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A Support Program for College Students with Autism Spectrum Disorder: The Functioning of Participants Versus Non-Participants and the Role of Program-Sponsored Mentoring

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A Support Program for College Students with Autism Spectrum Disorder: The Functioning of
Participants Versus Non-Participants and the Role of Program-Sponsored Mentoring

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Abstract

Increasingly more students with autism spectrum disorder (ASD) are attending college. In response, many colleges are now offering these students the extra support of an Autism Support Program (ASP), many of which include a mentoring component. This study is one of only a handful of attempts to examine these programs empirically. Using a small sample of college students who identified as having ASD, I compared participants and non-participants of a university ASP. An online survey was used to assess demographic characteristics and pre-college academic performance, as well as students' functioning across the following domains: social, adaptive, academic, emotional, and having a natural mentor. I also examined the degree to which student functioning was associated with the quality and frequency of ASP-sponsored mentoring relationships. Results indicated ASP participants were more often men and likely to report higher levels of social, adaptive, academic, and emotional functioning than non-participants. There were few significant correlations between relationship quality or frequency with ASP mentors and students' functioning. The implications of these findings for future research and for recruiting students into ASPs is discussed.

Keywords: autism, autism support programs, mentoring

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A Support Program for College Students with Autism Spectrum Disorder: The Functioning of Participants versus Non-Participants and the Role of Program-Sponsored Mentoring

The Diagnostic and Statistical Manual of the American Psychiatric Association (2013) defines ASD as a group of pervasive developmental disorders characterized by a continuum of impairment in social, communicative, and repetitive domains. According to the Centers for Disease Control and Prevention (2014), approximately 1 in 68 children are diagnosed with ASD, an estimate that represents 1% of the population in the United States (American Psychiatric Association, 2013). Increases in early diagnosis and identification of individuals with higher functioning ASD, along with early intervention and supportive educational practices, have helped students with ASD attend college (Graetz & Spampinato, 2008; Smith, 2007; Taylor, 2005). Recent studies document an increase of the number of college students with ASD (Graeitz & Spampinato, 2008; Pillay, 2012; Smith, 2007; Van Bergeijk, Klin, & Volkmar, 2008). According to Shattuck and colleagues (2012), a national survey estimated 34.7% of youth ages 19 to 23 with ASD attended either a 2- or 4-year college; of those who reported, 28% had attended a 2-year college and 12.1% had attended a 4-year college. Findings from the National Longitudinal Study (NLTS2) revealed that 46.7% of adults with ASD enrolled in a postsecondary institution within 6 years of high school, with 15.5% having enrolled in a 4-year college (Sanford et al., 2011). Importantly, the graduation rate for students with ASD enrolled at any postsecondary institution was only 35%. In comparison, the overall graduation rate for students with disabilities was 38%, and the graduation rate for the general student population was 42.2% (Sanford et al., 2011).

The Challenges and Needs of College Students with ASD

Recent studies document college students with ASD are more likely to experience an array of social, emotional, adaptive, and academic challenges. Jobe and White (2007) found students with a strong autism phenotype (e.g., rigidity, preferences for sameness) reported significantly more loneliness compared to students with a weak autism phenotype. The former group of students also reported fewer friendships and that their friendships were shorter in duration. White, Ollendick, and Bray (2011) found the level of ASD symptoms in college students was significantly and positively correlated with self-reported social anxiety, depression, and aggression. In a large-scale study designed to capture the life experience, aspirations, and support needs of adults with ASD, researchers in Australia found 84% of students with ASD reported a lack of adequate social support and 83% experienced an absence of behavioral support in their university environment (Autism Spectrum Australia, 2013). In addition, 42% reported negative social experiences such as being teased, bullied, or socially excluded.

Students with ASD also tend to report difficulty with academic stressors, interpersonal relationships, and daily activities or events (Glennon, 2001). Glennon found students with ASD struggle with the increased academic demands of college and are likely to encounter social challenges. Social challenges can impede students' academic progress. For example, problematic social interactions with professors and peers (e.g., speaking too loudly, standing too close, touching others' materials) can negatively affect their academic performance (Longtin, 2014; Welkowitz & Baker, 2005).

Transitioning to college requires that students with ASD engage in adaptive or independent behavior which is often dependent on their level of executive functioning (Adreon & Durocher, 2007). Executive functioning includes flexibility, self-regulation, self-monitoring, planning, organizing, and problem solving (Adreon & Durocher, 2007; Alverson, 2015). College

life also requires students to be responsible for their own needs, to seek help, and to advocate for themselves (Longtin, 2014). Glennon (2001) reported students with ASD tend to struggle with time management and have a strong preference for predictability and routine which can interfere with their ability to adapt to the many tasks of being a college student, such as cooking, cleaning, personal hygiene, and interacting with others in the academic community.

Qualitative studies also document the tendency for college students with ASD to report difficulties in the domains of education, student life, and independent living (Van Hees, Moyson, & Roeyers, 2015). Ames, McMorris, Alli, and Bebko (2016) found that students with ASD discussed a range of difficulties. Students spoke about stress and coping (75%), dating and romantic relationships (67%), employment and careers (67%), social skills (67%), coursework (58%), as well as about worry, sadness, or mental health concerns (58%). Findings suggest extra support and accommodations might be needed if students with ASD are to manage the unique challenges they face in a post-secondary education environment (Glennon, 2016).

Support Programs for College Students with ASD

The increase in students with high functioning ASD attending college has motivated colleges and universities to provide supportive services designed to increase retention and graduation rates for this population (Ligon, 2016). The Americans with Disabilities Act of 1990 (1990) has played a critical role in making it feasible for students with disabilities to attend post-secondary educational institutions. This act requires that reasonable accommodations are provided to students with disabilities as a way to promote their academic success. The act also ensures that students cannot be discriminated against based on their disability. In addition, Section 504C of the Rehabilitation Act of 1973 (1973) certifies that individuals with disabilities will not be excluded from any aspect of college life.

The protections afforded by these federal laws are important; however, students with ASD will likely require additional supports beyond what is legally required. Using data from the National Longitudinal Transition Study-2, Roux et al. (2015) found approximately half (48.6%) of students with ASD attending a 2-year college reported receiving accommodations or services. Barnhill (2014) examined the types of accommodations accessed by students with ASD and the range of support programs provided in institutions of higher education. Barnhill found that postsecondary institutions were frequently faced with many barriers when attempting to help these students, including difficulty identifying students with ASD, lack of adequate staff training, and limited support for nonacademic issues and needs. These findings are in line with those reported in a study of 21 adolescents with ASD interviewed about postsecondary education aspirations and concerns (Camarena & Sarigiani, 2009). Participants noted concerns about the readiness of postsecondary institutions to provide adequate support, the social challenges they would face, and the need for peer support and mentoring.

To better address the needs of these students, numerous post-secondary institutions have created supplementary Autism Support Programs (ASPs). The *College Autism Spectrum* website offers a list of 39 autism support programs currently available at colleges in the U. S. (College Autism Spectrum, n.d.). For example, Adelphi University in Long Island, NY offers the *Bridges to Adelphi* Program*,* which provides vocational and social support for students with ASD through peer mentoring, coaching, social skill instructions, strategy instructions, and behavioral modeling (Adelphi University, n.d.). Nearly all ASPs include a mentoring component (cf. Wise, 2015).

Several researchers have evaluated college ASPs (Ames et al., 2016; Coombs, 2017; Hendrickson, Carson, Woods-Groves, Mendenhall, & Scheidecker, 2013; Ligon, 2016; McCarty, 2013; Ness, 2013; Pearlman-Avnion & Aloni, 2016; Post, 2017; Roberts & Birmingham, 2017;

Siew, Maxucchelli, Rooney, & Girdler, 2017; Weiss & Rohland, 2015; Wise, 2015). Of these studies examining ASPs, all except one of the programs evaluated (Wise, 2015) included a mentoring component. To date, seven of these studies were peer reviewed journal articles (Ames et al., 2016; Hendrickson et al., 2013; Ness, 2013; Pearlman-Avnion & Aloni, 2016; Roberts & Bermingham, 2017; Siew, Maxucchelli, Rooney, & Girdler, 2017; Weiss & Rohland, 2015), three were dissertations (Ligon, 2016; McCarty, 2013; Wise, 2015), one was a master's thesis (Coombs, 2017), and one was an undergraduate honors thesis (Post, 2017). Six studies used purely qualitative research designs (Hendrickson et al., 2013; Ligon, 2016; McCarty, 2013; Roberts & Bermingham, 2017; Wise, 2015; Weiss & Rohland, 2015) and typically examined progress reports or personal accounts of students' experiences in or perceptions of the ASP. For example, Ligon (2016) evaluated four different autism support programs, including the Autism Support Program at the University of Arkansas, and gathered information from parents on common barriers faced by students with ASD. Parents reported that their children experienced difficulties financially, finding transportation, getting adequate housing services, and finding information on or guidelines regarding support services on campus. Parents also reported concerns about bullying and social media safety.

Only one study used purely quantitative methodology: Pearlma-Avnion and Aloni (2016) found statistically significant improvements in college students' self-efficacy and future orientation after participating in an ASP. Four studies used a mixed-methods approach. Siew et al. (2017) conducted a pre-post design to examine a specialized peer mentoring program for university students with ASD and found significant reductions in self-reported general anxiety and communication apprehension. These investigators also conducted interviews and learned students found consistent social support, specifically from peers, was most helpful. In a study of

10 students participating in the ASP at the University of Arkansas, Post (2017) asked students how the program facilitated academic and social success and how they felt about certain resources provided by the program. Interview responses were largely positive, with half or more participants providing positive responses about peer mentoring, group mentoring, and academic coaching. At least six of the participants also indicated that one-on-one peer mentoring was helpful and enjoyable, and six of participants indicated academic coaching was helpful and enjoyable. Another study, conducted by Ness (2013), used a case study approach to analyze outcomes for three college students participating in an ASP. The researchers found that students' academic achievement, self-regulated learning strategies, and acceptability of mentoring improved over time.

Mentoring

A key aspect of most ASPs is formal mentoring, which is the intentional pairing is the intentional pairing of young persons with specific non-parental adults in a relationship designed to promote positive youth outcomes (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011, p. 56). Crisp and Cruz (2009) defined *mentoring* as aiding in the growth and accomplishment of an individual through various forms of support, including professional development, role modeling, and psychological support. Crisp and Cruz also note that relationships between mentors and mentees are personal and reciprocal. Research has shown youth mentoring can lead to positive outcomes for youth at risk for wide range of negative outcomes (Herrera, DuBois, & Grossman, 2013). Among the populations studied by mentoring researchers are youth with mental illness, students bullied at school, aggressive or delinquent youth, and youth in foster care (Britner, Balcazar, Blechman, Blinn-Pike, & Larose, 2006; Elledge, Cavell, Ogle, & Newgent, 2010; Keating, Tomishima, Foster, & Alessandri, 2002; Ryan, Kramer, & Cohn, 2016; Taussig,

Culhane, & Hettleman, 2007; Tolan, Henry, Schoeny, Lovegrove, & Nichols, 2014; Weiler, 2013). Mentoring has also been linked to improvements in academics, social acceptance, peer relationships, and emotional or psychological wellbeing (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011; Herrera et al., 2013).

      Researchers have also examined the benefits of mentoring for different groups of college students, including first-generation college students, low-income students, students from under-represented ethnic-racial backgrounds, and students with disabilities (e.g., Bordes & Arredondo, 2005; Campbell & Campbell, 1997; Faison, 1996; Ishiyama, 2007; Phinney, Torres Campos, Padilla Kallemeyn, & Kim, 2011; Taylor, 2016; Zalaquett & Lopez, 2006). Several researchers have demonstrated that mentoring programs have a positive effect on indicators of academic performance such as GPA, study progress, drop-out rates, number of courses passed, and study persistence (Campbell & Campbell, 1997; Crisp & Cruz, 2009; Larose, et al., 2011; Leidenfrost, Strassnig, Schabmann, Spiel, & Carbon, 2011). Researchers have found participation in mentoring programs is related to increases in students' academic self-efficacy and sense of belonging, as well as to decreased stress and depression (Phinney et al., 2011; Taylor, 2016). Researchers who focused more specifically on college students with disabilities found mentoring was related to an increase in self-management skills and students' use of structure, organization, and time-management, and their approach to preventing procrastination (Atkinson, 2014). Findings from a qualitative study by Zalaquett and Lopez (2006) indicated mentoring provided guidance, coaching, nurturing, teaching, and modeling to Latino college students that supported their academic progress. Taken together, these studies suggest mentoring is a viable strategy for supporting college students.

