



Effects of a 9-Month Military-Base Internship on the Competitive Integrated Employment of Military Dependent and Connected Youth with ASD

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Abstract

This waitlist-controlled cluster randomized clinical trial presents the results of PS + ASD for military dependent and connected youth with ASD. Following earlier findings regarding PS + ASD, this study expands upon that previous work by including a new population, military dependent and connected transition aged youth with ASD. Findings indicate that military dependent and connected youth who participated in PS + ASD gained competitive integrated employment at 60% despite the impact of the COVID-19 pandemic and economic downturn. In addition, these youth worked a mean of 24.42 h weekly and earned an average hourly wage of \$9.38 at one year post baseline while the waitlist control group participants did not gain CIE. In addition, by 18 months, 58.3% of participants gained positions in federal employment. Implications of the study are discussed.

Keywords Autism · Transition · Employment · Military · Project SEARCH plus ASD Supports

Abbreviations

α	Alpha
ABA	Applied Behavior Analysis
ANOVA	Analysis of variance
ASD	Autism Spectrum Disorder
BIPOC	Black, Indigenous, and People of Color
CBET	Community-Based Employment Training
CI	Confidence Interval
CIE	Competitive Integrated Employment
CONSORT	Consolidated Standards of Reporting Trials
$\leq$	Less than or Equal to
ID	Intellectual Disability
IEP	Individualized Education Plan
IRB	Institutional Review Board

p	Probability value
Pre-ETS	Pre-Employment Transition Services
PS + ASD	Project SEARCH plus ASD Supports
SIS-A	Support Intensity Scale–Adult Version
SRS-2	Social Responsiveness Scale, 2nd Edition
VR	Vocational Rehabilitation
WINTAC	Workforce Innovation and Technical Assistance Center
WIOA	Workforce Innovation and Opportunity Act

Youth with autism spectrum disorder (ASD) experience unique challenges related to post school employment outcomes. Competitive employment rates for individuals with ASD, regardless of intellectual ability, reportedly range between 4.1 and 11.8% (Shattuck et al., 2012). Across the ability spectrum, individuals with ASD have lower rates of participation in vocational or technical education, employment, and post-secondary education in 2 or 4-year programs than their peers with other disabilities. Findings indicate individuals with ASD continue to have significant challenges in all environments related to social interaction and communication into adolescence and adulthood (Roux et al., 2015; Shattuck et al., 2012; Taylor & Seltzer, 2011). Military offspring present a particular risk for poor outcomes due

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to the mobile nature of their parents' jobs (Davis & Fink, 2015; Davis et al., 2016; Hall, 2018; Lincoln & Sweeten, 2011). This greatly impacts the individual with ASD who may not be able to access programs to assist them in the transition to employment as well as their parents, who may not be able to take advantage of promotions that involve moving. With an estimated 34,361 military dependents with ASD, 20,735 of them dependents of active-duty military families, the lack of viable interventions for this population is an important research topic to address (U.S. Department of Defense, 2021). The objective of this paper is to present the results of a study of the impact of Project SEARCH Plus ASD Supports (PS + ASD) on the employment outcomes of military dependent and connected youth with ASD.

Review of the Literature

Competitive Employment Outcomes for Youth With ASD

Individuals with ASD display comparatively low rates of competitive employment versus individuals without disabilities and other disabilities (Alverson & Yamamoto, 2017; Shattuck et al., 2012). A decade of data from vocational rehabilitation (VR) services indicates that only an average of 37% of adults with ASD become employed within the community (Alverson & Yamamoto, 2017). Instead, over half of adults with ASD (56%) leave high school and end up in segregated work settings such as sheltered workshops making subminimum wage or in segregated non-work alternative settings such as day facilities (Taylor & Seltzer, 2011; Winsor et al., 2019). Providing meaningful work experience during transition-age years (14–21) is critical in combating poor post school outcomes. A plethora of research indicates that paid work experience obtained during high school is a strong predictor of employment after exit (Carter et al., 2012; Siperstein et al., 2014; Wehman et al., 2015). In fact, students with disabilities are 3.8 times more likely to be employed one year after high school if they were employed during high school (Rabren et al., 2002). Findings from the 2015 *National Autism Indicators Report* demonstrated that 90% of youth with ASD employed during high school later reported paid work (Roux et al., 2015). By comparison, only 40% of those who did not have a job in high school later secured paid work. Thus, it is essential that community work experience be prioritized during transition planning for youth and young adults with ASD.

The Impact of Military Life on Youth with ASD

In the face of such poor employment outcomes, the transition-to-work process is challenging for all young adults

with ASD but military dependent youth with ASD face additional challenges (Hall, 2018). Military directed relocations cause frequent breaks in ASD related supports and services. To illustrate, military dependent youth with ASD change schools up to 9 times during K through 12th grade (Davis et al., 2016; The Ohio State University Project Team, 2011). Frequent relocation across different counties, states, and overseas disrupts the continuity of important educational supports due to challenges associated with transferring services in an effective and timely manner (Davis & Finke, 2015). Military families report trouble obtaining previous service records for their child, discrepancies in quality of services across locations, and having to transfer academic plans that were written specifically for other locations (Davis & Finke, 2015; Davis et al., 2016). Service barriers such as these present real cause for concern as military dependent children with ASD have a documented need for ongoing supports. For instance, Davis et al. (2016) found that 97% of military parents surveyed reported that their child with ASD had a medium to high need (versus no or low need) of at least one educational or behavioral intervention. In addition, 78.6% of military parents reported delayed access to services for their child with ASD following relocation (Davis et al., 2016). Further, military dependent youth with ASD are not a small population. Recent data from TRICARE, the health insurance provided to military families by the United States Department of Defense, indicate that approximately 34,361 military dependents had autism, with approximately 20,735 of that total number being dependents of active-duty military families (U.S. Department of Defense, 2021). Despite these facts, military dependent youth with ASD remain an understudied population (Davis & Finke, 2015). To date, there is a paucity of research within the extant literature investigating effective interventions for transition-age military dependent youth with ASD that lead to competitive employment.

