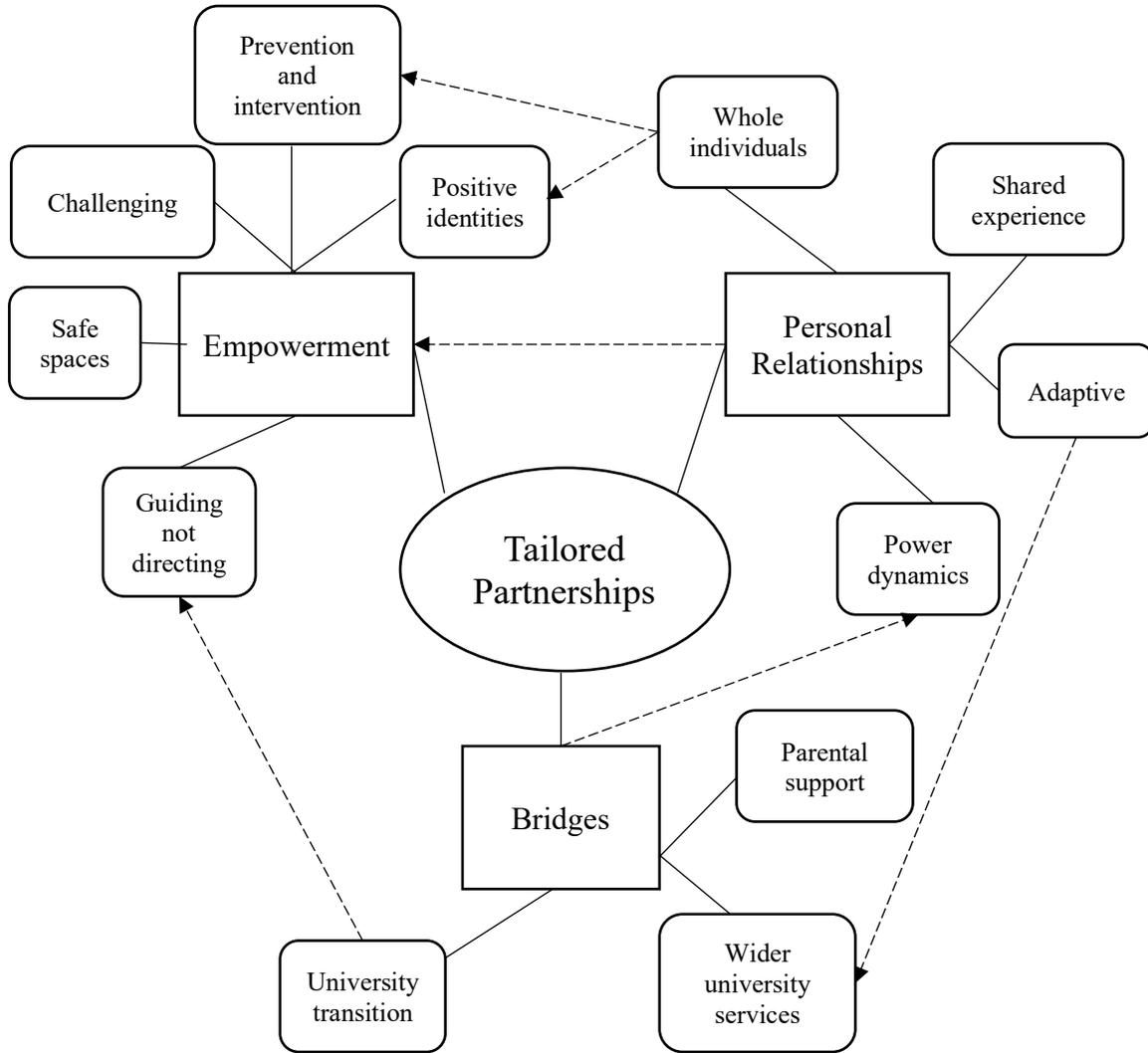
aspects of the mentoring process. Mentors reported numerous positive outcomes because of their involvement in the program including developed personal skills, satisfaction with the university experience, strong relationship with their mentee, and positivity regarding their mentoring role. The central aspect found to be critical for the mentorship process was tailored partnership. Mentoring that was tailored to the mentees needs was key to a mentee-mentor relationship. Additionally, mentors acted as bridges to help mentees transition to the university environment and support their growing independence while also developing a personal relationship with their mentees and empowering them through guidance, prevention, and intervention. For a visual representation of the central aspects of the mentoring process identified by participants of this study see Figure 5.