Another type of mentoring is referred to as *natural* or *informal* mentoring, which involves youth receiving support and guidance from nonparental adults(Zimmerman Bingenheimer, and Behrendt, 2005). These adults might be extended family members, teachers, coaches, religious leaders, neighbors, etc.. Natural mentor relationships are thought to emerge naturally from youths' experiences in their existing social network (Drevon et al., 2017). Natural mentors tend to have shared cultural and social backgrounds as youth, which can help in fostering a supportive bond (Bruce & Bridgeland, 2014). Youth are also typically more familiar with these adults and such relationships can last over a long period of time with frequent contact.

There is empirical research linking the presence of natural mentors to positive youth outcomes (Dam et al., 2018). Connections with these nonparental adults have been considered a protective factor for risk or adversity in youth (Drevon et al., 2017). Researchers have found presence of a natural mentor is associated with positive improvements in areas of education, employment, psychological wellbeing, and health (e.g., DuBois & Silverthorn, 2005). Additionally, researchers have found the presence of natural mentors was linked to high self-esteem and greater likelihood of graduating high school for youth with learning disabilities (Ahrens, DuBois, Lozano, & Richardson, 2010).

Empirical Evidence for Mentoring Youth with ASD

Notably lacking is systematic research on the formal and informal mentoring of youth with ASD. Only six studies were found that evaluated mentoring for youth with ASD (Curtin et al., 2016; Humphrey, n.d.; Jones & Schwartz, 2004; Lee, Odom, & Loftin, 2007; McCarville, 2014; Ogilvie, 2009). Three of the studies were peer reviewed (Curtin et al., 2016; Jones & Schwartz, 2004; Lee et al., 2007), two were dissertations (McCarville, 2014; Ogilvie, 2009), and one provided descriptive information following an intervention (Humphrey, n.d.).

Curtin and colleagues (2016) found students' level of social connections, self-esteem, social anxiety, and quality of life improved following an individualized mentoring program for adolescents with high-functioning ASD. Curtin et al. found youth and parents reported high satisfaction with the program. Relatedly, McCarville (2014) utilized a pre-posttest design to examine independent adaptive living skills and social initiation for seven adolescents and young adults (ages 15 to 24 years-old) with ASD following a peer mentoring intervention. McCarville found participants demonstrated increased socialization and communication skills as well as improved adaptive behavior.

Jones and Schwartz (2004) utilized a parallel-treatment single-subject design to observe and rate the effectiveness of peer social modeling for three preschoolers with ASD and found participants learned target skills when, and only when, the modeling intervention was introduced. Similarly, Lee et al. (2007) observed three children in a multiple baseline design and found decreases in stereotypic behavior as well as increases in social engagement after engaging in peer-initiation training with peer buddies. Ogilvie (2009) extended this work to middle school students by observing three participants' social skills following an intervention which combined video modeling and peer mentoring. Ogilvie found all three students demonstrated increased targeted social skills.

In addition, Humphrey (n.d.) provided descriptive information on a short-term program in which adolescents with ASD were provided college-aged mentors. Humphrey found parents and youth reported increased quality of life, self-esteem, and less social anxiety following the program. Humphrey also reported high satisfaction from youth mentors, parents, and staff.

Also lacking is research on the role of informal or natural mentoring for youth with ASD. Cook, Weiss, and Hodge (2017) investigated whether small-group assignments in class that

allowed for ample social interaction opportunities led to the formation of natural peer mentoring relationships. Temple Grandin (1990), a renowned autism spokeswoman with ASD, lists the presence of an informal mentor as a key aspect for success for high functioning individuals with ASD. She suggested adolescents and adults with ASD require a mentor to develop and support their interests. She sees the need for someone like a natural mentor to aid individuals with ASD make key transitions in their life (e.g., to college, to a career).

Theoretical Models of Mentoring College Students with ASD

Support programs for college students with ASD typically list one of two theoretical constructs as foundational for success: social support or social modeling. Researchers have long viewed social support as an important protective factor (Barnes, 1954; Cassel, 1990), and social support is often considered critical to the success and wellbeing of individuals with ASD (e.g., Tobin, Drager, & Richardson, 2014; Van Bergeijk et al., 2008). In a study, in which researchers interviewed parents of college students with ASD, researchers found that parents often recommend peer support for students in order to provide someone who will listen and help (Carmarena & Sargiani, 2009). Adreon & Durocher (2007) claimed that support can enhance the level of social participation and social functioning of students with ASD, but often these students struggle to identify readily available sources of support. Social support can promote a number of key outcomes, including physical health and wellbeing, sense of belonging, sense of worth, response to stressful events, and the ability to cope (Glanz, Rimer, & Viswanath, 2008). Van Bergeijk et al. (2008) argued that a lack of established sources of social support is a primary reason many college students with ASD experience social isolation.

The other key construct underlying support programs for college students with ASD is social modeling by one's peers. According to Bandura's (1977) social learning theory, people

learn from one another through observation, imitation, and modeling. Bandura posited that observational learning of new patterns of behavior could happen purposefully or unintentionally. The notion that others' modeling can promote the learning of new behavior (Bandura, 1977) has been suggested as the mechanism by which individuals with ASD can learn the rules of social engagement and increase their social skills (Lee et al., 2007). Expectations for and rules governing social behavior tend to be implicit and are thus difficult for individuals with ASD to recognize and apply (Ogilvie, 2009). They could potentially benefit, however, from explicit instruction or the modeling of social skills in real-world settings.

The mechanisms of social support and modeling often invoked by proponents of autism support programs are also foundational to youth mentoring (Nora & Crisp, 2007). Nora and Crisp proposed a theoretical framework in which psychological and emotional support are considered critical domains in mentoring. In the context of mentoring, these include listening, supporting, encouraging, and promoting mutual understanding. Researchers have also emphasized the role of social support in mentoring as preventing stress, promoting healthy coping strategies for managing stress, and reducing the consequences of stress (e.g., Jacobi, 1991). Mentors provide support by serving as a trusted friend or by helping mentees develop strategies to foster meaningful relationships (Colvin & Ashman, 2010; Curtin et al., 2016). Support from mentors can also promote mentees' connections to a wider network of support from others (Colvin & Ashman, 2010). Mentoring can involve modeling of appropriate social behavior, which can lead to the acquisition of new and enhanced social skills. Mentors' use of modeling can also help mentees face new and challenging social situations and take advantage of opportunities for real-world practice (Curtin et al., 2016; Hart, Grigal, & Weir, 2010; Nora & Crisp, 2007; Ogilvie, 2009).

The Current Study

Existing research on ASPs is limited. Also lacking is research on the mentoring of youth

with ASD. Few studies have been conducted and what has been done is constrained by more

case-study approaches, a lack of a comparison group of youth with ASD who are not enrolled in

ASPs, and a narrow focus on program satisfaction. The primary aim of this study was to compare

the characteristics (demographics, prior academic performance) and functioning of students with

ASD who were enrolled or not enrolled in an ASP and to investigate possible links between

students' functioning and their mentoring experiences within the support program. Given the

range of difficulties and challenges faced by students with ASD, the following domains of

functioning were assessed: social, adaptive, academic, and emotional. The degree to which ASP

participants reported the presence of a natural mentor was also examined.

Guiding this study were the following questions:
a) Are there differences in key demographic and pre-college academic factors of college students with ASD who are or are not ASP participants?
b) Are there differences across domains of functioning for ASP participants compared to students with ASD who did not participate in the program?
c) For students in the ASP, are mentor relationship quality and frequency of interactions, associated with functioning?

In terms of demographic and pre-college academic variables, the only hypothesis was

students in the ASP would report higher family income. Given the costs associated with the ASP,

it was reasoned that participants would report higher levels of family income relative to non-

participants. I made no predictions about possible group differences in the functioning of ASP

participants and non-participants. Although it is possible that participating in the ASP could

enhance students' functioning relative to participants in the comparison group, it is also possible

that non-participants were functioning at levels that precluded the need for an ASP. Further

precluding a specific hypothesis is that fact that the temporal sequence of participation in the

ASP for study participants was variable, with some students being in their first year and others in

their second through fourth years. Finally, it was hypothesized that formal mentor relationship quality with program mentors and the frequency of interactions with these mentors, would be associated with better functioning, as well as higher rates of presence of a natural mentor, for ASP participants.

<div style="text-align:center">Method</div>

Participants

Participants were 34 college students enrolled at the University of Arkansas registered with the University's Center for Educational Access (CEA) as being on the autism spectrum. For a student to be registered with the CEA, student must have a diagnosis by a licensed psychologist, psychiatrist, licensed counselor, or clinical social worker who is an impartial individual not related to the student. The diagnosis must be from the DSM-IV or DSM -5, the date of the diagnosis must be within the last three years, and it must be based on the most recent visit with licensed professional.

Participants were recruited with assistance from the CEA. CEA staff sent emails (see Procedures) to 104 students registered as being on the autism spectrum. Of the 34 students who responded, 5 indicated they were graduate students and were thus excluded from the analyses given the aim of this study was to explore the role of an Autism Support Program (ASP) for undergraduate students. Therefore, the final sample consisted of 29 students, 13 of whom reported involvement in the University's ASP (11 currently, 2 previously) and 16 who indicated having never participated in the program. Given that roughly 85% of respondents were undergraduates, it is estimated that 88 undergraduate students were registered with CEA as being on the spectrum. Therefore, the response rate for the email survey links was 33%.

In the final sample, 61.2% were male, with a mean age of 20.39 years, ($SD = 2.35$). Most participants identified as White (86.2%), while the remaining students identified as multi-racial

(10.3%) or other (3.4%). In addition, 86.2% identified as non-Hispanic/Latino, 6.9% Hispanic or Latino, and 6.9% as unknown. Most participants were juniors (41.3%), followed by freshman (24.1%), seniors (20.6%), and sophomores (13.7%).

Procedures

The institutional review board at the University of Arkansas approved all study procedures. Participants were recruited with assistance from the CEA. Staff members at CEA emailed a study recruitment messages to all students who identified as having ASD. The email contained a link to an online Qualtrics survey along with the following message:

> Based on our records at the Center for Educational Access, you are eligible to participate in a research study about the experiences of college students who identify as being on the autism spectrum. Participation involves completing a brief survey. You will receive a $25 Gift Card for Walmart when you complete the survey.

Two reminder emails were sent several weeks apart that contained the following message:

> If you have already participated in the survey, you do not need to complete the survey again. We appreciate your participation. Each person is eligible for only one gift card.
>
> If you have not yet participated, you still have time to do so. And you will receive a $25 gift card for Walmart when you complete the survey.
>
> Based on the Center for Educational Access records, you are eligible to participate in a research study about the experiences of college students who identify as being on the autism spectrum. Participation involves completing a

brief survey.

The answers you provide on the survey will be kept completely separate from your personal information. There will be no way to correlate your personal information and your answers.

Informed consent was obtained from participants at the beginning of the survey. The survey took 15 to 20 minutes to complete and the total number of survey items was 110 for students in the ASP and 82 items for students not in the ASP. The items from the survey are presented in Appendix A. After completing the survey, students provided their mailing address and received a $25 gift card in the mail.

The Autism Support Program

The ASP at the University of Arkansas is housed in the College of Education and Health Professions but serves students from all colleges. The primary aim of the ASP is to provide assistance for individuals with high functioning autism, asperger's syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), and non-verbal learning disability needs in order for these students to be successful in the college milieu (University of Arkansas, n.d.). Students pay a fee of $5,000 per semester, in addition to tuition, meals, and housing, to participate. In order to participate in the ASP, students must be registered with the CEA as having ASD. In addition, the director of the ASP requires documentation of most recent Individualized Education Plan (IEP), two recommendation letters, and a Neuropsychological Report stating diagnoses. There are several components to the program including study hall, tutoring/coaching sessions, group mentoring, peer mentoring, and on-campus living accommodations with other students in the program. Students' level of involvement in the ASP varies over the course of their time at college but for most, ASP involvement is most intense

during the first year at the University of Arkansas. Therefore, survey questions asked about each participant's first year in the program.

Measures of Functioning

There is limited research on support programs for college students on the autism spectrum; therefore, outcome measures were adapted from various relevant sources. Also, due to time constraints and possible limitations in verbal functioning of study participants, I selected measures in which the content and format were streamlined and easily understood and contained items that were generally brief and concrete. To assess broad program outcomes, I selected measures that covered the following domains: social functioning, adaptive functioning, academic functioning, emotional functioning, and relationships with natural mentors. I selected five to seven items from various measures, which required making decisions about which items to select. An effort was made to select items based on readability and limited use of abstract language. The following scales were completed by all participants and allowed for testing of differences in functioning between students who did and did not participate in the ASP.[1] Due to limited power, and to the exploratory nature of the study, I aggregated individual scale scores within each of the five domains to form a single domain score. Subscale scores that used different metrics were standardized before being aggregated.