Evidence-Based Pathways to Employment for Youth with ASD

Several evidenced-based pathways to employment are currently recognized for non-military dependent youth with ASD, such as employment internships (Schall et al., 2020). In 2014, the Workforce Innovation and Opportunity Act (WIOA) mandated VR agencies to allocate at least 15% of funding toward pre-employment transition services (Pre-ETS) for youth and young adults with disabilities (Workforce Innovation and Technical Assistance Center, [WINTAC], 2019). This created more opportunities for transition-age students with disabilities to obtain work-based learning experiences, such as paid and unpaid internships, integrated within the community to the maximum extent possible (U.S. Department of Labor, 2018; WINTAC, 2019). The U.S. Department of Labor (2018) conceptualizes an internship

as a temporary position that is primarily for the purposes of education and should therefore provide the type of training typically offered by an educational institution. Internships should thus provide beneficial learning opportunities as part of academic coursework or performed for educational credit (U.S. Department of Labor, 2018). Thus, employment internships are commonly utilized by adolescents and young adults as they prepare to exit secondary school and transition to paid work.

Project SEARCH

Project SEARCH is a 9-month intensive internship program recently identified as one of nine evidenced-based special education practices for transition-age students with disabilities (Rowe et al., 2021). Project SEARCH is comprised of a number of core components including workplace immersion, a supported employment approach with assessment, job development and job-site training, follow-along support, braided funding, and focus on meeting the needs of a host business (Rutkowski et al., 2006). Central to the Project SEARCH model is a collaborative effort among multiple agencies (e.g., host business, local education agency, community rehabilitation program, state VR) which together provide a valuable system of vocational opportunities, funding, and employment and educational support (Almalki, 2021). Students who participate in Project SEARCH receive 180 h of classroom instruction and 720 h of applied experience in a work setting (Christensen & Richardson, 2017; Christensen et al., 2015). During Project SEARCH, students work with educators and employment service providers to develop two to three individualized internship rotations within a host business that meets that student's vocational preferences, interests and strengths (Almalki, 2021). Students thus leave the internship with extensive work experience, a curated resume, employment references, and already established connections to adult services agencies, such as VR, to promote a seamless transition to work (Project SEARCH, 2018).

Project SEARCH Plus ASD Supports

Compared to people without disabilities and other disabilities, individuals with ASD have unique learning and sensory needs that can pose substantial barriers to securing and maintaining employment (Alverson & Yamamoto, 2017; Harmuth et al., 2018). These include communication and social difficulties, challenges fitting within certain work cultures, attitudinal issues from co-workers or supervisors, a lack of proper workplace support from employment agencies, and limited opportunities for upward mobility (Harmuth et al., 2018). PS + ASD is an adapted model designed to meet the specific and unique diagnostic needs associated

with ASD. Evidence-based strategies effective for individuals with ASD are embedded within the internship coursework and on-the-job experiences within the host business to teach social-communication, behavioral, and educational skills necessary for success in an employment setting (Schall et al., 2015; Whittenburg et al., 2020). The PS + ASD model has been tested across multiple randomized controlled trials and resulted in high rates of post internship employment for young adults with ASD (Wehman et al., 2017, 2020; Whittenburg et al., 2020).

To illustrate, findings from two randomized control studies found superior rates of employment after internship exit for participants in PS + ASD compared to peers receiving transition supports as usual (Wehman et al., 2017, Wehman et al., 2020). Wehman et al. (2017) found that 87% of PS + ASD interns were in competitive work one year after internship conclusion compared to only 12% of the control group. Findings from a multi-site randomized control study indicated that 73.4% of PS + ASD interns were employed one year after internship exit compared to 17% of the control group (Wehman et al., 2020). After completing PS + ASD, interns receiving supported employment services on-the-job have been shown to need fewer employment intervention hours, earn higher wages, and demonstrate better job retention rates than peers receiving supported employment who did not participate in PS + ASD (Schall et al., 2015). In addition, youth and young adults who participate in PS + ASD showed lower support needs in a variety of major life domains including health and safety, social, home living and lifelong learning skills over a comparison group (Schall et al., 2020). One preliminary study reported early findings from the implementation of PS + ASD on a military base. Early findings from Whittenburg et al. (2020) discussed the development of 14 internships within a military base and revealed that 83.3% of PS + ASD interns secured competitive employment compared to 0% of a control group. The purpose of the current study is to describe the full sample findings following up from Whittenburg et al. (2020).

Objective of the Current Study and Hypotheses

The objective of this study was to research the impact of PS + ASD on the employment outcomes of military dependent and connected youth with ASD using a randomized clinical trial with a waitlist control group. To accomplish this objective, the research team employed a waitlist cluster randomized controlled trial of PS + ASD for military dependents at Joint Base Eustis Langley, Fort Eustis. The research hypotheses tested in this study were:

- (1) Military dependent or connected young adults with ASD who participate in PS + ASD on a military base will demonstrate a higher rate of employment than those in the control condition.
- (2) Military dependent or connected young adults with ASD who participate in PS + ASD on a military base will earn higher wages on average compared to those in the control condition.
- (3) Military dependent or connected young adults with ASD who participate in PS + ASD on a military base will work more hours per week on average than those in the control condition.

Method

Trial Design

The design and development of this waitlist-controlled cluster randomized clinical trial was developed following the “CONSORT Statement for Randomized Trials of Nonpharmacologic Treatments: A 2017 Update and a CONSORT Extension for Nonpharmacologic Trial Abstracts,” (Boutron et al., 2017). Participants were allocated to the immediate treatment or waitlist on a 1:1 ratio. This research trial was overseen by three institutional review boards (IRBs). The primary IRB was Virginia Commonwealth University, with secondary review provided by the Virginia Department for Aging and Rehabilitative Services, and the Human Research Protection Office of the United States Army Medical Research and Development Command. This study was registered at clinicaltrials.gov as NCT04001790.

Participants

Participants were eligible to participate in the research if they met the following inclusion criteria: (a) have a medical diagnosis or educational eligibility of autism or ASD; (b) are a military dependent or connected youth; (c) are between the ages of 18–21; (d) are entering their final year of public school participation in a participating school district and are on track to receive an individualized education program (IEP) certificate of completion upon exit; (e) possess independent personal hygiene, eating, and basic grooming skills; (f) are able to pass a drug screen and felony check and are willing to have up-to-date immunizations as may be required by internship sites or potential employers; (g) have a desire to gain CIE upon graduation from public school.