Summary

While each reviewed study differed in purpose and implementation, several themes emerge as the studies are collectively considered. These themes are summarized in Table 2. Across all the studies, most implemented mentoring programs with young adults, with only two including children and teenage students. Additionally, only two mentoring models were implemented in the available literature, with most implementing peer mentoring models. Target student outcomes varied across studies based on the study's specific purpose, with most studies assessing satisfaction with the program and perceived social validity of the mentoring program to some degree. Additionally, the available literature reported limited statistical significance data; however, qualitative improvements were reported across a variety of outcomes in all the studies reviewed.

Figure 5

Central Aspects of the Mentoring Process



Note. Adapted from Lucas and James (2018).

Table 2

Summary of Reviewed Literature

	Mentee Age	Mentoring Model Used	Measured Outcomes
Hillier et al. (2019)	16 – 22 years <i>M</i> = 18 years	Peer Mentoring	-Student understanding of college expectations* -Student comfort with and excitement for college -Student worriedness or concerns about academics^ -Student knowledge about college logistics* -Student satisfaction -Program social validity
Ames et al. (2016)	18 – 27 years <i>M</i> = 21.78 years	Peer Mentoring	-Program participation -Student satisfaction -Student goals and topics covered
Ncube et al. (2018)	<i>M</i> = 21.43 years	Peer Mentoring	-Student goals and topics covered -Student perceived social support^ -Student quality of friendships^ -Student satisfaction
Ashburner et al. (2018)	17 - 21 years <i>M</i> = 19 years	Inter-generational Mentoring	-Student social participation and friendships -Student emotional well-being including happiness and confidence -Student communication skills -Student awareness of future study/employment options -Transition to future study/employment
Siew et al. (2017)	17 – 20 years <i>M</i> = 18 years	Peer Mentoring	-Student well-being -Student general anxiety -Student perceived social support* -Student communication skills and perceptions^ -Student general communication apprehension* -Program social validity -Student satisfaction
Bradley (2016)	11 – 12 years <i>M</i> = 11.67 years	Peer Mentoring	-Student self-esteem* -Student social satisfaction* -Student bullying experience*
Curtin et al. (2016)	13 – 18 years	Peer Mentoring	-Student quality of life -Student self-esteem

	<i>M</i> = 15.4 years		-Student social worries - Student satisfaction - Program social validity
Lucas and James (2018)	<i>M</i> = 18.98 years	Inter-generational Mentoring	- Student satisfaction -Student academic attainment -Student adjustment to university life -Student social relationships and skills^ -Student well-being -Student perceived relationship with mentor -Student perceived exam support

Note. *M* = Mean; Bold represents an outcome reported across multiple studies;

* represents a statistically significant outcome; ^ represents a non-significant outcome

Discussion

The present review included four key research questions to aid in understanding the available literature in this area: (a) What is the student age range being targeted by mentoring programs? (b) What mentoring models or programs are being used for students with ASD? (c) What outcomes are mentoring models targeting? (d) How effective are the mentoring programs at addressing the target outcomes? The findings for each question are discussed below.

The available research demonstrates a clear preference for implementing mentoring programs with college-age mentees and mentors. This is likely due to the convenience of sampling as well as accessibility for follow up and data tracking. Only one study (Bradley, 2016) included younger students with students in the range of 11-12 years of age. This pattern in the literature demonstrates the need for further study of the effectiveness of mentoring programs with a broader range of students with ASD, specifically younger elementary age and middle school age students.

The reviewed literature also revealed that peer mentoring was the most common mentoring model used. Many of the studies examined paired mentees who were high school upperclassmen or recent graduates with mentors who were undergraduate or graduate level college students (Ames et al., 2016; Curtin et al., 2016; Hillier et al., 2019; Ncube et al., 2018; Siew et al., 2017). Bradley (2016) was the only study to implement peer mentoring groups where four students from the same class, one with ASD, comprised the group. The studies that implemented intergenerational mentoring included mentors who were hired by the program and served as program employees rather than strictly volunteers (Ashburner et al., 2018; Lucas & James, 2018). Because peer-mediated instruction and intervention is an intervention for ASD that is supported by research (Fettig, 2013; Koegel et al., 2014; Neitzel, 2008; Sperry et al., 2010;

Steinbrenner et al., 2020), the use of peer mentoring as the preferred mentoring model may be viewed as consistent with the general autism intervention research; however, this finding is inconsistent with general mentoring research which reports that peer mentoring is utilized less often than traditional mentoring models such as intergenerational mentoring (Garringer et al., 2017).