   Social Functioning.

To assess social functioning, I adapted several measures and then aggregated the measures to form a domain score. The social domain was comprised of a total of 20 items from four measures

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1. The full survey was piloted with three University of Arkansas alumni who participated in the ASP while enrolled. All three students indicated the survey was acceptable, the items were not confusing or difficult to answer, and the survey was not too long.

and demonstrated good reliability (a = .83). The domain included five items from the Friendship

Quality Questionnaire-Revised (FQQ), three items from the Autism Quotient 10 (AQ-10), five

items from the Adaptive Behavior Assessment System-Third Edition (ABAS-3), and seven items

from the Secondary School Success Checklist (SSSC).

The FQQ is a 40 item, self-report questionnaire assessing the quality of one's friendship

with a best friend (Parker & Asher, 1993). For this study, five items were selected from the

Validation and *Caring* subscales of the FQQ. The FQQ scales have demonstrated good internal

consistency, with Cronbach alphas ranging .73 to .90 for children in third through fifth grade

(Parker & Asher, 1993). FQQ scores have also been shown to predict children's levels of

friendship satisfaction and loneliness. Given the FQQ has been used previously with child and

adolescent samples only, it was adapted for use with college students with ASD. Instead of

asking about one's best friend, participants were asked about the depth or quality of *all* possible

friendships. Participants were asked to rate each item on a five-point Likert-type scale

(1 = *not at all true*; 4 = *really true*), along with the option to indicate "I don't have any friends."

A mean item score was computed with higher scores indicating greater friendship quality. This

adapted version of the FQQ demonstrated good internal consistency in the current study

(Cronbach α = .87).

The AQ-10 is composed of five subscales measuring key traits thought to be important

dimensions of ASD: social interaction, communication, attention to detail, attention switching,

and imagination (Allison, Auyeung, & Baron-Cohen, 2012; Autism Research Center, 2017;

Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). The AQ-10 was developed to

briefly assess the degree to which an adult with average intellectual functioning has traits

associated with ASD. The AQ-10 has been used previously in a sample of 149 adults with ASD

and 134 controls without a diagnosis of ASD (Booth et al., 2013). Booth and colleagues found the AQ-10 performed as well as the full 50-item AQ when discriminating between individuals with and without a clinical diagnosis of ASD (AUC = 0.90). In addition, Allison et al. (2012) reported excellent predictive accuracy for the AQ-10 (AUC = 0.95) and found high internal consistency for all versions of the AQ ($\alpha > 0.85$). I originally selected five items from the AQ-10 and created a mean score after recoding such that higher scores indicated a greater capacity to read interpersonal cues and execute interpersonal skills. However, this five-items adaptation of the AQ-10 had questionable internal consistency in the current study (Cronbach α = .61), which increased to an acceptable level when the two negatively worded items were removed (Cronbach α = .76). The two negatively worded items were "When I'm reading a story, I find it difficult to work out the characters' intentions," and "I find it difficult to work out people's intentions." Only the three positively worded items were used to create the social domain scores (i.e., "I find it easy to 'read between the lines' when someone is talking to me", "I know how to tell if someone listening to me is getting bored", "I find it easy to work out what someone is thinking or feeling just by looking at their face").

The ABAS-3 provides a comprehensive, norm-referenced, assessment of adaptive skills. Harrison and Oakland (2015) discuss the ABAS-3 demonstrates acceptable interrater reliability and studies have indicated high correlations among rates on all forms (r = .68 - .92). The ABAS-3 scale is originally rated on a four-point scale (0 = *is not able*, 1 = *never (or almost never) when needed)*; 3 = *always (or almost always when needed)*). However, participants in the current study were asked to rate each item on a four-point Likert-type scale (1 = *not at all*; 4 = *always true*) to increase understanding of answer options. The five-item adapted ABAS-3 communication scale used in this study demonstrated a questionable level of internal consistency (Cronbach α = .62).

However, the nature of the items of the ABAS-3 do not necessarily reflect a single dimension or factor within the subscale, so the relatively low internal consistency reliability was not considered problematic.

Seven items from the SSSC *Social* subscale were used to assess participants' level of social abilities (Hume et al., 2017). The *SSSC* was used previously to assess unique skill profiles of more than 500 high school students with ASD (Hume et al., 2017). Self-report ratings on the social scale were found to have acceptable internal consistency (Cronbach's $\alpha = .77$) and to correspond in general with ratings made by teachers and parents. Internal consistency for this adapted version of the SSSC social scale demonstrated poor internal consistency (Cronbach $\alpha = .52$). However, like the ABAS-3 communication scale, items on this scale do not necessarily reflect a single dimension or factor within each subscale, so the relatively low internal consistency reliability was not considered problematic.

Adaptive Functioning.

To assess adaptive functioning, items from different measures were aggregated to form a domain score. The adaptive domain was comprised of a total of 25 items from five measures and demonstrated acceptable reliability ($a = .70$). Five items were chosen from the ABAS-3 *Self-Care*, *Home Living*, and *Community Use* subscales to assess adaptive behavior in various settings (Harrison & Oakland, 2015)., Cronbach's alphas are not effective indices to interpret internal reliability for these scales. Five items each from the *Transition* and *Independent Behavior* subscales of the SSSC were used to assess participants' level of independence and ability to make transitions in everyday life (Hume et al., 2017). Hume et al. (2017) found questionable levels of internal consistency for these subscales (Cronbach's $\alpha = .63, .64$), suggesting these scales do not reflect a single dimension when used with participants on the autism spectrum. As

expected, the scales demonstrated poor to questionable internal consistency (Cronbach's α = .43, .67) based on data from the current study.

Academic Functioning

Participants' self-reported academic engagement was assessed using five items from the *Behavioral Engagement* subscale from the Engagement Versus Disaffection with Learning scale (Skinner, Furrer, Marchand, & Kinderman, 2008). These items were designed to assess effort, attention, and persistence when participating in learning activities. Skinner and colleagues found these items demonstrated acceptable internal consistency (Cronbach α = 0.71 & 0.72, fall and spring, respectively). In a study of 1,018 third- through sixth-graders, scores on this scale were strongly correlated with teacher reports (r = .70). For the current study, two items were added to the scale (i.e., "I send emails to my professors" and "I talk one-on-one with my professors") to assess participants' engagement in communicating with their college professors. The scale was originally a four-point scale (1 = *not at all true for me/this student*; 4 = *very true for me/this student*); however, in this study, participants were asked to respond to each item on a five-point scale (1 = *always*; 5 = *never*). This seven-item scale demonstrated good internal consistency (Cronbach α = .83). A mean item score was computed after first recoding responses such that higher scores indicated a greater academic engagement. Participants were also asked to provide their current college grade point average (GPA).

Emotional Functioning

Emotional functioning was assessed by aggregating items from different measures to form a domain score. The emotional domain was comprised of a total of 10 items from two measures and demonstrated excellent reliability (a = .95). Five items from the Patient Reported Outcome Measurement Information System (PROMIS) Anxiety-short form (American

Psychiatric Association, 2017) were used to assess frequency of self-reported fear, anxiety, and hyperarousal over the past seven days. Teresi, Ocepek-Welikson, Kleinman, Ramirez, and Kim (2016) found excellent internal consistency (alpha coefficients from .96 to .97) for this scale in a large, ethnically diverse sample. Kroenke, Yu, Wu, Kean, and Monahan (2014) reported that this measure was significantly predictive of anxiety diagnoses (AUC of .79). In the current study, this scale demonstrated excellent internal consistency (Cronbach α = .94). Also included in the emotional functioning domain were five items from the PROMIS Depression-short form (American Psychiatric Association, 2017) to assess self-reported depression. Kroenke and colleagues (2014) found excellent internal consistency for this scale (α = .93) as well as support for its convergent validity through strong correlations with the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). Kroenke et al. (2014) also found that the Depression-short form was significantly predictive of diagnoses of depression (AUC = .90). The scale demonstrated excellent internal consistency (Cronbach's α = .91).

Relationships with Natural Mentors.

The five-item Natural Mentor Questionnaire (NMQ) was used to assess whether individuals established relationships with a natural mentor while in college (Cavell, Meehan, Heffer, & Holladay, 2002). Cavell and colleagues used the NMQ as a way to identify college students who had a natural mentor in their lives. Cavell and colleagues found that college students who had a natural mentor, compared to students without a natural mentor, were more likely to come from single parent homes. For this study, items were adapted so that the timeframe was limited to college. Participants were asked not to count anyone who is or was part of the ASP on campus. Participants rated each item on a six-point Likert-type scale (0 = *never;* 5

= *always*). In the current study, the five items from the adapted NMQ demonstrated excellent internal consistency (Cronbach's α = .91).

Measures of Mentoring Relationships

Only those students who had involvement in the ASP completed measures assessing mentoring relationships with ASP staff. These scales were used to assess both the quality and frequency of interactions with ASP staff who could function as potential mentors. This included designated peer mentors, academic coaches, the activity leader, and the director of the ASP.

Mentor support.

Six items from the Mentor Alliance Scale (MAS; Cavell, Elledge, Malcolm, Faith, & Hughes, 2009) were used to assess mentor relationship quality. This 18-item scale has been used previously to assess the quality of mentoring as rated by elementary school children and their mentors. Three items were selected to assess relationship alliance and three to assess relationship conflict. Cavell and colleagues (2009) previously found support for the internal consistency of the MAS with a sample of elementary school age children (alpha coefficients across three different semesters ranged from .75 to .84). Cavell and colleagues also found scores on the alliance items of the MAS were negatively related to items assessing relationship conflict. In this study, conflict items were reverse coded and combined with the alliance items to create a single index of relationship support. Each version of the MAS demonstrated acceptable to good internal consistency (Cronbach's α = .78 - .81) after first removing one item from the MAS specific to the ASP designated mentor. The item-total correlation for this item ("*I looked forward to meeting with my mentor*") was *r* = -.50. The same item was not problematic for the MAS for the activity leader, academic coach, or director. For reasons that are unclear, this item was only problematic for the MAS for the designated mentor. Items from the four different version of the

MAS were also aggregated to form a single index of mentor quality. Internal consistency for this 23-item scale was excellent (Cronbach's α = .93).

Mentoring frequency.

To assess the frequency of interactions with potential mentors, participants were asked "How often did you meet with [individual]?" Participants responded using a five-point scale (1 = *not at all*; 2 = *once a semester*; 3 = *about once a month*, 4 = *about two to three times a month*; 5 = *once a week*; 6 = *almost every day*). Frequency ratings were aggregated to form a single index to represent the average amount of mentor-related contact with program staff. Internal consistency for this four-item scale was poor (Cronbach's α = .58) and suggests the scale is somewhat variable. However, given frequency of interaction with mentor-related program staff does not reflect an underlying factor but rather represents average interaction with staff, reliability should be interpreted with caution.

Results

Missing Data and Assumptions

The amount of missing data did not exceed 5% for any variable other than college GPA (17.2%), ACT score (13.8%), high school GPA (10.3%), and age (10.3%). Dummy codes were created for the missing data for each of the four variables (1 = *missing*, 0 = *else*), and chi-square tests were conducted to test if the data were missing at random across group. There was a significant association between ASP participation (yes/no) and missing data for college GPA, $x^2(1)$ = 7.44, p = .006, indicating more individuals in the ASP did not report their GPA compared to students who had not participated in the program. There was also a significant association between year in college and missing data for college GPA, $x^2(1)$ = 9.89, p = .002, revealing that all individuals who did not report their GPA were freshman. Most freshman (85.7%) were ASP

participants. The other comparisons for missingness on ACT, high school GPA, and age were not significantly associated with ASP participation ($p = .672$, $p = .422$, $p = .452$). These findings suggest the data were not missing at random (NMAR). Based on Cheema's (2014) recommendations for handling missing data (NMAR) with a small sample size, multiple imputation was not conducted. Given the amount of missing data for the ASP group, it was decided to not include college GPA as part of the index for academic functioning.

Checks for normality revealed that data regarding having a natural mentor were skewed; therefore, a log transformation was completed. Data for the aggregated index of mentoring frequency also violated the assumption of normality; however, further examination revealed an outlier near the low end of the distribution. This extremely low value was changed to the second lowest value in the distribution, and a subsequent check for normality revealed no violations. No other outliers were found. For variables used in between-subjects analyses, tests for homogeneity of variance were satisfactory (Levene's Test for Equality of Variance was not significant). For within-subjects analyses, tests for linearity and homoscedasticity assumptions were satisfactory.