A military dependent youth was defined as the child or ward of a parent, stepparent, or guardian who was currently serving on active duty in, on reserves, retired, or medically discharged from the Army, Navy, Air Force, Marines, Coast

Guard, or the National Guard or a parent, stepparent, or guardian who died in service of one of the branches of military listed above. A military connected youth was defined as a person who had:

- (a) A parent or guardian, immediate family member, or any person who lived in the same household who worked as a civilian on a military base, as a federal employee who provided work or services to a military base or whose office was located on a military base, or who was contractor to a military base;
- (b) An immediate family member other than the parent or guardian, or any person who lived in the same household who was serving on active duty in, on reserves, retired, or medically discharged from the Army, Navy, Air Force, Marines, Coast Guard, or the National Guard;
- (c) An immediate family member other than the parent or guardian or any person who lived in the same household who died in service of one of the branches of military listed above.

Participants were excluded if they were unable or unwilling to provide consent. Participants who were not their own legal guardian were excluded if their legal guardian was not able or willing to provide consent and/or if the potential participant was unable or unwilling to provide assent.

Interventions

The interventions compared in this study were PS + ASD for military connected and dependent youth versus high school as usual. Each intervention is described briefly below.

PS + ASD for Military Dependent and Connected Students

PS + ASD, as previously described, was the 9-month intervention that involved the delivery of the Project SEARCH model with the addition of an array of applied behavior analytic interventions to meet the needs of youth with ASD (Daston, et al., 2012; Wehman et al., 2017, 2020). Project SEARCH is a transition program that focuses on teaching youth with significant disabilities employment skills and behaviors by immersing them into a large business environment. In addition, youth in the program identify career goals and rotate through three 10–12-week internships where they learn skills to accomplish those career goals. The business’ needs for entry level employees drive the opportunities provided in the program so that participating youth are learning skills in needed fields that match their career goals. The program is collaboratively funded and staffed by educational and adult services agencies. Finally, the goal of the program

is for participating youth to gain CIE upon or soon after their graduation as they frequently graduate with a resume and references from the business site. In addition to specific job skills, participants also learn important life skills that will increase their ability to gain and maintain CIE like transportation to and from work, clothing management for work, and money management for daily work experiences, such as buying lunch and taking public transportation to and from work.

Wehman and et al., (2017, 2020) developed an array of interventions and supports to meet the unique needs of youth with ASD seeking CIE. ASD supports included a higher ratio of professionals and paraprofessionals to interns. Project SEARCH usually has 3 to 4 students to every professional or paraprofessional staff member. PS + ASD has a lower student to staff ratio with 2 to 2.5 students to every staff member. This resulted in a higher amount of direct instruction available to participants with ASD (Wehman et al., 2020). In addition, job coaches and educational staff were trained in and used applied behavior analytic instructional techniques to meet the learning needs of youth with ASD.

This iteration of the model was delivered on Fort Eustis Military Base. This was the second Project SEARCH model to be delivered on a military base, and the first to specifically target military dependent and connected youth with ASD. The military component added to the PS + ASD model was to provide the intervention on a military base and include specialized planning to address military related relocations or deployments that might directly affect these youth. This aspect addressed the needs of the military dependent and connected youth participants and their family members.

Implementation, Oversight, and Research Teams

This clinical trial was a community-based trial with an implementation team who ensured the delivery of the intervention, an oversight team who supported program implementation, and a research team that supervised data collection and analysis.

The Implementation Team This team was composed of those individuals who implemented PS + ASD daily. They were the classroom teacher and paraprofessional educator, the assigned job coach, and the site coordinator. The implementation team met daily or more to implement PS + ASD and meet the needs of the participants. They received intensive initial training in the PS + ASD model and routinely received additional training based on the needs of the participants. Additional training included the implementation of specific individualized social communication instruction and positive behavior support plans. In addition, the implementation team regularly met with a positive behavior support facilitator and/or a board-certified

behavior analyst to provide additional individualized supports to students with ASD who had higher intensity needs. This aspect of support to the implementation team ensured that ASD supports were delivered with fidelity to the participants.

Individuals on the implementation team were previously trained and certified in their respective fields. The special educator was a certified teacher in the state with a bachelor's degree in special education and experience teaching in a public high school. The job coach had a bachelor's degree in an unrelated human services field and completed the Association of Community Rehabilitation Educators certificate of achievement in employment services with an emphasis on customized employment, at the professional level. The professional level certificate of achievement requires 40 h of training and a minimum of one year of employment service experience (Association for Community Rehabilitation Educators, 2013). The site coordinator received a master's degree in special education and was a certified teacher as well. In addition, all team members received approximately 40 additional hours of training in the PS + ASD model by the research director and Project SEARCH state coordinator, as well as 16 h of training from Erin Riehle, one of the developers of Project SEARCH (Rutkowski et al., 2006).

The Oversight Team The second team was the oversight team. This team was composed of representatives from the military base, the three participating school divisions, the regional education program, the employment services organization providing job coaching services, and the VR case managers. This team met monthly to oversee the implementation of the program and plan for upcoming events like recruitment of new participants. The implementation and oversight teams are standard operations teams in the PS + ASD model and were funded through regular funding streams including federal, state, and local education and VR service funds. The members of the oversight team each had their own professional training related to their primary job assignment. As a group, they received approximately 8 h of training in the PS + ASD model.

The Research Team The third team was the research team. This team ensured that the research aspect of the model was carried out using ethically sound research practices. They were also responsible for ensuring the training of an independent data collector and the implementation of all aspects of the research project. This third team was only present for research purposes and was funded by the research grant. This team received post graduate training in research ethics and methodology. They included two Ph.D. level researchers, one of whom was also a board-certified behavior analyst. Both researchers were experienced in the PS + ASD model, having implemented it in previous studies and hav-

ing developed the ASD supports for the model (Wehman et al., 2017). Figure 1 shows how these teams interacted and ensured communication.

Measures of Fidelity

Fidelity of implementation to the intervention was monitored in multiple ways. Those ways included monthly monitoring by the project coordinator who was the Virginia Project SEARCH state coordinator, review by the developers of Project SEARCH from Cincinnati Children's Hospital, monitoring of daily operations by the trained site coordinator, and monthly review by the research director and principal investigator. Fidelity reviews included a review of daily practices and program implementation, monthly collaboration and interaction between partners, and yearly implementation of the PS + ASD model. Reviews were detailed and ensured that all participants had access to embedded internships that taught the intern high demand job skills. In addition, each internship was monitored to ensure close communication between program staff and business site mentors. The research staff also reviewed student data, including scored task analyses and intern ratings completed by the employees of the business to ensure intern progress. Finally, the research staff monitored staff implementation of ASD supports through observations and interviews. Project SEARCH has its own fidelity checklist which was used to ensure adherence to Project SEARCH fidelity of implementation (see <https://www.projectsearch.us/core-model-fidelity>). The ASD supports fidelity checklist is presented in Fig. 2. When fidelity indicators

were not met, the research director retrained the staff who failed to implement the fidelity item missed. This occurred three times during the implementation of the project. Each time, the staff member achieved fidelity after one retraining session.