Because of the variance in program content as well as program purpose across studies, the only outcome consistently targeted across the examined studies is limited to participant satisfaction. Most of the studies reviewed included a mentee, mentor, parent, and/or staff evaluation of the program as well as overall satisfaction (Ames et al., 2016; Ashburner et al., 2018; Curtin et al., 2016; Hillier et al., 2019; Lucas and James, 2017; Ncube et al., 2018; Siew et al., 2017). No studies directly targeted a specific skill outcome for students. This is likely due to the variations in study purpose, with many studies aiming to evaluate the feasibility and acceptability of the program and understand its underlying characteristics rather than effect immediate and measured change (Ames et al., 2016; Ashburner et al., 2018; Siew et al., 2017). Because there are no clear patterns in the target outcome across the reviewed studies, the possibility exists that future research may demonstrate that mentoring for students with ASD varies in effectiveness across specific outcomes. For example, future researchers may find that mentoring is effective at targeting social-communication and self-confidence outcomes, but it may be ineffective in targeting academic outcomes. Without further research, such patterns cannot be determined.

Patterns were also evident across studies regarding the data collection and outcomes measurement. Most notably, the available literature includes limited quantitative data, with many studies relying on transcribed and coded interviews for portions of the outcome data (Ashburner

et al., 2018; Hillier et al., 2019; Lucas & James, 2018; Siew et al., 2017). Although this may be due to the small sample sizes and lack of overall statistical power, the lack of quantitative data draws into question the true effectiveness of the programs evaluated. Future studies may choose to collaborate across program locations to increase overall sample sizes and improve the statistical power of this research moving forward. Additionally, few of the available studies focused largely or even exclusively on evaluating what characteristics make a socially valid or effective mentoring program (Ashburner et al., 2018, Lucas & James, 2018) rather than evaluating mentee outcomes such as changes in social perceptions, confidence, or goal attainment (Bradley, 2016; Curtin et al., 2016; Hillier et al., 2019; Lucas and James, 2018; Ncube et al., 2018; Siew et al., 2017). Several of the available studies examined whether mentees felt the program had helped them meet their goals (Ames et al., 2015; Curtin et al., 2016; Ncube et al., 2018); however, they included no measure of whether the goals were truly attained. The studies that did include analyses of effect sizes demonstrated promising results for the use of mentoring as an intervention for ASD (Bradley, 2016; Hillier et al., 2019; Lucas & James, 2018; Siew et al., 2017). The lack of quantitative data reveals a gap in the literature that requires further study. Outcomes, both positive and negative, of mentoring programs need to be assessed empirically to determine their value regarding measurable goals and outcomes.

While this project did not specifically examine gender or race/ethnicity, it was noted that the reviewed literature infrequently reported mentee racial/ethnic group identification, and the few studies that did report race/ethnicity were mostly composed of white mentees (i.e., Curtin et al., 2016; Hillier et al., 2019; Ncube et al., 2018). Since ASD is more prevalent in males (CDC, 2020), it comes as no surprise that the mentees in the reviewed studies were mostly male. General population mentoring research has demonstrated that mentoring has the longest lasting

results when male students are paired with male mentors (Raposa et al., 2019); however, most of the reviewed literature does not report mentor demographic data such as gender. The studies that reported mentor gender (i.e., Ashburner et al., 2018; Bradley, 2016; Lucas & James, 2018) reported high numbers of male mentors; however, the mentee outcomes were not statistically examined in relation to mentor gender. Without a systematic examination into the impact of mentor-mentee gender pairings, little is known about the impact of gender match on student outcomes. More examination into the male mentor-mentee relationship specific to mentees with ASD is needed in future studies to determine the implications for the largely male ASD population.

A common characteristic noted across studies was the inclusion of high functioning individuals on the autism spectrum. Of the reviewed studies, two explicitly stated that the mentees were high functioning (i.e., Ames et al., 2016; Curtin et al., 2016). Ashburner et al. (2018) specified that to be included in their study mentees had to be able to independently manage basic self-care, emotion and behavior regulation, and understand instructions and verbally express their needs. With such criteria, it seems that Ashburner et al. excluded lower functioning individuals with ASD from participation. Additionally, the samples across the studies are mostly college attending or college interested individuals (Ames et al., 2016; Hillier et al., 2019; Lucas & James, 2018; Ncube et al., 2018; Siew et al., 2017). When sampling college students or students interested in pursuing a college education, it is likely that higher functioning individuals will be those eligible for participation in the study because they are able to navigate daily life with more independence and less needed support. This exclusion of lower functioning individuals with ASD is likely an effect of the sampling methods and participant criteria used by the researchers and limits the generalizability of their results to the entire spectrum of ASD

abilities. Mentoring with persons with a range of abilities is an area for future research to determine the efficacy of mentoring programs for mid to low functioning individuals with ASD.