Group Differences in Demographic Characteristics and Pre-College Academic Scores

T-tests and chi-square analyses were conducted to test for differences in demographic characteristics and pre-college academic performance between the two groups of students. Means and frequencies for demographic variables and pre-college academic scores are presented in Tables 1 and 2. Participants reported their current college GPA, high school GPA, and ACT score. The mean college GPA was 3.22 ($SD = .41$), the mean high school GPA was 3.60 ($SD = .41$), and the mean ACT score was 27.42 ($SD = 4.33$). Many participants (46.7%) reported their father completed a 4-year degree, and most reported having a mother who completed a 4-year degree (33.3%) or a professional degree/doctorate (33.3%). The majority of participants (63.3%)

reported a family income greater than $60,000. Tests of group differences revealed only two statistically significant differences: There were more men in the ASP group than in the non-ASP group and those in the non-ASP group tended to be older students (juniors and seniors). Despite this difference, gender was not used as a covariate in the analyses due to limited power.

Group Differences in Functioning

Bivariate correlations were used to examine associations among domain scores (Table 3). Social functioning was significantly positively correlated with both adaptive and academic functioning, which were also significantly positively correlated. Although not statistically significant, emotional functioning and reports of having a natural mentor were positively correlated but both were negatively correlated with social, adaptive, and academic functioning.

T-tests were used to test for group differences across the five domains of functioning to determine whether ASP students differed from students not in the program. Group means and a summary of analyses are presented in Table 4. Although five t-tests were conducted, I did not correct for family-wise error rate and set alpha at .05 due to the exploratory nature of the study; therefore, results should be interpreted with that limitation in mind. Results indicated statistically significant differences in four of the five areas. ASP students tended to report higher scores on measures of social, adaptive, and academic functioning and lower scores on measures of emotional functioning, relative to non-ASP students. There was not a statistically significant difference in students' reports of having a natural mentor. Students reported having a variety of natural mentors (with some students reported having more than one natural mentor), including other students/close friends/roommates (65.2%), minister/pastor/preacher (26%), instructor/professor/advisor (17.4%), siblings (13%), and romantic partners (8.7%).

As noted previously, items from the Adapted-SSSC and Adapted-ABAS-3 scales do not necessarily reflect a single dimension or factor; therefore, to better understand the pattern of functioning across the two groups, item scores were dichotomized to understand how many students in each group engaged in the various behaviors. A-SSSC scores were dichotomized as follows: items originally coded on a three-point scale (1 = *this is not like me*, 2 = *this is sort of like me*, and 3 = *this is very much like me*) were recoded as 1 = *no*, and 2 or 3 = *yes*. A-ABAS items were originally coded on a four-point scale (1 = *not at all*, 2 = *sometimes true*, 3 = *often true*, and 4 = *always true*) and were recoded as 1 = *no*, and 2, 3, or 4 = *yes*. Percentages of positive endorsements for each dichotomized item of the A-SSSC and A-ABAS-3 items are presented in Table 5. For 12 of the 17 SSSC items, the percentage of ASP students endorsing *Yes* was greater than that for non-ASP students, with the largest discrepancy for the item, *"I know how to ask for a break when I need one."* For 12 of the 20 ABAS-3 items, the percentage of ASP students endorsing *yes* was greater than that for non-ASP students, with the largest discrepancy for the item "*I walk or ride my bike alone to locations within 1-mile of home or work."*

Mentoring Relationships within the ASP Group

Descriptive statistics for ratings of mentor quality and mentoring frequency are presented in Table 6. Students rated their relationship with the ASP-designated mentor as highest in quality. On average, students in the ASP interacted most frequently with the academic coach, followed by the ASP director, the designated-mentor, and the activity leader. As expected there was variability in how often ASP students met with program staff. Most students reported meeting with the designated mentor and activity leader once a week, the academic coach and the director of the program almost every day.

Correlations among the five domains of functioning and measures of mentor relationship quality and frequency are presented in Table 7. Social and adaptive functioning scores were generally positively related with indices of mentor relationship quality and frequency; conversely, ratings of academic and emotional functioning and having a natural mentor were negatively correlated with mentor relationship quality and frequency. Importantly, only two of correlations were significant: ASP students' mentor quality scores with the activity leader were negatively correlated with their reported involvement with natural mentors, and their quality scores with the ASP director were positively correlated with academic functioning. Additional results tables are presented in Appendix B.

Discussion

There is an increasing number of students with ASD attending college and there are many Autism Support Programs developing to meet the unique needs of this growing population. This study was an effort to add to the small body of research examining benefits of support programs for college students with ASD. I examined differences in the functioning of college students with ASD who did and did not participate in the ASP at the University of Arkansas. Given most university ASPs include a mentoring component, this study examined whether the quality and frequency of students' mentoring relationships with ASP staff was associated with students' functioning across various domains.

There were several important findings. First, there was only two statistically significant differences between ASP participants and non-participants in terms of demographic characteristics or pre-college academic performance: Significantly more male students were in the ASP group than the non-ASP group, and significantly more older students did not participate in the ASP. Second, ASP students tended to report significantly better social, adaptive, and

emotional functioning compared to non-ASP students. Third, I found very few significant correlations between measures of mentor relationship quality or frequency and ASP students' functioning. Overall, these findings suggest that students who participated in the ASP, compared to non-ASP students, tended to report higher functioning and their level of functioning across domains was generally unrelated to their mentoring experiences in the ASP.

Differences in Demographic Characteristics and Pre-College Academic Performance

The fact that men were overrepresented in the ASP compared to women was unexpected and could be due to differences in how students are referred to the program. Researchers often find gender differences in the recognition of individuals with ASD. For example, one study found, in elementary school, boys were four times more likely to be identified with ASD than girls (Baio et al., 2014). Researchers have suggested gender differences in prevalence rates for ASD could reflect a tendency for women and girls to use camouflage-like coping strategies. Lai et al. (2017) defined *camouflaging* as strategies that compensate for or hide social communication difficulties in interpersonal or social situations. Examples include making eye contact, learning certain phrases or jokes, learning social scripts, or mimicking others' social behavior (Lai & Baron-Cohen, 2015). Lai et al. (2017) found that adult women with ASD engaged in more camouflaging, on average, than adult men with ASD. Lai and colleagues speculated this tendency leads to an under-diagnosing of women. Similarly, Dean, Harwood, and Kasari (2017) examined gender-related social behaviors in elementary age boys and girls and found girls with ASD were more likely to use compensatory behaviors (e.g., staying close with pears, weaving in and out of activities) to mask any social challenges. Tierney, Burns, and Kilbey (2016) interviewed 10 adolescent girls with ASD about managing social relationships and found they were motivated to use relationship strategies that involved mimicking or imitation. In

addition, Head, McGillivray, and Stokes (2014) found adolescent girls with ASD had more and better friendships than their male counterparts and suggested these differences were due to girls camouflaging their social difficulties. Based on these findings, it is possible student referrals to the ASP routinely favor male students and overlook female students who are more adept at camouflaging their difficulties.

The finding that non-ASP participants tended to be older students (juniors and seniors) was not wholly unexpected given that the director of the ASP program indicated the program is relatively new and has been focused on recruiting students who are transitioning from high school to college. There were no other significant differences in the demographic characteristics of ASP and non-ASP participants. Due to the cost of participating in the ASP, it was expected students in the program would report higher family income than non-participants. However, there was not a significant difference, with the majority of study participants reporting a family income of $60,000 or greater.

Group Differences in Functioning

Results indicated students in the ASP reported higher functioning in the domains of social, adaptive, and emotional functioning compared to students not in the ASP. This suggests students in the ASP have a greater capacity to read social cues, to communicate with others, and to work well with others in a group. Similarly, on individual measures of adaptive behavior and independent living, findings suggest students in the ASP reported a greater ability to ask others for help when needed, to walk or ride a bike to locations alone, and to manage changes in schedules or routines. ASP-students also had significantly lower scores on measures of anxiety and depression.

These findings could be an indication that ASP students' social, adaptive, and emotional functioning is benefited by the level of social support and social modeling provided via the ASP. The ASP comprises a suite of services that provide a fairly comprehensive and supportive network for students. Previous research has shown social support is critical to the success and wellbeing of individuals with ASD (e.g., Tobin et al., 2014; Van Bergeijk et al., 2008). Social support is thought to promote their wellbeing, sense of worth, response to stressful events, and ability to cope (Glanz et al., 2008), while also protecting from social isolation (Van Bergeijk et al., 2008). In addition, the ASP provides access to several individuals who serve in mentor roles. Mentors can model appropriate social behavior and challenge students to engage in new social situations (Curtin et al., 2016; Hart et al., 2010; Nora & Crisp, 2007; Ogilvie, 2009), and this social modeling has been suggested as a mechanism by which individuals with ASD can learn social skills and increase social engagement (Lee et al., 2007). This modeling and support may go beyond social and communication domains and translate to improved independent and adaptive behaviors. Support and encouragement from ASP staff may help students engage in different experiences and adapt to new circumstances.

It is also possible that students with higher functioning in these domains are simply more likely to enroll or to be enrolled in such programs. For example, it could be that these kinds of support programs represent, for both students and parents, a continuation of a pattern of support and activity that was in place prior to college. Conversely, it is possible that non-ASP participants, in general, have a history of functioning with few if any extraordinary supports. The data do not allow for direct tests of these questions, but if these speculations are accurate, the current findings suggests the ASP, although not directly enhancing students' functioning, may offer a useful means of transitioning students from a supportive pre-college environment into

college.   Lastly, it the results might be an indication that students in the ASP perceive themselves as having high ability in these areas of functioning, given all measures are self-report.

Results for academic functioning indicated students in the program reported higher scores on academic engagement than those not in the program. However, as stated above, due to the design of the current study, casual direction of this association cannot be determined. One possibility is students in the ASP receive support and encouragement that help them be engaged academically. These supports include weekly meetings with academic coaches and meeting with the Director of the ASP program. It is also possible that students who chose to participate in the ASP did well academically prior to college and had academic supports in high school that prepared them for college-level instruction.

There was not a statistically significant difference for presence of natural mentors. Given the lack of an a priori hypotheses regarding group differences in student involvement with a natural mentor, the absence of a significant difference was not wholly unexpected. It is unclear what might explain the lack of differences between the two groups of students. The current findings might change if assessed at another point in time. It might be that students in the program are able to develop more natural mentoring relationships over time given they have experience with mentors and relationship building from the ASP. Conversely, students not in the ASP might have been pressed to find those natural relationships on their own and gain more experience seeking out those natural mentors.

Mentor Relationships and the Functioning of ASP Students

I examined mentor relationship quality and frequency of interactions with mentors. Students in the program reported highest relationship quality with the designated peer mentor. On average, students reported most frequently meeting with the academic coach, followed by the

ASP director, the designated peer mentor, and least often with the activity leader. These ratings are in line with the structure of the program, with academic coaches meeting with students almost every day and meeting with a mentor and activity leader about once a week.

I also examined the degree to which the quality and frequency of mentoring was linked to the functioning of ASP students. There were no significant associations between mentor quality or frequency and students' ratings of social, adaptive, and emotional functioning but all correlations were positive. Ratings of academic functioning were significantly positively associated with relationship quality with the director of the ASP. The findings are in line with expectations but fail to provide strong support for the hypotheses. One possible explanation for the lack of significant findings is limited variability in mentoring quality; however, means and ranges suggests ample variability. Another possibility is individual mentoring relationships in the ASP were not salient to students as contributors to or factors in their functioning. Research on interventions for youth with ASD indicates stronger support for behavior-based interventions over relationship-based interventions (Wong et al., 2015). Given there is little support for the use of relationship-based interventions for youth on the spectrum, and ample studies have documented the social and communication difficulties of ASD students, it is possible that individual ratings of relationship quality with ASP mentors are simply not associated with measures of functioning.

Unexpected were findings indicating that ratings of mentor relationship quality and frequency were negatively associated with having a natural mentor, including the significant association involving ratings of quality with the activity leader. One explanation for these findings is students who enjoyed the support of ASP mentors were less likely to develop close bonds with individuals who are not part of this college program. It is interesting to consider the

possible implications. It can certainly be beneficial for these students to have a stable and supportive network in college; however, it is fair to ask whether these students benefit over the long term. It is possible that students with ASD who do not have the pre-arranged support of an ASP learn to actively seek out supportive adults, which is a beneficial skill to possess once graduated from college. However, it may be as students become older, and participation in the program decreases, presence of natural mentors might increase. The current study's sample size is not large enough to make these comparisons statistically, but future studies utilizing a larger sample and a longitudinal design should examine this possibility.