High School as Usual

The high school condition in this study was considered the control arm of the waitlist cluster randomized controlled trial. Participants who were assigned to the high school arm of the study received educational services at their assigned local high schools. They attended classes as planned in their IEPs. These participants were not restricted from any services for which they might be eligible, including community-based employment training (CBET). The independent data collector collected copies of participants' IEP documents to develop adequate descriptions of the differences between the PS + ASD model and high school.

Measures

To measure the effect of PS + ASD on the research hypotheses posed, the research team collected key baseline and outcome data using two researcher made surveys and two standardized measures of ASD and general support needs.

Researcher Made Baseline Survey

The baseline survey asked participants' age in years and months, gender, race, military connection of both parents,

Fig. 1 Collaboration between the Three PS + ASD Teams

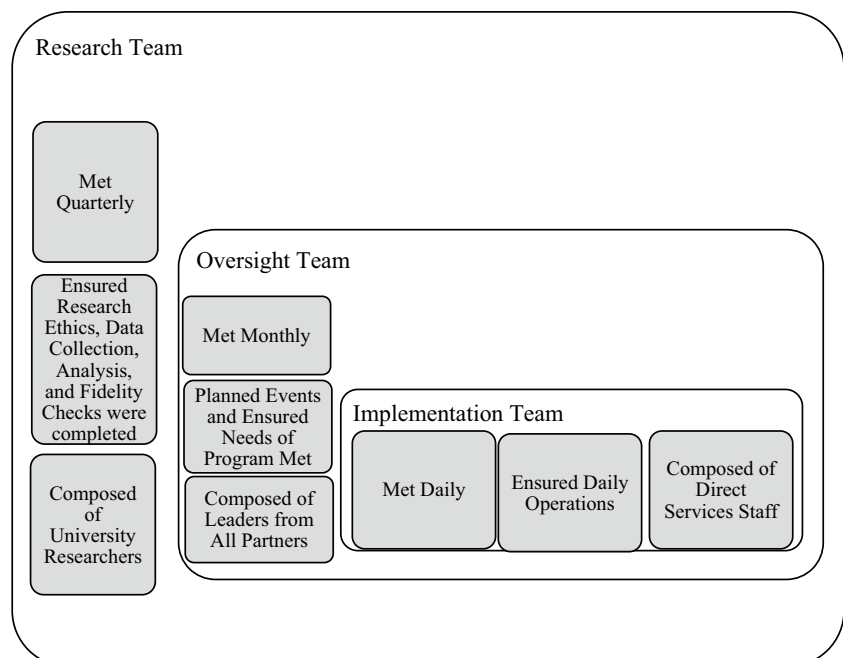


Fig. 2 PS + ASD Fidelity Checklist*PS + ASD Fidelity checklist*

Meeting the Unique Needs of Young Adults with Autism Spectrum Disorder Components	
Program Component	Indicators of Treatment Fidelity
On-Site Systematic Instruction	1. Job coaches design, implement, and evaluate customized employment strategies (modifying, eliminating, or adding job duties) to design job descriptions and tasks to eliminate acquisition or performance issues affecting the individual's ability to successfully complete the job to employer's satisfaction. 2. Job coaches design, implement, and evaluate advanced stimulus control procedures (discrimination and generalization) to address job performance problems. 3. Job coaches design, implement, and evaluate self-management procedures, including self-monitoring, self-reinforcement, and self-instruction strategies, to address job performance problems. 4. Job coaches use devices, technologies, etc. to enable individuals to perform tasks to employer accuracy and production strategies. 5. Job coaches use stimulus transfer strategies to fade control from training stimuli to the naturally occurring supervision activities on the job site.
Behavior Specialist On-Site Support	1. Behavior analyst/behavior support facilitator meets with staff at least bi-weekly to review student progress, analyze any problem behaviors or social skill deficits, plan interventions as needed. 2. Behavior analyst/behavior support facilitator observes students on internship sites to complete functional behavior assessment as necessary. 3. Behavior analyst/behavior support facilitator observes in classroom to ensure the development and delivery of intensive applied behavior analysis in the delivery of instruction. 4. Behavior analyst/behavior support facilitator develops behavior intervention plans and social skill instruction for individual students as necessary. 5. Behavior analyst/behavior support facilitator trains direct staff in the implantation of plans.
Intensive Staff Training	1. Each teacher and job coach participates in 80 hours of training prior to serving students in the internship sites. 2. Training is based on the Project SEARCH implementation manual and Virginia Commonwealth University materials specific to the serving students with autism spectrum disorder in community settings. 3. Each teacher and job coach shadows an experienced trainer for four days prior to providing service to students. 4. Each teacher and job coach is observed weekly and receives feedback on their performance.

income level of the family home, medical diagnosis, primary and secondary IEP category, last measured intelligence quotient score, number of paid jobs and unpaid work experiences prior to enrollment in the study, and hours per week spent in CBET in the previous and current school years. This information was collected in an interview format or by asking the individual or their caretakers to complete the survey via paper and pencil. If data were collected using the latter format, participants and caretakers were provided with a self-addressed stamped envelope to return the survey. The surveys did not contain names, but only contained an

assigned study identification number, thus, the independent data collector was not able to link survey responses to individual participants. This baseline survey was completed between September and October of the year in which the participant was participating in the research.

Researcher Made Outcomes Survey

The researcher made outcomes survey asked participants' current employment status, descriptive information regarding the current employment status (where employed, job

title, duties assigned, date of hire), whether the participant was employed with or without support, hourly wage earned, hours worked weekly, and employment benefits earned as part of employment. This survey also updated any changes in the participant's military dependent or connected status. This survey was completed at 12 and 18 months after the baseline survey. This was also collected by the independent data collector in the same manner as the baseline survey.

Social Responsiveness Scale, 2nd Edition (SRS-2)

The SRS-2 is a 65-item scale that has been used as a measure of treatment effectiveness in recent studies (Aldridge et al., 2012; Booker & Starling, 2011; Constantino & Gruber, 2012; Gantman et al., 2012). Gantman et al. (2012) reported the psychometrics of the SRS-2 by noting that the SRS-2 Adult Form was normed on a sample of 2210 reports of 702 adults aged 18 to 59. For the purposes of this study, the SRS-2 was used to confirm the presence of ASD and measure the impact of social communication and behavioral traits associated with ASD on participants in each group.