A program-level characteristic across studies included that the mentee-mentor pairings often were allowed the freedom to choose their own goals, topics of discussion, and activities (Ames et al., 2016; Bradley, 2016; Curtin et al., 2016; Ncube et al., 2018; Siew et al., 2017). Ashburner et al. (2018) allowed the dyads to select their own goals within an area of interest of the mentee and then work on a series of activities and tasks aimed at skill building toward the goal. Hillier et al. (2019) provided the dyads with a set curriculum including weekly topics, goals, handouts, and homework as well as loosely structured activities. Only one study (Lucas & James, 2017) did not clearly state the level of freedom provided to the dyads, leaving it unclear if the dyads were allowed to choose their own activities or if they followed a set curriculum. A lack of structure may restrict the program's ability to measure changes in specific domains, limit the overall generalizability, replicability, and scope of interpretation, and require the data collection to assess a wider array of changes. On the other hand, a lack of structure may allow the dyads to develop a closer relationship over mutual interests and allow for skill development in broader domains rather than targeting specific skills. Providing the participants with choices rather than following a structured curriculum with targeted skill building could be a beneficial alternative.

The overall lack of a structured curriculum found in the reviewed literature is inconsistent with the findings of general mentoring research. In their evaluation of general mentoring programs, Garringer et al. (2017) found that 50% of mentoring programs in the United States use a structured program curriculum and track mentors' fidelity when implementing the program curriculum. According to Garringer et al., (2017) the use of a structured curriculum helps to ensure that the program's target outcomes are being addressed rather than allowing the dyads to

do as they please and “hopefully hit the mark (p. 49).” The use of a program curriculum helps to ensure that the dyads form relationships within the context of intentional and meaningful activities. The reviewed literature focused on the relationship of the dyad largely without the intentional development of meaningful activities aligned with the program’s target outcomes.

Future Directions

Because mentoring and peer mentoring have been demonstrated to be effective for neurotypical students, the possibility exists that mentoring may reap benefits for students on the autism spectrum. The available literature highlights that additional research is needed to determine the future of mentoring for students with autism spectrum disorder. Specifically, future research is needed to address aspects of participant characteristics as well as broad program characteristics that may guide future mentoring program development.

Participant Characteristics

Research implementing mentoring programs with a wider student age range may help to establish ages when mentoring is most or least effective and thereby help guide program development. By collecting broader efficacy data based on mentee ages, mentoring programs can be created to target specific age groups using age-appropriate activities, language, and measurement to maximize student skill development and growth. Future researchers may choose to collaborate across sites, cities, or states to increase the sample size and overall representativeness of the sample.

Another area for future study is determining the optimal length of the mentoring relationship. Research has demonstrated that the optimal length of a mentoring relationship for neurotypical individuals is one year (Grossman & Rhodes, 2002); however, research is needed to determine the optimal length for students with ASD. The reviewed studies were implemented

and evaluated over the course of an academic year or years with different participants across years, with most of the satisfaction data demonstrating the mentees' desire for a longer relationship. Due to the difficulties with social communication and social relationships, it is possible that students with ASD may need more time to establish a firm connection with their mentor and they may rely on the mentor for stability and consistency. Future research should evaluate how long positive outcomes persist after a mentoring relationship as well as optimal strategies for ending the mentoring relationship without excessive disruption of the mentee's life or routine.

Additionally, future research examining the role of mentor gender as well as the dyad gender pairing may be critical to enhancing mentee outcomes. If ASD mentoring programs are evaluated and the male dyad outcomes seen in neurotypical peers (Raposa et al., 2019) is similar, programs may be able to make this pairing intentional in their matching procedures to help enhance student outcomes. Research manipulating the dyad gender pairing may also be pertinent to the way future dyads are matched for mentoring programs and set the precedent for empirically supported pairing methods.