Strengths and Limitations

The current study was based on a small sample size and had limited power, which can impact a) ability to detect effects, b) increased probability of committing a type II errors, and c) reduced generalizability to large sample of students at the University. Given this study was only conducted with students at the University of Arkansas, we were also unable to generalize findings to students at other universities. Another limitation was the use of measures to assess functioning for these students. Given there are limited validated, brief, self-report measures for college students with autism, measures were extracted from other areas and were truncated. As little research has been done on ASPs, the goal was to be comprehensive and measure several different areas for which individuals with ASP tend to experience difficulty to see which areas were most associated with involvement in the ASP. Several of the adapted scales had poor to questionable reliability; however, given the nature of several of the adapted measures, the items did not necessarily represent a single dimension or factor; therefore, Cronbach's alphas were not effective indices to interpret internal reliability and the scales were evaluated at the item level. A third limitation was the use of single informant measures. Self-report data are helpful in order

gain a basic understanding, but future research should obtain data from multiple informants, including ASP staff and students' parents to gain a better understanding of the benefits of these programs. Another critical limitation was the cross-sectional design. Following the same sample over time would have allowed for a better understanding of the relations among the variables. A final but critical limitation was the lack of true control group, which precludes inferring causality.

In terms of strengths, this was one of the first studies to evaluate functioning of participants of an ASP and to make comparisons with non-participants. Another strength was the quantitative assessment of several domains of functioning. Many previous studies of ASPs involved qualitative data on feasibility, acceptability, self-esteem, quality of life, as well as some examination of communication skills, academic achievement, and self-regulated learning strategies (e.g., Curtin et al., 2016; Ness, 2013). This was also the first study to specifically examine the mentoring aspects of an ASP. This study looked at a range of mentoring relationships that are present in the program, rather than only examining one-one-one peer mentoring relationships.

Implications

There is very little research examining the use of ASPs, and almost all research conducted in this area is qualitative. Previous research typically asked questions such as satisfaction with the programs or experiences in the program, but no one is asking if the programs are beneficial or harmful. Future research is needed that utilizes large sample sizes and follows students over time. Ideally, random assignment for participating in an ASP or not would be beneficial in making inferences for causality. In addition, given one of the more challenging aspects of the current study was finding appropriate measures, future research is needed

validating measures for this population. Future research should also obtain informant-reports on functioning, before, during, and after participation in a program.

The current study provides some evidence for the validity for the measures used. For instance, as would be expected, the adapted anxiety and depression scale scores were highly correlated ($r = .79$) and were negatively correlated with all other adapted scale scores (see Table A1 in Appendix A). It is common for internalizing concerns to be negatively correlated with friendship quality, social functioning, adaptive functioning, etc.; therefore, the findings from this study provide some evidence for construct validity of these adapted scales. In addition, the adapted scales that comprise the social functioning domain were highly correlated providing evidence for reliability within this domain.

Although there were no significant group differences for presence of a natural mentor, natural mentoring might be beneficial for individuals with ASD as they graduate because these relationships are more likely to be sustained, whereas formal mentor relationships end after graduation from the program. Natural mentors can provide continual social support, encouragement, guidance, and motivation. There is benefit in examining the presence of natural mentors for students with ASD, utilizing larger samples and longitudinal designs, to better understand possible benefits of a natural mentor for students with ASD and how these students might seek out this support.

The current study also has potential implications for practice. First, it appears that ASP participants were more often men than women, suggesting female students are less visible to those making referrals to the program. Second, students in the ASP, regardless of the reasons, reported higher functioning than students not in the program. These results are in line with the view that these kinds of programs provide beneficial support for students with ASD.

Given the negative association between relationship quality with ASP mentors and having a natural mentor, it is worth considering that the support experienced by students in the program could be hampering their level of agency for seeking support outside of the program. Wenzel and Rowley (2010) discussed the possibility of putting too much emphasis on social support for students with ASD and the risk of students relying too heavily on others' support, rather than showing responsibility and developing skills to improve agency. Hart et al. (2010) discussed that ASP-type initiatives should be geared towards increasing opportunities for students with ASD to improve advocacy and self-determination skills by encouraging them to speak with professors in regard to learning requirements or needs, to meet with disability support offices for accommodations, to speak to peers, and to participate in a range of social events. Researchers examining ASPs have also suggested increased communication with and connections to academic and administrative offices, including student advocacy groups, and developing a website to increase campus awareness (Coombs, 2017).

Tables

Table 1

Frequencies for Categorical Demographic Variables by Group

Variable		ASP	No ASP	*df*	X^2
Gender				1	6.50*
	Male	12	6		
	Female	1	7		
Race				1	.05
	White	11	14		
	Non-White	2	2		
Ethnicity				1	3.14
	Hispanic/Latino	2	0		
	Not Hispanic/Latino	9	16		
Year				1	5.58*
	Younger	8	3		
	Older	5	12		
Family Income				1	.49
	<$10,000-$59,999	3	6		
	≥$60,000	9	10		

* Difference is significant at the p<.05 level (2-tailed).

Table 2

Means for Continuous Demographic and Pre-College Academic Variables

	ASP		No ASP			
Variable	*N*	*M (SD)*	*N*	*M (SD)*	*df*	*t*-Test
Age	12	19.42 (1.38)	14	21.07 (2.84)	24	-1.84
High School GPA	11	3.43 (.47)	15	3.72 (.31)	24	-1.91
ACT	10	26.30 (4.79)	14	28.21 (3.97)	22	-1.07
Highest Grade Father	13	4.85 (1.14)	16	4.56 (1.55)	27	.55
Highest Grade Mother	13	5.08 (1.12)	16	4.38 (1.50)	27	1.40

Note. Highest Grade: 1 = Less than high school; 2 = High school graduate; 3 = Some college; 4 = Two-year degree; 5 = Four-year degree; 6 = Doctorate/professional degree
* Difference is significant at the p<.05 level (2-tailed).

Table 3
Summary of Correlations Among Five Domains of Functioning

Domain of Functioning	*1*	*2*	*3*	*4*	*5*
1. Social Functioning	1.00	---	---	---	---
2. Adaptive Functioning	.41*	1.00	---	---	---
3. Academic Functioning	.52**	.50**	1.00	---	---
4. Emotional Functioning	-.29	-.42*	-.28	1.00	---
5. Natural Mentoring	-.34	-.02	-.10	.37	1.00

Note. Higher scores on Emotional Functioning indicate more anxiety and depression. For Social Functioning, Adaptive Functioning, Academic Functioning, and Natural Mentoring, higher scores are indicative of better functioning in that domain.
*Correlation is significant at the p<.05 level (2-tailed).
**Correlation is significant at the p<.001 level (2-tailed).

Table 4
Means for Dependent Variables by Group

Domain of Functioning	ASP M(SD)	No ASP M(SD)	t value (df)	p-value	Effect size d
Social Functioning	.25 (.39)	-.18 (.48)	2.58 (27)	.016	.97
Adaptive Functioning	.15 (.35)	-.13 (.27)	2.52 (27)	.018	.93
Academic Functioning	4.00 (.65)	3.53 (.54)	2.11 (26)	.045	.79
Emotional Functioning	2.32 (.76)	3.08 (1.07)	-2.14 (27)	.042	-.81
Natural Mentor	3.29 (.83)	2.91 (.95)	-1.15 (27)	.260	.43

Note. Higher scores on Emotional Functioning indicate more anxiety and depression. For Social Functioning, Adaptive Functioning, Academic Functioning, and Natural Mentoring, higher scores are indicative of better functioning in that domain. ASP $N = 13$, No ASP $N = 16$. Social and Adaptive Functioning means were calculated based on standardized scores.

Table 5
Descriptive Statistics for the SSSC and ABAS-3 Item Scores

Variable or Item	Total M (SD)	ASP M (SD) or % yes	NO ASP M (SD) or % yes
Adapted SSSC-Social	2.34(.35)	2.54(.27)	2.17(.32)
I talk with other students about things they like.		100%	100%
I listen to what other people say when I am talking with them.		100%	100%
I ask my teachers if I need extra help with my work.		91.7%	75%
I tell people "Good job" or "Nice work"		100%	100%
I can figure out what other people are feelings.		92.3%	58.3%
I offer to help other students if they need help.		100%	76.9%
I work well with others in a group.		92.3%	57.1%
Adapted SSSC-Independent behavior	2.17(.46)	2.45(.31)	1.97(.45)
I bring everything I need to classes.		100%	93.8%
I keep track of my homework and turn it in on time.		91.7%	81.3%
I know how to ask for a break when I need one.		90.9%	42.9%
I know how to stay calm when I am mad about something.		100%	68.8%
I don't mind if my schedule or routine changes.		90.9%	46.7%
Adapted SSSC-Transition	2.63(.30)	2.67(.33)	2.59(.29)
I ask teachers for help if I need it during class.		91.7%	80%
I have ideas about what I want to do after college or my career.		90.9%	85.7%
I look clean when I go to class.		100%	93.3%
I know how to find places I need to go (i.e., classroom, cafeteria, bus stop) on this campus.		100%	100%
I understand what I read in my classes (e.g., science, history, English)		100%	100%
Adapted ABAS-3 Communication	2.62(.51)	2.88(.55)	2.43(.39)
I look at other people's faces when I am talking to them.		100%	87.5%
I nod my head or smile when I talk to others.		100%	93.8%
I start conversations with others.		83.3%	87.5%
I repeat stories or jokes correctly after hearing them from others.		91.7%	93.8%
I wait for other to finish what they are saying.		100%	87.5%

Table 5 (Cont.)

Variable or Item	Total *M (SD)*	ASP *M (SD)* or % yes	NO ASP *M (SD)* or % yes
Adapted ABAS Self-Care	2.61(.54)	2.86(.46)	2.41(.53)
I eat a variety of food instead of preferring only one or two.		84.6%	81.3%
I get out of bed on time by myself.		92.3%	100%
I wear a variety of clothes, instead of the same or similar clothes most days.		84.6%	68.8%
I wash and rinse the sink after brushing my teeth.		84.6%	87.5%
I exercise or work out at least 2 hours a week.		84.6%	56.3%
Adapted ABAS Home Living	2.81(.60)	2.77(.59)	2.84(.63)
I take out the trash when it is full.		100%	93.8%
I clear the table after a meal.		100%	93.8%
I clean my room or living area regularly.		92.3%	87.5%
I pay the bills on time (for example, electricity or telephone bills).		69.2%	93.8%
Adapted ABAS Community Use	2.77(.55)	3.0(.54)	2.59(.51)
I use a credit or debit card to make purchases.		92.3%	93.8%
I make appointments by telephone, mobile device, or internet.		84.6%	93.8%
I get money from an ATM.		69.2%	81.3%
I ask other people's advice on where to shop.		92.3%	50%
I walk or ride my bike alone to locations within 1-mile of home or work.		92.3%	43.8%

Note. For all scales, higher scores are indicative of higher functioning. For all adapted measures, response scales were re-defined to compute % yes. For a description see results section.

Table 6

Means for Mentor Relationship Quality and Frequency for each Mentor-Role

Mentor-Role	Relationship Quality *M (SD)*	Frequency *M (SD)*
Mentor	3.22 (.67)	5.08 (.64)
Activity Leader	3.06 (.68)	4.69 (1.03)
Academic Coach	3.19 (.54)	5.77 (.44)
Director	3.05 (.57)	5.23 (.83)
Total	3.13 (.54)	5.25 (.35)

Note. N=13. Score for mentor relationship quality are from the Adapted Mentor Alliance Scale (AMAS). Total = aggregated AMAS scores for all four mentor-roles. Frequency: 1 = not at all; 2 = once a semester; 3 = about once a month, 4 = about two to three times a month; 5 = once a week; 6 = almost every day. For all AAMAS scales, higher scores are indicative of better mentor relationship quality.

Table 7

Correlations Between Functioning and Mentor Relationship Quality and Frequency

	AMAS Mentor	AMAS Activity Leader	AMAS Academic Coach	AMAS Director	AMAS Total	Frequency Total
Social Functioning	.34	.12	.51	.38	.37	-.07
Adaptive Functioning	.23	.25	.32	.33	.32	.11
Academic Functioning	.14	.01	.47	.60*	.35	.36
Emotional Functioning	-.12	-.37	-.21	-.35	-.30	-.21
Natural Mentoring	-.29	-.66*	-.25	-.36	-.46	-.43

Note. AMAS = Adapted Mentor Alliance Scale.