Support Intensity Scale—Adult Version (SIS-A)

The SIS-A (Thompson et al., 2004) is an interview-based assessment tool that identifies the type, amount, and frequency of support required by individuals with significant disabilities, including persons with ASD, to perform 57 life activities. An additional 28 items address behavioral and medical support needs. The assessment is completed through an interview with the individual, as well as family, school, and community members with in-depth knowledge of the individual. The assessment generates a composite scale score and individual scale scores in the areas of home living, community living, lifelong learning, employment, health and safety, and social activities domains. For the purposes of this study, the SIS-A was completed at baseline and used as a descriptive and clinical tool to understand the support needs of participants.

Recruitment and Sample Size

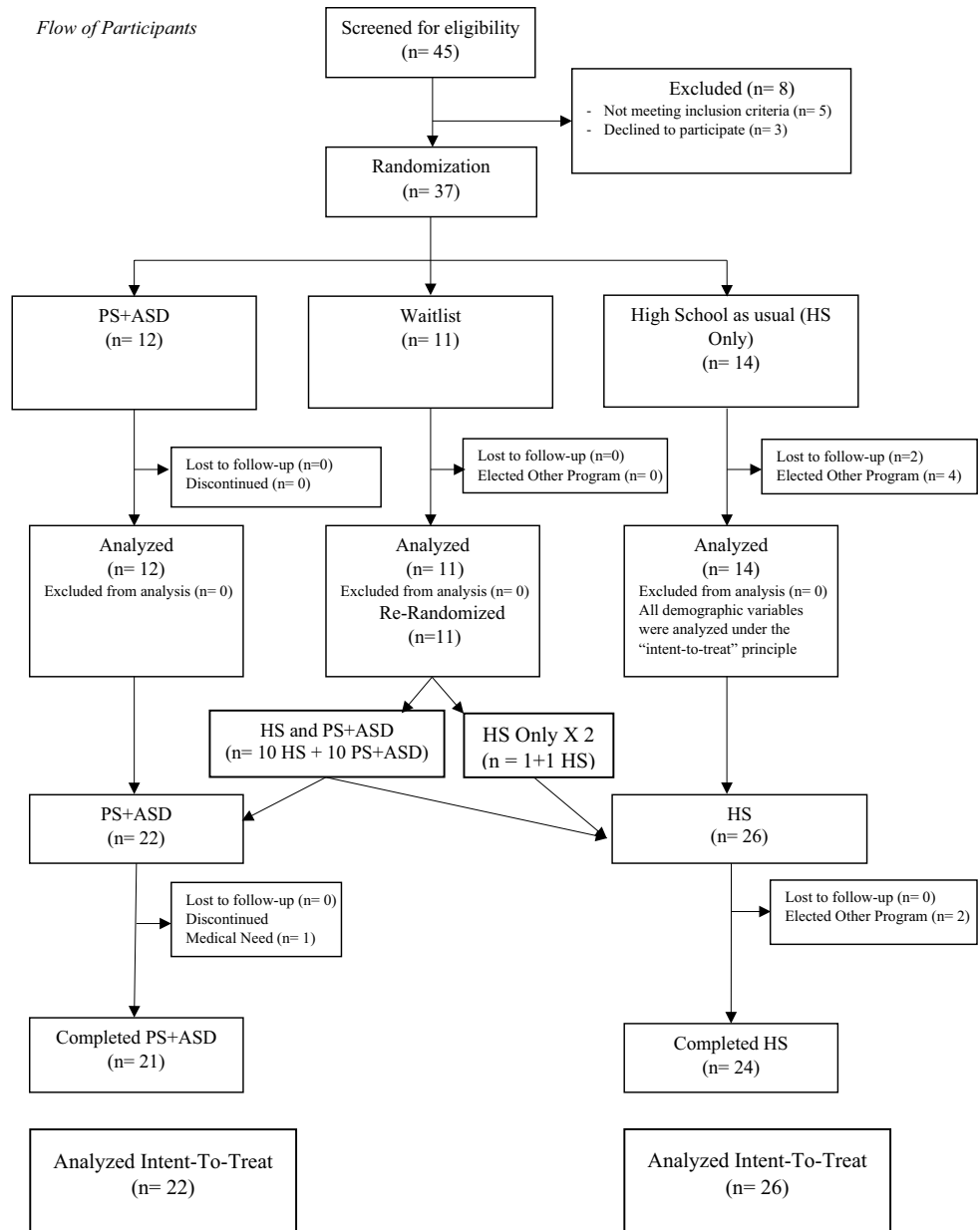
Recruitment occurred within the three participating school divisions and one regional education program who provided school services to students of military families near Fort Eustis Military Base. The school divisions sent students with ASD and challenging behaviors to the regional program due to their inability to meet the student's educational needs in the home school district. Those students from the regional program were coded to note their regional program participation but were counted as students from their home school district. Recruitment occurred between February and June of the year preceding participants' participation in the

study. Potential participants were recruited through flyers sent home and during discussions at IEP meetings where the flyer was provided. Potential applicants were also invited to an informational meeting where the study was described. Interested participants completed an application to attend the program. Once the application was received, project research staff met with potential participants and their family members/caretakers to complete the consent or consent/assent process. Participants who were assigned legal guardians by a court completed the assent process, while their legal guardians completed the consent process on their behalf. After completing the consent process, all applications were screened to ensure eligibility for the study. Once consent and screening were completed, potential participants were interviewed by the oversight committee. This interview process is a standard practice in PS + ASD.

The planned sample size identified for this waitlist cluster randomized controlled study was 32, with 16 in the PS + ASD group and 16 in the control group. The planned sample size of the study was determined a priori to have greater than 0.80 power to detect significant differences in two sided tests ($\alpha \leq 0.05$) between the treatment and control groups.