Future ASD mentoring research should also evaluate the efficacy of mentoring programs as an intervention for lower functioning individuals with ASD. The reviewed articles included only participants a narrow range of skills (i.e., high functioning), so the efficacy of mentoring for other individuals with ASD is unknown at this time. Future studies should implement more diverse recruitment and sampling methods to ensure that the participant pool is as diverse as the autism community itself rather than over representation of high functioning individuals.

A final participant characteristic that may be an area of future study is dyad racial or ethnic identification. The possibility exists that racial/ethnic representation may influence

positive outcomes for mentees with ASD, especially in areas where racial/ethnic representation may be limited overall. Similar to the enhanced outcomes of neurotypical male dyads (Raposa et al., 2019), dyads matched based on racial/ethnic identification may experience enhanced outcomes as well. Additional research is needed to support or refute the role of racial/ethnic representation in mentoring outcomes.

Program Characteristics

Another area of future research could include manipulation of the type of mentoring program implemented. The studies included in this review were mostly those which implemented peer mentoring models; however, other mentoring models need further examination for their efficacy with this student population. The possibility exists that other models, such as instrumental mentoring, may also be effective at producing meaningful mentee outcomes. Without further empirical study, mentoring programs for students with ASD cannot be developed to truly maximize outcomes.

Additionally, future research is needed to examine the role of freedom and structure in the mentoring relationship and its outcomes. Many of the reviewed studies were unstructured and allowed the dyads the freedom to do and discuss what they pleased; however, the lack of a structured curriculum limits the ability to target specific skills as outcomes or measure outcomes in general. Without a well-defined and structured program, researchers cannot be sure the role the program in a given outcome. Future studies may choose to manipulate how structured the mentoring program is, ranging from completely unstructured to completely manualized, and evaluate mentee outcomes. This manipulation may play a key role in developing future mentoring programs for individuals with ASD.

Future research should also implement quantitative measures to determine the

significance and effectiveness of participant outcomes across program involvement. The reviewed studies primarily included qualitative data and descriptive data rather than consistently implementing quantitative measures. Although qualitative measures give valuable insight into the programs evaluated, they do not measure true change or differences between groups or conditions. Additionally, researchers can draw very limited conclusions using qualitative data alone. Quantitative data allows researchers to examine significance, measure growth, and attempt to replicate results. Quantitative data also allows researchers to draw empirically supported conclusions that are necessary for the future of mentoring program development, implementation, and assessment.

Future research is also needed examining mentoring programs that target specific skills for development and growth. The available literature does not include any direct skills-based intervention; therefore, the efficacy of these programs in teaching specific measurable skills is unknown. For example, a mentoring program could be developed to target mentee social communication by teaching the mentees to identify emotions in themselves and others. Using pre-mentoring baseline data collection and post-mentoring measures, skill changes can be detected and used to determine how effective the program was at helping the mentee to develop the target skills.

Conclusion

While it is known that students with ASD present with their own strengths and weaknesses, especially in the areas of understanding, establishing, and maintaining social relationships and difficulty with social verbal and non-verbal communication (APA, 2013), there are empirically supported interventions that can be used to target specific deficits and provide measurable positive student outcomes (Steinbrenner et al., 2020; Wong et al., 2014). Numerous

researchers have demonstrated that mentoring is an effective intervention for neurotypical students (DuBois et al., 2011; Raposa et al., 2019). Despite the breadth of research surrounding mentoring for neurotypical students, this literature review demonstrates that little is known regarding the efficacy of mentoring as an intervention for students with ASD.

This analysis of the existing literature only discovered eight empirical evaluations of mentoring programs for mentees with ASD. These programs were largely limited in scope to young adults, ranging mostly from high school to college age, who were higher functioning individuals on the autism spectrum. Each study targeted a variety of qualitative outcomes. Little is known about the true efficacy of these programs because little quantitative data is reported. However, the available literature demonstrates that mentees with ASD often report high satisfaction with mentoring programs.

In addition to summarizing the available research in this area, this project also provides numerous possibilities for future directions that may be critical in determining the future of mentoring programs for students with ASD. It is the position of the present literature review that the ultimate goal of future research should not solely be to understand the efficacy and effectiveness of mentoring programs and their mechanisms. Rather, future research should seek to establish an empirically supported framework that can be used to create mentoring programs effective for various ages, levels of functioning, genders, race/ethnicities and more. This analysis of the literature serves as an initial step on the path to a well-researched mentoring program developed for the broad spectrum of individuals with ASD who deserve the support they may want or need.

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