*Correlation is significant at the 0.05 level (2-tailed).

References

Adreon, D., Durocher, J. S. (2007). Evaluating the college transition needs of individuals with high-functioning autism spectrum disorders. *Intervention in School and Clinic, 42*(5), 271-279. doi:10.1177/10534512070420050201

Adelphi University (n.d.) *Bridges to Adelphi*. Adelphi University. Retrieved from https://bridges.adelphi.edu/

Alverson, C. Y., Lindstrom, L. E., & Hirano, K. A. (2015). *High school to college: Transition experiences of young adults with autism, 13*. Focus on Autism and Other Developmental Disabilities, doi:10.1177/1088357615611880

Allison, C., Auyeung, B., & Baron-Cohen, S. (2012). Toward brief 'red flags' for autism screening: The short Autism Spectrum Quotient and the short Quantitative Checklist in 1,000 cases and 3,000 controls. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(2), 202-212. doi:10.1016/j.jaac.2011.11.003

American Psychiatric Association (2017). Online Assessment Measures. Retrieved from https://www.psychiatry.org/psychiatrists/practice/dsm/educational-resources/assessment-measures

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Americans With Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990).

Ames, M. E., McMorris, C. A., Alli, L. N., & Bebko, J. M. (2016). Overview and evaluation of a mentorship program for university students with ASD. *Focus on Autism and Other Developmental Disabilities, 31*(1), 27-36. doi:10.1177/1088357615583465

Autism Research Center (2017). *Autism Spectrum Quotient- 10 items (AQ-10).* Autism Research Center. Retrieved from https://www.autismresearchcentre.com/arc_tests/

Atkinson, V. S. (2014). *Supporting students with disabilities in transition: A case study of a college mentoring program* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3641957)

Autism Spectrum Australia (2013). We belong: Investigating the experiences, aspirations and needs of adults with asperger's disorder and high functioning autism. *Autism Spectrum Australia (Aspect).* Retrieved from https://www.aspect.org.au/sites/default/files/Autism_Spectrum_WE_BELONG_Research_Report-FINAL_LR_R.pdf

University of Arkansas. (n.d.). *Autism Support Program*. Retrieved from https://autism.uark.edu/

Bandura, A. (1977). *Social learning theory*. Oxford, England: Prentice-Hall.

Barnes, J. A. (1954). Class and committees in a norwegian island parish. *Human Relations*, *7*, 39-58. doi:10.1177/001872675400700102

Barnhill, G. P. (2014). Supporting students with asperger syndrome on college campuses: Current practices. *Focus on Autism and Other Developmental Disabilities*, *31*(1), 3-15. doi:10.1177/1088357614523121

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The Autism-spectrum quotient (AQ): Evidence from asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders, 31*(1), 5-17. doi:10.1023/A:1005653411471

Booth, T., Murray, A. L., McKenzie, K., Kuenssberg, R., O'Donnell, M., & Burnett, H. (2013). Brief report: An evaluation of the AQ-10 as a brief screening instrument for ASD in adults. *Journal of Autism and Developmental Disorders, 43*(12), 2997-3000. doi:10.1007/s10803-013-1844-5

Bordes, V., & Arredondo, P. (2005). Mentoring and 1st-year latina/o college students. *Journal of Hispanic Higher Education, 4*(2), 114-133. doi:10.1177/1538192704273855

Britner, P. A., Balcazar, F. E., Blechman, E. A., Blinn-Pike, L., & Larose, S. (2006). Mentoring special youth populations. *Journal of Community Psychology, 34*(6), 747-763. doi:10.1002/jcop.20127

Bruce, M., & Bridgeland, J. (2014). The mentoring effect: Young people's perspectives on the outcomes and availability of mentoring. *National Criminal Justice Reference Service*. Retrieved from https://www.mentoring.org/new-site/wp-content/uploads/2015/09/The_Mentoring_Effect_Full_Report.pdf

Camarena, P. M., & Sarigiani, P. A. (2009). Postsecondary educational aspirations of high-functioning adolescents with autism spectrum disorders and their parents. *Focus on Autism and Other Developmental Disabilities, 24*(2), 115-128. doi:10.1177/1088357609332675

Campbell, T. A., & Campbell, D. E. (1997). Faculty/student mentor program: Effects on academic performance and retention. *Research in Higher Education, 38*(6), 727-742. doi:10.1023/A:1024911904627

Cassel, J. (1990). The contribution of the social environment to host resistance. In R. E. Ornstein, C. Swencionis, R. E. Ornstein, C. Swencionis (Eds.), The healing brain: A scientific reader (pp. 31-42). New York, NY, US: Guilford Press.

Cavell, T. A., Elledge, L. C., Malcolm, K. T., Faith, M. A., & Hughes, J. N. (2009). Relationship quality and the mentoring of aggressive, high-risk children. *Journal of Clinical Child and*

Adolescent Psychology, 38(2), 185-198. doi: 10.1080/15374410802698420

Cavell, T. A., Meehan, B. T., Heffer, R. W., & Holladay, J. J. (2002). The natural mentors of adolescent children of alcoholics (COAs): Implications for preventive practices. *The Journal of Primary Prevention, 23*(1), 23-42. doi:10.1023/A:1016587115454

Centers for Disease Control and Prevention. (2012). CDC's autism and developmental disabilities monitoring (ADDM) network. Retrieved from http://www.cdc/gov/ncbdd/autism/addm.html

Cheema, J. R. (2014). Some general guidelines for choosing missing data handling methods in educational research. *Journal of Modern Applied Statistical Methods, 13*(2), 53-75. doi: 10.22237/jmasm/1414814520

College Autism Spectrum (n.d.). Programs for students with Asperger syndrome. *College Autism Spectrum*. Retrieved from http://www.collegeautismspectrum.com/collegeprograms.html

Colvin, J. W., & Ashman, M. (2010). Roles, risks, and benefits of peer mentoring relationships in higher education. *Mentoring & Tutoring: Partnership in Learning, 18*(2), 121-134. doi:10.1080/13611261003678879

Cook, B., Weiss, D., & Hodge, V. (2017). A facilitated natural mentoring program. *ASHA Leader, 22*(7), 40-43. Retrieved from http://0-search.ebscohost.com.library.uark.edu/login.aspx?direct=true&db=c8h&AN=123832233&site=ehost-live&scope=site

Coombs, N. (2017). *The collaborative autism support program at brooklyn college: A formative program evaluation* (Master's thesis). Available from ProQuest Dissertations and Theses database. (UMI No. 10265041)

Crisp, G., & Cruz, I. (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education, 50*(6), 525-545. doi:10.1007/s11162-009-9130-2

Curtin, C., Humphrey, K., Vronksy, K., Mattern, K., Nicastro, S., & Perrin, E. C. (2016). Expanding horizons: A pilot mentoring program linking college/graduate students and teens with ASD. *Clinical Pediatrics, 55*(2), 150-156. doi:10.1177/0009922815588821

Dean, M., Harwood, R., & Kasari, C. (2017). The art of camouflage: Gender differences in the social behaviors of girls and boys with autism spectrum disorder. *Autism, 21*(6), 678-689. doi:10.1177/1362361316671845

DuBois, D. L., & Silverthorn, N. (2005). Characteristics of natural mentoring relationships and adolescent adjustment: Evidence from a national study. *The Journal of Primary Prevention, 26*(2), 69-92. doi:10.1007/s10935-005-1832-4

DuBois, D., Portillo, N., Rhodes, J. E., Silverthorn, N., & Valentine, J. C. (2011). How effective are mentoring programs for youth? A systematic assessment of the evidence. *Psychological Science in the Public Interest, 12*(2), 57-91. doi:10.1177/1529100611414806

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28, 1-11.

Glanz, K., Rimer, B. K., & Viswanath, K. (2008). The scope of health behavior and health education. In Glanz, K., Rimer, B. K. Viswanath, K. (Eds.), *Health behavior and health education: Theory, research, and practice, 4th ed* (pp. 3-22). San Francisco, CA, US: Jossey-Bass.

Glennon, T. J. (2001). The stress of the university experience with students with Asperger syndrome. *Journal of Prevention, Assessment & Rehabilitation, 17*(3), 183-190.

Glennon, T. J. (2016). Survey of college personnel: Preparedness to serve students with autism spectrum disorder. *American Journal of Occupational Therapy 70*(2), 1-6. doi:10.5014/ajot.2016.017921

Graetz, J. E., & Spampinato, K. (2008). Asperger's syndrome and the voyage through high school: Not the final frontier. *Journal of College Admission*, *198*, 19-24.

Grandin, T. (1990). Needs of high functioning teenagers and adults with autism: Tips from a recovered autistic. *Focus on Autistic Behavior, 5*(1), 16.

Harrison, P. L., & Oakland, T. (2003). *Adaptive Behavior Assessment System II*. San Antonio, TX: Western Psychological Services.

Harrison, P. L., & Oakland, T. (2015). *Adaptive Behavior Assessment System* (3rd ed.). Torrance, CA: Western Psychological Services.

Hart, D., Grigal, M., & Weir, C. (2010). Expanding the paradigm: Postsecondary education options for individuals with autism spectrum disorder and intellectual disabilities. *Focus on Autism and Other Developmental Disabilities, 25*(3), 134-150. doi:10.1177/1088357610373759

Hendrickson, J. M., Carson, R., Woods-Groves, S., Mendenhall, J., & Scheidecker, B. (2013). UI REACH: A postsecondary program serving students with autism and intellectual disabilities. *Education and Treatment of Children, 36*(4), 169-194.

Hume, K., Steinbrenner, D., Sideris, J., Smith, L., Kucharczyk, S., & Szidon, K. (2017). Multi-informant assessment of transition-related skills and skill importance in adolescents with autism spectrum disorder. *Autism, 22*(1), 40-50. doi:10.1177/1362361317722029

Humphrey, K. (n.d.). Effective mentoring for youth with autism spectrum disorders. *Partners for Youth with Disabilities*. Retrieved from

http://www.mentoring.org/images/uploads/Effective%20Mentoring%20For%20Youth%2
0With%20Autism%20Spectrum%20Disorders.pdf

Elledge, L. C., Cavell, T. A., Ogle, N. T., & Newgent, R. A. (2010). School-based mentoring as selective prevention for bullied children: A preliminary test. *Journal of Primary Prevention, 31*(3), 171-187. doi:10.1007/s10935-010-0215-7

Faison, J. J. (1996). The next generation: The mentoring of african american graduate students on predominately white university campuses. *Annual Meeting of the American Education Research Association.*

Head, A. M., McGillivray, J. A., & Stokes, M. A. (2014). Gender differences in emotionality and sociability in children with autism spectrum disorders. *Molecular Autism, 5*(1), 1-19. doi:10.1186/2040-2392-5-19.

Herrera, C., DuBois, D. L., & Grossman, J. B. (2013). *The role of risk: Mentoring experiences and outcomes for youth with varying risk profiles.* New York, NY: A Public/Private Ventures project distributed by MDRC.

Ishiyama, J. (2007). Expectations and perceptions of undergraduate research mentoring: Comparing first generation, low income white/caucasian and african american students. *College Student Journal, 41*(3), 540-549.

Jacobi, M. (1991). Mentoring and undergraduate academic success: A literature review. *Review of Educational Research, 61*(4), 505-32.

Jobe, L. E., & White, S. W. (2007). Loneliness, social relationships, and a broader autism phenotype in college students. *Personality and Individual Differences, 42*(8), 1479-1489. doi:10.1016/j.paid.2006.10.021

Jones, C. D., & Schwartz, I. S. (2004). Siblings, peers, and adults: Differential effects of models for children with autism. *Topics in Early Childhood Special Education, 24*(4), 187-198. doi:10.1177/02711214040240040101

Keating, L. M., Tomishima, M. A., Foster, S., & Alessandri, M. (2002). The effects of a mentoring program on at-risk youth. *Adolescence, 37*(148), 717-734.