Randomization

Randomization was completed by using a random numbers list with each enrolled participant being assigned one of the random numbers. Participants were assigned groups using a digital random number generator. Participants were randomized by computer into the immediate PS + ASD group or the waitlist group. Waitlisted participants were not guaranteed automatic acceptance into the PS + ASD group in the next year. Instead, they were combined with all newly enrolled participants for re-randomization. Some of the individuals who were randomized into the waitlist group were not eligible for the second randomization due to their age. Thus, this randomization scheme resulted in three groups that, after confirming no statistically significant differences between these three groups, were combined into two groups. The initial three groups were PS + ASD immediate treatment group, high school to second randomization group, and high school only group. It is important to note that 11 participants were enrolled in the high school to second randomization group and participated in two different cohorts of the study. This resulted in 10 participants who had one year of high school and one year of PS + ASD and one participant who had two years of high school. Because of their participation in two cohorts, these 11 participants are represented in each cohort in which they participated. Each of these groups are depicted in the flow of participants through the study in Fig. 3.

Fig. 3 Flow of Participants

Blinding was not possible in this study due to the need to interview participants, their teachers, job coaches, and caretakers. To mitigate the influence that bias might have on the results, the research team employed an independent data collector who was not a part of the implementation or research teams. This individual completed all interviews, collected, scored, and logged all data in a secure digital database. To ensure correctness of the digital database, all paper copies of questionnaires and interviews were also securely stored and regularly cross checked with the digital database.

Statistical Methods

Data reporting was consistent with the recommended CONSORT guidelines (Boutron et al., 2017). Participant demographic and descriptive data are presented as means and/or percentages with standard deviations and ranges noted. Comparisons within and between groups were completed through the analysis of variance (ANOVA), chi-square, and standard t-test statistical procedures as required by the type of data analyzed. All p-values reported were considered significant if meeting a measured value of ≤ 0.05 . Effect sizes are reported using a Hedges g procedure due to the sample size presented.

Results

Implementation of the research procedures described above resulted in the recruitment of 45 individuals who were screened for eligibility in the study. Eight of those potential participants were excluded with five who did not meet inclusion criteria, and three who declined to participate. This resulted in the cluster randomization of 37 participants into the three groups depicted in the Flow of Participants Through the Study (Fig. 3). Once enrolled, all participants were included in analysis under the “intent-to-treat” principle. After randomization, one participant in PS + ASD dropped from the study after requiring intensive medical intervention due to a seizure disorder, two individuals who were assigned to the high school group were lost to follow-up, and six individuals in that group dropped from the study to participate in other activities outside of the two programs in this study.

Recruitment for this study occurred in three school years (2017–2018, 2018–2019, and 2019–2020). As noted, three school divisions participated in the program, but one school division hired and supervised the PS + ASD classroom teacher and paraprofessional educator. Consequently, the partner school divisions agreed to allow that school division’s cluster of potential students be awarded most slots in the program. This resulted in four of six in 2017–2018, six of eight in 2018–2019, and six of eight in 2019–2020 school year slots going to that school division’s students. Even so, that school division was the largest in the study and had the most students apply and qualify to participate. Consequently, despite this cluster randomization scheme that favored the larger school division, the randomization ratio for all clusters was approximately 1.0 with cluster ratios ranging from 1.25 to 0.75. Finally, this recruitment strategy resulted in the enrollment of 22 (59.5%) military dependents and 15 (40.5%) military connected youth with ASD. Table 1 presents the recruitment and data collection schedule for each of the three participating cohorts.

The study procedures described above were significantly impacted by the COVID-19 crisis in the 2019–2020 school year. Specifically, the third cohort of participants were only able to attend 6.5 of the 9-month intervention in-person prior to the Governor of Virginia closing all school programs to in-person learning. In addition, the military base was closed

to all non-essential off-base personnel and many of the internship sites were also closed. The impacts caused by this disruption and a comparison between cohorts was presented in another paper describing the impact of this global crisis on intervention implementation and employment outcomes. The protocol change has also been taken into consideration in this analysis of outcomes and serves as a limitation to findings as well.

Baseline Data

A comparison of the participants across the three initial groups on the demographic variables of age, gender, race, and family income was completed using chi-square and t-test comparison of means. These analyses found no significant differences between the three groups on these variables. Demographic data are presented in Table 2.

Given that the groups were balanced across these demographic variables, the three groups were then analyzed for outcomes by intervention assignment into PS + ASD or high school as depicted in Fig. 3. Because there were 11 participants who had two years of participation in the research, this resulted in a final *N* of 48 with 22 in the PS + ASD group and 26 in the high school group. The clinical characteristics of these two groups at baseline are presented in Table 3.

These data show that the PS + ASD group and the high school group were balanced on every variable with no statistically significant differences noted. All but 10 participants had a medical diagnosis of ASD, and all but four received special education services under the category of autism, while 41 (85%) reported having both a medical diagnosis and educational eligibility. In addition, only 10 participants reported full scale IQ scores. None of the IQ scores provided were in the average or above range. Those who provided an IQ score did not overlap with those who identified as having an intellectual disability (ID) as a medical diagnosis or educational eligibility. So, a total of 17 (35%) participants reported having an ID in addition to autism. In addition to ASD, 13 (27%) participants reported other medical and psychiatric conditions. Those conditions included seizure disorder, fragile X genetic syndrome, attention deficit-hyperactivity disorder, schizophrenia, sensory processing disorder, fetal alcohol disorder, post-traumatic stress disorder, oppositional defiant disorder, and obsessive-compulsive

Table 1 Research Activities Timeline for Each of the Cohorts

	Recruitment, Screening and Enrollment, Randomization	Baseline	12-Month Follow-up	18-Month Follow-up
Cohort 1	March–June 2017	Sept.–Oct. 2017	Sept.–Oct. 2018	March–April 2019
Cohort 2	March–June 2018	Sept.–Oct. 2018	Sept.–Oct. 2019	March–April 2020
Cohort 3	March–June 2019	Sept.–Oct. 2019	Sept.–Oct. 2020	March–April 2021