Kroenke, K., Spitzer, R. L., & Williams, J. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613. doi:10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Yu, Z., Wu, J., Kean, J., & Monahan, P. O. (2014). Operating characteristics of PROMIS four-item depression and anxiety scales in primary care patients with chronic pain. *Pain Medicine, 15*(11), 1892-1901. doi:10.1111/pme.12537

Lai MC, Baron-Cohen S. (2015) Identifying the lost generation of adults with autism spectrum conditions. *Lancet Psychiatry 2*(11): 1013–1027. doi:10.1016/S2215-0366(15)00277-1

Lai, M., Lombardo, M. V., Ruigrok, A. V., Chakrabarti, B., Auyeung, B., Szatmari, P., & ... Baron-Cohen, S. (2017). Quantifying and exploring camouflaging in men and women with autism. *Autism, 21*(6), 690-702. doi:10.1177/1362361316671012

Larose, S., Cyrenne, D., Garceau, O., Harvey, M., Guay, F., Godin, F., & ... Deschênes, C. (2011). Academic mentoring and dropout prevention for students in math, science and technology. *Mentoring & Tutoring: Partnership in Learning, 19*(4), 419-439. doi:10.1080/13611267.2011.622078

Lee, S., Odom, S. L., & Loftin, R. (2007). Social engagement with peers and stereotypic behavior of children with autism. *Journal of Positive Behavior Interventions, 9*(2), 67-79. doi:10.1177/10983007070090020401

Leidenfrost, B., Strassnig, B., Schabmann, A., Spiel, C., & Carbon, C. (2011). Peer mentoring styles and their contribution to academic success among mentees: A person-oriented study in higher education. *Mentoring & Tutoring: Partnership in Learning, 19*(3), 347-364. doi:10.1080/13611267.2011.597122

Ligon, S. W. (2016). *Providing a way for students with autism spectrum disorder to succeed in transitioning to postsecondary educational institutions: A collaborative project* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 10162136)

Longtin, S. E. (2014). Using the college infrastructure to support students on the autism spectrum. *Journal of Postsecondary Education and Disability, 27*(1), 63-72.

McCarty, M. M. (2013). *The experience of college students diagnosed with asperger's disorder and participating in a university-based autism spectrum transitional support program* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3525431)

McCarville, E. (2014). *Peer mentoring intervention teaching adaptive skills to individuals with high functioning autism spectrum disorders* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3597280)

Ness, B. M. (2013). Supporting self-regulated learning for college students with asperger syndrome: Exploring the 'strategies for college learning' model. *Mentoring & Tutoring: Partnership in Learning, 21*(4), 356-377. doi:10.1080/13611267.2013.855865

Nora, A., & Crisp, G. (2007). Mentoring students: Conceptualizing and validating the multi-dimensions of a support system. *Journal of College Student Retention: Research, Theory & Practice, 9*(3), 337-356. doi:10.2190/CS.9.3.e

Ogilvie, C. R. (2009). *The impact of video modeling and peer mentoring of social skills for middle school students with autism spectrum disorders in inclusive settings* (Doctoral

dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3335359)

Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology, 29*(4), 611-621. doi:10.1037/0012-1649.29.4.611

Pearlman-Avnion, S., & Aloni, A. A. (2016). The impact of a post-secondary education program on the self-efficacy and future orientation of people with high-functioning autism. *European Scientific Journal*, *12*(29), 251-268.

Pillay, Y., & Bhat, C. S. (2012). Facilitating support for students with asperger's syndrome. *Journal of College Student Psychotherapy, 26*(2), 140-154. doi:10.1080/87568225.2012.659161

Phinney, J. S., Torres Campos, C. M., Padilla Kallemeyn, D. M., & Kim, C. (2011). Processes and outcomes of a mentoring program for latino college freshman. *Journal of Social Issues, 67*(3), 599-621. doi:10.1111/j.1540-4560.2011.01716.x

Post, J. (2017). A qualitative study of the effects of the university of arkansas autism support program. *Rehabilitation, Human Resources, and Communication Disorders Undergraduate Honors Theses*. Retrieved from http://scholarworks.uark.edu/cgi/viewcontent.cgi?article=1053&context=rhrcuht

Roberts, N., & Birmingham, E. (2017). Mentoring university students with ASD: A mentee-centered approach. *Journal of Autism and Developmental Disorders, 47*(4), 1038-1050. doi:10.1007/s10803-016-2997-9

Roux, A. M., Shattuck, P. T., Rast, J. E., Rava, J. A., Edwards, A. D., Wei, X., McCracken, M., Yu, J. W. (2015). Characteristics of two-year college students on the autism spectrum and their support services experiences. *Autism Research and Treatment, 2015*, 1-10. doi:10.1155/2015/391693

Ryan, C. T., Kramer, J. M., & Cohn, E. S. (2016). Exploring the self-disclosure process in peer mentoring relationships for transition-age youth with developmental disabilities. *Intellectual and Developmental Disabilities, 54*(4), 245-259. doi:10.1352/1934-9556-54.4.245

Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A. M., & Shaver, D. (2011). The post-high school outcomes of young adults with disabilities up to 6 years after high school: Key findings from the National Longitudinal Transition Study-2 (NLTS2). *National Center for Special Education Research, 3004*, 1-106.

Section 504, Rehabilitation Act of 1973, Pub. L. No. 93-112, 87 Stat. 394 (1973).

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum

disorder. *Pediatrics, 129*(6), 1042-1049. doi:10.1542/peds.2011-2864

Siew, C. T., Maxucchelli, T. G., Rooney, R., & Girdler, S. (2017). A specialist peer mentoring program for university students on the autism spectrum: A pilot study. *PLoS One, 12*(7). doi:10.1371/journal.pone.0180854

Skinner, E., Furrer, C., Marchand, G., & Kinderman, T. (2008). Engagement and dissatisfaction in the classroom: Part of a larger motivation dynamic? *Journal of Educational Psychology, 100*(4), 765-781. doi:10.1037/a0012840

Smith, C. P. (2007). Support services for students with asperger's syndrome in higher education. *College Student Journal, 41*(3), 515-531. doi:10.1097/MRR.0b013e32834f4d3b

Taylor, M. J. (2005). Teaching students with autistic spectrum disorders in HE. *Education & Training, 47*(7), 484-495. doi:10.1108/00400910510626330

Taylor, R. D. (2016). Effects of peer mentoring on high-achieving, low-income first year college students (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 10106089)

Taussig, H. N., Culhane, S. E., & Hettleman, D. (2007). Fostering healthy futures: An innovative preventive intervention for preadolescent youth in out-of-home care. *Child Welfare*, *86*(5), 113-132.

Teresi, J. A., Ocepek-Welikson, K., Kleinman, M., Ramirez, M., & Kim, G. (2016). Measurement equivalence of the patient reported outcomes measurement information system (PROMIS) anxiety short forms in ethnically diverse groups. *Psychological Testing and Assessment Modeling, 58*(1), 183-219.

Tierney, S., Burns, J., & Kilbey, E. (2016). Looking behind the mask: Social coping strategies of girls on the autistic spectrum. *Research in Autism Spectrum Disorders, 23*, 73-83. doi:10.1016/j.rasd.2015.11.013

Tobin, M. C., Drager, K. R., & Richardson, L. F. (2014). A systematic review of social participation for adults with autism spectrum disorders: Support, social functioning, and quality of life. *Research in Autism Spectrum Disorders, 8*(3), 214-229. doi:10.1016/j.rasd.2013.12.002

Tolan, P. H., Henry, D. B., Schoeny, M. S., Lovegrove, P., & Nichols, E. (2014). Mentoring programs to affect delinquency and associated outcomes of youth at-risk: A comprehensive meta-analytic review. *Journal of Experimental Criminology, 10*(2), 179–206. doi:10.1007/s11292-013-9181-4

Van Bergeijk, E., Klin, A., & Volkmar, F. (2008). Supporting more able students on the autism spectrum: College and beyond. *Journal of Autism and Developmental Disorders, 38*(7), 1359-1370. doi:10.1007/s10803-007-0524-8

Van Hees, V., Moyson, T., & Roeyers, H. (2015). Higher education experiences of students with autism spectrum disorder: Challenges, benefits and support needs. *Journal of Autism and Developmental Disorders, 45*(6), 1673-1688. doi:10.1007/s10803-014-2324-2

Weiler, L. M. (2013). *Prevention of substance abuse in juvenile delinquents: Identification of important mentoring processes* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3565468)

Weiss, A. L., & Rohland, P. (2015). Implementing a communication coaching program for students with autism spectrum disorders in postsecondary education. *Topics in Language Disorders, 35*(4), 345-361. doi:10.1097/TLD.0000000000000071

Welkowitz, L. A., & Baker, L. J. (2005). Supporting college students with asperger's syndrome. *Asperger's syndrome: Intervening in Schools, Clinics, and Communities*, 173-187.

Wenzel, C, & Rowley, L. (2010). Teaching social skills and academic strategies to college students with Asperger's syndrome. *TEACHING Exceptional Children, 42*(5). 44-50. Retrieved from http://journals.sagepub.com/doi/pdf/10.1177/004005991004200505

Wise, K. L. (2015). *A formative program evaluation of a postsecondary support program for students with high functioning autism spectrum disorder* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No 10016538)

White, S. W., Ollendick, T. H., & Bray, B. C. (2011). College students on the autism spectrum: Prevalence and associated problems. *Autism, 15*(6), 683-701. doi:10.1177/1362361310393363

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., & … Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders, 45*(7), 1951-1966. doi: 10.1007/s10803-014-2351-z

Zalaquett, C. P., & Lopez, A. D. (2006). Learning from the stories of successful undergraduate latina/latino students: The importance of mentoring. *Mentoring & Tutoring: Partnership in Learning, 14*(3), 337-353. doi:10.1080/13611260600635563

Appendix A

Adapted FQQ
(1=Not at all true, 2 = A little true, 3 = Somewhat true, 4 = Pretty true, 5 = Really true, 6 = I don't have any friends).
1. My friends tell me I'm good at things.
2. If other people were talking behind my back, my friends would stick up for me.
3. If my friends hurt my feelings, they say "I'm sorry."
4. My friends would still like me even if other people didn't like me.
5. My friends care about my feelings.

Adapted AQ-10
(1=Definitely agree, 2= Slightly agree, 3= Slightly disagree, 4 = Definitely disagree) → recoded so higher means better functioning
1. I find it easy to 'read between the lines' when someone is talking to me.
2. I know how to tell if someone listening to me is getting bored.
3. When I'm reading a story, I find it difficult to work out the characters' intentions.
4. I find it easy to work out what someone is thinking or feeling just by looking at their face.
5. I find it difficult to work out people's intentions.

Adapted SSSC-Social
(1= This is NOT like me, 2= This is sort of like me, 3 = This is very much like me, 4 = I have not had a change to try this, 5 = Not sure)
1. I talk with other students about things they like.
2. I listen to what other people say when I am talking with them.
3. I ask my teachers if I need extra help with my work.
4. I tell people "Good job" or "Nice work" when they do something well.
5. I can figure out what other people are feeling.
6. I offer to help other students if they need help.
7. I work well with others in a group.

Adapted SSSC-Independence
(1= This is NOT like me, 2= This is sort of like me, 3 = This is very much like me, 4 = I have not had a change to try this, 5 = Not sure)
1. I bring everything I need to my classes.
2. I keep track of my homework and turn it in on time.
3. I know how to ask for a break when I need one.
4. I know how to stay calm when I am mad about something.
5. I don't mind if my schedule or routine changes.

Adapted SSSC-Transition
(1= This is NOT like me, 2= This is sort of like me, 3 = This is very much like me, 4 = I have not had a change to try this, 5 = Not sure)
1. I ask teachers for help if I need it during class.
2. I have ideas about what I want to do after college or for my career.
3. I look clean when I go to school.

4. I follow the rules in class.
5. I know how to find places I need to go (i.e., classroom, cafeteria, bus stop) on this campus.

Adapted ABAS-Communication
(1=Not at all, 2= Sometimes true, 3 = Often true, 4 = Always true)
1. I look at other people's faces when I am talking to them.
2. I nod my head or smile when I talk to others.
3. I start conversations with others.
4. I repeat stories or jokes correctly after hearing them from others.
5. I wait for others to finish what they are saying.

Adapted Skinner Engagement
(1=Always, 2 = Very often, 3 = Sometimes, 4 = Rarely, 5 = Never)
1. I try hard to do well in school.
2. In class I work as hard as I can.
3. When I'm in class, I participate in class discussions.
4. I pay attention in class.
5. When I'm in class, I listen very carefully.

Additional Academic Behavior Questions
(1=Always, 2 = Very often, 3 = Sometimes, 4 = Rarely, 5 = Never)
6. I send emails to my professors.
7. I talk one-on-one with my professors.

Adapted ABAS-Self-Care
(1 = Not at all, 2 = Sometimes true, 3 = Often true, 4 = Always true)
1. I eat a variety of food instead of preferring only one or two.
2. I get out of bed on time by myself.
3. I wear a variety of clothes, instead of the same or similar clothes most days.
4. I wash and rinse the sink after brushing my teeth.
5. I exercise or work out at least 2 hours a week.