Table 2 Demographic Baseline Data

Demographic variable	PS + ASD n = 12	Waitlist n = 11	High school only n = 14	Total sample n = 37	<i>p</i> -value
Age					0.261
Mean	19.42	19.9	19.58	19.59	
Sd	1.01	0.77	1.27	0.99	
Range	18.00–21.67	18.58–20.75	18.00–20.75	18.00–21.75	
Gender %					0.182
Male	8 (67%)	11 (100%)	11 (70%)	30 (81%)	
Female	4 (33%)	0	3 (21%)	7 (19%)	
Other	0	0	0	0	
Race					
Black	7 (58%)	5 (45%)	4 (29%)	16 (43%)	0.224
White	5 (42%)	5 (45%)	8 (57%)	18 (49%)	0.1
Latinx	0	1 (9%)	1 (7%)	2 (5%)	0.478
Asian American	0	0	1 (7%)	1 (3%)	0.598
Family Income*					0.535
< \$20,000	0	1 (9%)	2 (14%)	3 (8%)	
\$20,000–\$49,999	2 (17%)	2 (18%)	0	3 (8%)	
\$50,000–\$99,999	3 (25%)	1 (9%)	1 (7%)	5 (14%)	
\$100,000–\$149,999	1 (8%)	1 (9%)	3 (21%)	5 (14%)	
> \$150,000	2 (16%)	0	0	2 (5%)	
Missing	4 (33%)	6 (55%)	8 (57%)	18 (49%)	

*Only 19 participants elected to share their family income

disorder. A comparison across groups regarding the type and number of co-morbid disorders yielded a non-significant chi-square *p*-value of 0.609. With respect to their support intensity needs, these participants ranged from having limited to extensive support needs. According to the support intensity grid developed by Luckasson, et al. (1996), such individuals display support needs across several settings, require regular to high frequency support, and have a mix of natural to service-based supports. These individuals also display a lesser degree of choice and autonomy.

Treatment and control participants did not display significantly different work histories at baseline with respect to either paid or unpaid prior work experience (Table 3). The mean number of weekly hours participants spent in CBET during the school year prior to participation in this research study was low for both groups (PS + ASD $M = 7.23$ h; high school $M = 8.03$ h), with no significant difference observed. While PS + ASD participants reported a significantly higher number of average weekly CBET hours at baseline than high school group participants (34.76 vs 9.38 respectively), these data do not indicate a difference in relevant experience across groups. Interviews collecting this data were conducted during the beginning of the academic school year, so reports of “current” CBET hours reflect only what participants

were projected to receive during the upcoming school year. What is noteworthy about this information is that the PS + ASD group received a substantially large increase in CBET hours from prior to current years while the high school group did not experience an increase of similar magnitude across years.

12- and 18-Month Follow-up

Employment outcomes were measured at 12-months and 18-months after baseline. At both time points, PS + ASD participants displayed higher rates of employment, earned higher hourly wages, and worked more hours per week than the high school group at $p < 0.001$ level of statistical significance. These data are depicted in Table 4. Of the 20 PS + ASD participants, approximately 60% were employed at both 12-months and 18-months. In contrast, only one of the 18 participants in the high school group were employed in sheltered work, while none were employed in CIE at either timeframe. While an odds ratio could not be calculated for the 12-month data collection point because of no employment outcomes for the control group, the PS + ASD group had 12.00 odds ratio (95% CI 1.28–115.36) of achieving employment at the 18-month data collection point. In short, those who participated in PS + ASD had a 12 times greater chance of gaining CIE than their peers in high school.

Table 3 Clinical Variables Across PS + ASD and High School Groups

Variable	High school <i>n</i> = 26	PS + ASD <i>n</i> = 22	Total <i>n</i> = 48	<i>p</i> -value
Medical diagnosis*				χ^2
Autism	12 (42%)	13 (59%)	25 (50%)	0.371
ASD	3 (11%)	7 (31%)	10 (20%)	0.085
PDD-NOS	2 (7%)	1 (5%)	3 (6%)	0.654
Aspergers	1 (4%)	1 (5%)	2 (4%)	0.904
Missing	10 (36%)	0	10 (20%)	
Educational eligibility*				χ^2
Autism	19 (68%)	20 (91%)	39 (78%)	0.115
Intellectual disability	3 (11%)	3 (13.6%)	6 (12%)	0.827
Other health impaired	1 (4%)	2 (9%)	3 (6%)	0.454
Multiple disabilities	1 (4%)	1 (5%)	2 (4%)	0.904
Missing	4 (14%)	0	0	
Reported intelligence quotient**	59.75 (11.84)	62.17 (2.93)	61.2 (7.28)	<i>t</i> -Test 0.714
Support intensity scale**				<i>t</i> -Test
Support needs index	78.95 (5.93)	76.64 (5.75)	77.71 (5.88)	0.214
Minimum–maximum score	67–89	63–90	63–90	
Social responsiveness scale, 2 nd Ed**				<i>t</i> -Test
Total score, t-score	67.32(11.41)	61.81 (9.85)	64.63 (10.84)	0.110
Minimum– maximum score	41.00–88.00	49.00–83.00	41.00–88.00	
Social awareness, t-score	62.79 (12.73)	58.10 (9.18)	60.33 (11.19)	0.194
Social cognition, t-score	69.63(11.79)	64.00 (9.49)	66.68 (10.86)	0.103
Social communication, t-score	64.00 (10.99)	60.29 (9.89)	62.05 (10.46)	0.268
Social motivation, t-score	62.26 (11.27)	56.71 (8.63)	59.35 (10.23)	0.087
Restricted interests and repetitive behaviors t-score	70.16 (13.99)	63.90 (13.20)	66.87 (13.77)	0.154
DSM-V social communication and interaction	66.05 (11.389)	60.86 (9.23)	63.33 (10.51)	0.120
DSM-V restricted interests and repetitive behaviors	70.16 (13.989)	63.90 (13.19)	66.87 (13.77)	0.154
Prior paid work experience***	0.21 (0.41)	0.09 (0.29)	0.15 (0.36)	<i>t</i> -Test 0.292
Prior unpaid work experience***	0.16 (0.37)	0.09 (0.29)	0.12 (0.33)	<i>t</i> -Test 0.524
Prior school year weekly hours in CBET***	8.03 (5.49)	7.23 (5.26)	7.60 (5.32)	<i>t</i> -Test 0.637
Current school year weekly hours in CBET***	9.38 (6.35)	34.76 (1.09)	23.41 (13.48)	<i>t</i> -Test < 0.001

*Reported as *n* (percentage of group)

**Reported as standard score (standard deviation)

***Reported as mean (standard deviation)

Table 5 provides a description of employment outcomes. At the 12-month data collection point, 13 of the 21 PS + ASD participants were competitively employed within the community. These participants mainly worked part-time, averaging about 24 h per week. All participants earned at or above federal minimum wage, reporting a mean hourly rate of \$9.38; 29.4% higher than the minimum wage of \$7.25 per hour in Virginia. Of those employed, 46% were federal employees and 15.4% received benefits, including paid leave

(e.g., annual, personal, or sick time), employer provided health insurance, life insurance, retirement, and health savings accounts. Jobs were secured by PS + ASD graduates in five different industry types with the majority representing the hospitality/food services (10.4%) and retail industries (10.4%), along with advisory/information services, arts/entertainment/recreation, and healthcare/social assistance.