Adapted ABAS Home Living
(1 = Not at all, 2 = Sometimes true, 3 = Often true, 4 = Always true)
1. I take out the trash when it is full.
2. I clear the table after a meal.
3. I clean my room or living area regularly.
4. I pay the bills on time (for example, electricity or telephone bills).
5. I do minor household repairs (for example, fixing a clogged drain or leaky faucet).

Adapted ABAS Community Use
(1 = Not at all, 2 = Sometimes true, 3 = Often true, 4 = Always true)
1. I use a credit or debit card to make purchases.
2. I make appointments by telephone, mobile device, or internet.
3. I get money from an ATM.

4. I ask other people's advice on where to shop.
5. I walk or ride my bike alone to locations within 1-mile of home or work.

Adapted Anxiety short-form
(1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always)
1. In the past SEVEN (7) DAYS, I felt fearful.
2. In the past SEVEN (7) DAYS, I felt anxious.
3. In the past SEVEN (7) DAYS, I felt worried.
4. In the past SEVEN (7) DAYS, I found it hard to focus on anything other than my anxiety.
5. In the past SEVEN (7) DAYS, I felt nervous.

Adapted Depression short-form
(1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always)
1. In the past SEVEN (7) DAYS, I felt worthless.
2. In the past SEVEN (7) DAYS, I felt that I had nothing to look forward to.
3. In the past SEVEN (7) DAYS, I felt helpless.
4. In the past SEVEN (7) DAYS, I felt sad.
5. In the past SEVEN (7) DAYS, I felt depressed.

Natural Mentor
(1 = Never true, 2 = Usually true, 3 = Sometimes true, 4 = Always true)
1. At college, there is/was a person besides my parents who I felt close to.
2. At college, there is/was a person besides my parents who was an important influence in my life.
3. At college, there is/was a person besides my parents who helped and supported me.
4. At college, there is/was a person besides my parents who cared about me.
5. At college, there is/was a person besides my parents who helped me feel good about myself.

Adapted Mentor Alliance Scale- Mentor
(1 = Not like you, 2 = A little like you, 3 = Mostly like you, 4 = Very much like you)
1. I looked forward to meeting with my mentor. Would you say this is...
2. I told my mentor about things that upset me. Would you say this is...
3. I liked spending time with my mentor. Would you say this is...
4. There were times when my mentor and I got mad or upset with each other. Would you say this is...
5. My mentor and I would sometimes argue with each other. Would you say this is...
6. I'd rather do other things than meet with my mentor. Would you say this is...

Adapted Mentor Alliance Scale- Activity Leader
(1 = Not like you, 2 = A little like you, 3 = Mostly like you, 4 = Very much like you)
1. I looked forward to meeting with my activity leader. Would you say this is...
2. I told the activity leader about things that upset me. Would you say this is...
3. I liked spending time with the activity leader. Would you say this is...
4. There were times when the activity leader and I got mad or upset with each other. Would you say this is...

5. The activity leader and I would sometimes argue with each other. Would you say this is...
6. I'd rather do other things than meet with the activity leader. Would you say this is...

Adapted Mentor Alliance Scale- Academic Coach
(1 = Not like you, 2 = A little like you, 3 = Mostly like you, 4 = Very much like you)
1. I looked forward to meeting with my academic coach. Would you say this is...
2. I told my academic coach things that upset me. Would you say this is...
3. I liked spending time with my academic coach. Would you say this is...
4. There were times when my academic coach and I got made or upset with each other. Would you say this is...
5. My academic coaches and I would sometimes argue with each other. Would you say this is...
6. I'd rather do other things than meet with my academic coach. Would you say this is...

Adapted Mentor Alliance Scale- Director
(1 = Not like you, 2 = A little like you, 3 = Mostly like you, 4 = Very much like you)
1. I looked forward to meeting with Aleza Greene. Would you say this is...
2. I told Aleza Greene things that upset me. Would you say this is...
3. I liked spending time with Aleza Greene. Would you say this is...
4. There were times when Aleza Greene and I got mad or upset with each other. Would you say this is...
5. Aleza Greene and I would sometimes argue with each other. Would you say this is...
6. I'd rather do other things than meet with Aleza Greene. Would you say this is...

Frequency scale
(1 = *Not at all*; 2 = *Once a semester*; 3 = *About once a month*, 4 = *About two to three times a month*; 5 = *Once a week*; 6 = *Almost every day*).
1. How often did you meet with your mentor?
2. How often did you meet with the activity leader?
3. How often did you meet with an academic coach?
4. How often did you meet with Aleza Greene?

Appendix B

Table A1
Correlations Among Domains of Functioning

	1	2	3	4	5	6	7	8	9	10	12	13	14
Social Functioning													
1. AFQQ	1.00	--	--	--	--	--	--	--	--	--	--	--	--
2. ASSSC-S	**.53****	1.00	--	--	--	--	--	--	--	--	--	--	--
3. A-ABAS-3-C	**.29**	**.60****	1.00	--	--	--	--	--	--	--	--	--	--
4. A-AQ-10	**.00**	**.30**	**.28**	1.00	--	--	--	--	--	--	--	--	--
Adaptive Functioning													
5. ASSSC-I	-.04	.32	.40*	.08	1.00	--	--	--	--	--	--	--	--
6. ASSSC-T	.25	.37	.46*	-.06	**.40***	1.00	--	--	--	--	--	--	--
7. A-ABAS-3-SC	.13	.28	.55**	.12	**.42***	**.44***	1.00	--	--	--	--	--	--
8. A-ABAS-3-HL	-.04	.01	-.02	-.11	**-.01**	**.04**	**.07**	1.00	--	--	--	--	--
9. A-ABAS-3-CU	-.07	.12	.49**	.08	**.09**	**.00**	**.09**	**-.23**	1.00	--	--	--	--
Academic Functioning													
10. A-Academic Engagement	.35	.69**	.51**	-.15	.44*	.58**	.32	-.14	.28	1.00	--	--	--
Emotional Functioning													
12. A-Anxiety	.01	-.12	-.29	-.29	-.48**	-.24	-.28	.19	-.44*	-.26	1.00	--	--
13. A-Depression	-.16	-.21	-.43*	-.31	-.41*	-.27	-.30	.27	-.38*	-.27	**.79****	1.00	--
Natural Mentoring													
14. ANMQ	-.20	-.28	-.24	-.33	-.17	-.03	-.18	.50**	-.22	-.10	.20	.49**	1.00

Note. Higher scores on Emotional Functioning indicate more anxiety and depression. For Social Functioning, Adaptive Functioning, Academic Functioning, and Natural Mentoring, higher scores are indicative of better functioning in that domain. AFQQ = Adapted Friendship Quality Questionnaire, ASSSC-S, -I, -T = Adapted Secondary School Success Checkless, Social subscale, Independence subscale, Transition subscale, A-ABAS-3-C, -SC, -HL, -CU = Adapted Adaptive Behavioral Assessment System, Communication subscale, Self-Care subscale, Home Living subscale, Community Use subscale, A-AQ-10 = Adapted Autism Quotient 10, A-Behavioral Engagement = Adapted Behavioral Engagement scale, A-Anxiety = Adapted Anxiety-short form (PROMIS), A-Depression = Adapted Depression-short form (PROMIS), ANMQ = Adapted Natural Mentoring Questionnaire.
*Correlation is significant at the $p<.05$ level (2-tailed).
**Correlation is significant at the $p<.001$ level (2-tailed).

Table A2
Correlations Among Domains of Functioning for ASP Students Only

Domain of Functioning	1	2	3	4	5
1. Social Functioning	1.00	---	---	---	---
2. Adaptive Functioning	.49	1.00	---	---	---
3. Academic Functioning	.52	.63*	1.00	---	---
4. Emotional Functioning	-.19	-.50	-.10	1.00	---
5. Natural Mentoring	-.31	-.43	-.10	.59*	1.00

Note. Higher scores on Emotional Functioning indicate more anxiety and depression. For Social Functioning, Adaptive Functioning, Academic Functioning, and Natural Mentoring, higher scores are indicative of better functioning in that domain.
*Correlation is significant at the p<.05 level (2-tailed).

Table A3
Correlations Among Domains of Functioning for No-ASP Students Only

Domain of Functioning	*1*	*2*	*3*	*4*	*5*
1. Social Functioning	1.00	---	---	---	---
2. Adaptive Functioning	.08	1.00	---	---	---
3. Academic Functioning	.36	.13	1.00	---	---
4. Emotional Functioning	-.13	-.19	-.20	1.00	---
5. Natural Mentoring	-.26	.55*	.06	.17	1.00

Note. Higher scores on Emotional Functioning indicate more anxiety and depression. For Social Functioning, Adaptive Functioning, Academic Functioning, and Natural Mentoring, higher scores are indicative of better functioning in that domain.
*Correlation is significant at the p<.05 level (2-tailed).

Table A4
Means for Dependent Variables by Group

Domain of Functioning	Variable	ASP M (SD)	No ASP M (SD)	t-value (df)	Effect size d
Social		.25 (.39)	-.18 (.48)	2.58 (27)*	.97
	AFQQ	4.08 (.91)	3.98 (.90)		
	ASSSC Social	2.54 (.32)	2.43 (.39)		
	A-ABAS-3 Communication	2.88 (.55)	2.43 (.39)		
	A-AQ-10	2.51 (.66)	2.02 (.88)		
Adaptive		.15 (.35)	-.13 (.27)	2.52 (27)*	.93
	ASSSC Independence	2.45 (.31)	1.97 (.45)		
	ASSSC Transition	2.67 (.33)	2.59 (.29)		
	A-ABAS-3 Self-Care	2.86 (.46)	2.41 (.53)		
	A-ABAS-3 Home Living	2.77 (.59)	2.84 (.63)		
	A-ABAS-3 Community Use	3.00 (.54)	2.59 (.51)		
Academic					
	A-Behavioral Engagement	4.00 (.65)	3.53 (.54)	2.11 (26)*	.79
Emotional		2.32 (.76)	3.08 (1.07)	-2.14 (27)*	-.81
	A-Anxiety-short form	2.46 (.76)	3.44 (1.11)		
	A-Depression-short form	2.18 (.92)	2.73 (1.11)		
Natural Mentor					
	ANMQ	3.29 (.83)	2.91 (.95)	-1.15 (27)	.43

Note. AFQQ = Adapted Friendship Quality Questionnaire, ASSSC = Adapted Secondary School Success Checkless, A-ABAS = Adapted Adaptive Behavioral Assessment System, A-AQ-10 = Adapted Autism Quotient 10, A-Behavioral Engagement = Adapted Behavioral Engagement scale, A-Anxiety-short from = Adapted Anxiety-short form (PROMIS), A-Depression-short form = Adapted Depression-short form (PROMIS), ANMQ = Adapted Natural Mentoring Questionnaire.
* Difference is significant at the p<.05 level (2-tailed).

Appendix C

UNIVERSITY OF ARKANSAS.

To:	Ayla R Mapes BELL 4188
From:	Douglas James Adams, Chair IRB Committee
Date:	10/25/2017
Action:	**Exemption Granted**
Action Date:	10/25/2017
Protocol #:	1710077466
Study Title:	Peer Mentoring for College Students with Autism Spectrum Disorder

The above-referenced protocol has been determined to be exempt after review by the IRB Committee that oversees research with human subjects.

If the research involves collaboration with another institution then the research cannot commence until the Committee receives written notification of approval or exemption from the collaborating institution's IRB.

Adverse Events: Any serious or unexpected adverse event must be reported to the IRB Committee within 48 hours. All other adverse events should be reported within 10 working days.

Amendments: Any changes to the protocol that impact human subjects, including changes in experimental design, equipment, personnel or funding, must be approved by the IRB Committee before they can be initiated.

You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with the IRB Committee, original signed consent forms, and study data.

cc: Tim Cavell, Investigator
       Bailey Marie Mathis, Key Personnel

Appendix D

Rights & Permissions

Certificate of Limited-use License

License #:	Date:
WPS-000947	November 3, 2017

Principal Investigator's name and title:

Ayla R. Mapes

Name of the Assessment:	Permitted number of uses:
Adaptive Behavior Assessment System: Third Edition	100 Adult Form

Description of the study:

Examining the degree to which supportive relationships with peer mentors predict the functioning of college students with ASD.

Reference terms dated 19Jun'17.

Method of administration:

Administration and scoring via a secure, password-protected, online environment.

The required copyright notice that must be affixed in its entirety to each reprint/viewing of the assessment:

Sandra Ceja

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