At 18 months, 60% of PS + ASD participants were employed within the community working a similar number

Table 4 Treatment and Control Contrasts for Key Outcomes

	Treatment condition			Control condition			Difference	Effect size
Variable	N	Mean	SE	N	Mean	SE	C–T	<i>g</i>
Employment								
12 mos.	20	61.9%	11%	18	0.00%	0.00%	61.9%***	2.33
18 mos.	20	60%	11%	18	0.00%	0.00%	60.00%***	2.33
Hourly wages								
12 mos.	21	6.18	1.02	27	0.00	0.00	6.18***	1.98
18 mos.	21	6.05	0.99	27	0.00	0.00	6.05***	1.99
Hours per week								
12 mos.	21	0.52	0.11	27	0.04	0.04*	0.49***	1.30
18 mos.	21	0.38	0.11	27	0.04	0.04*	0.34**	0.94

The value displayed for t-tests are the differences in the means across the groups. For employment (a dichotomous measure), a two-sample test of proportions was used

*There was one control condition subject who reported 12 h weekly employment in sheltered vocational work but did not know the hourly wage due to piece rate sub-minimum wages earned

*** $p < .001$. ** $p < .01$

Table 5 Descriptive employment outcomes

	PS+ASD			HS		
Variable	<i>n</i>		%	<i>n</i>		%
Employed						
12 mos.	21		61.9	18		0
18 mos.	20		60.0	10		10%
Benefits Earned						
12 mos.	13		15.4	—		—
18 mos.	12		16.7	—		—
Federal Employment						
12 mos.	13		46.2	—		—
18 mos.	12		58.3			
Industry Employed						
12 mos.						
Advisory, Information Services	13		2.1	—		—
Arts, Entertainment, Recreation	13		2.1	—		—
Healthcare, Social Assistance	13		2.1	—		—
Hospitality Food Service	13		10.4	—		—
Retail	13		10.4	—		—
18 mos.						
Advisory, Information Services	12		3.3	—		—
Arts, Entertainment, Recreation	12		3.3	—		—
Healthcare, Social Assistance	12		3.3	—		—
Hospitality Food Service	12		20.0	—		—
Retail	12		10.0	—		—
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>
Weekly Hours Worked						
12 mos.	12	24.42	5.99	18	—	—
18 mos.	12	25.71	6.23	10	0.04	—
Hourly wage						
12 mos.	13	9.38	1.57	18	—	—
18 mos.	12	8.82	0.94	10	—	—

of average hours per week (25.71) as at 12 months (24.42) and reporting a slightly lower hourly wage with an average of \$8.82 compared to 12 months (\$9.38). Over half (58.3%) were federal employees and 16.6% reported receiving employer sponsored benefits. The majority were still working in the hospitality/food services (20%) and retail industries (10%) as was observed at the 12-month data collection period.

Military Supports: Relocation and Deployment Plan

As described earlier, interruptions in services for military dependents with ASD often occur due to military family member deployments and relocations (i.e., permanent changes of station; Davis et al., 2016; The Ohio State University Project Team, 2011). To mitigate potential disruptions that research participants could experience in the event of relocations and deployments, the implementation and research teams, with vetting by the grant's advisory committee, developed a relocation and deployment plan to facilitate successful transitions to new locations. The relocation and deployment plan was used once during the course of the study, when two active-duty parents of a treatment group participant received orders to deploy overseas approximately one year after the participant completed the PS + ASD program. At that time, the participant was employed on base. Because of their deployment, that individual's parents arranged for him to live with extended family members in another state while they deployed. The relocation and deployment plan provided the participant and his family with information to facilitate connections with the VR agency in the new state and highlighted the participant's career development and employment accomplishments, in order to assist employment service providers and potential employers in quickly recognizing the participant's strengths, interests, and previous work experiences. The plan included the participant's current resume, a video resume in which the participant demonstrated work skills he learned during his internships, letters of reference from his internship supervisors and employer, current certifications (e.g., food handlers first aid/CPR), and awards given to the participant for exceptional performance by the installation's medical center commander and PS + ASD staff. The implementation team met several times with the participant and his family prior to their deployment to review the contents of the relocation and deployment plan and to support the family in contacting the state vocational rehabilitation agency. These efforts resulted in the quick opening of a VR case when the participant arrived in the new state.

Discussion

Findings from the current study confirm previous results regarding the PS + ASD model with a new population, military dependent and connected youth with ASD. These findings mirror previous studies and were maintained across the significant employment and economic challenges posed by the COVID-19 pandemic. The PS + ASD group had 12 times higher odds of gaining CIE than their equal peer control group who attended high school. The study included outcomes at 12 and 18 months. Beyond CIE acquisition, these findings indicated employment retention associated with PS + ASD. Further, the acquisition of federal employment was also an important outcome. Specifically, the advantage of gaining a federal position implies greater employment stability and portability across the United States (Civil Service Success, 2020). In addition, the development of the relocation and deployment plan assisted one of the participants to transition to a new state where services were not delayed by waitlists. These results held across a global pandemic and economic crisis. Finally, to our knowledge, this was the first randomized controlled trial where Black, Indigenous, and People of Color (BIPOC) youth with ASD were the majority population representing 51% of participants included in the study. Previous studies indicated disparities in outcome with BIPOC and economically disadvantaged youth having worse outcomes compared to their white and economically advantaged peers with ASD (Eilenberg, et al., 2019). It appears that PS + ASD was effective in mitigating that impact in this study. The question of whether PS + ASD has the potential to be used as an intervention to decrease bias in hiring BIPOC youth with ASD is one for future consideration.

The implementation team had initial concerns regarding the acceptability of some behavioral challenges posed by individuals with ASD on a military base. In fact, they were concerned that the high level of conformity and rule-based behavioral expectations might not be welcoming to individuals with ASD whose behavior might not conform. There was some apprehension that the behavioral challenges presented by individuals with ASD might be incompatible with the behavioral expectations of employees on base. Instead, the opposite was realized. The depth of rules and structure observed on the military base made the teaching of expectations relatively easier for most of the participants in the study (Whittenburg et al., in press). Further, the generalizability of the logistics learned on base were also observed as these interns moved from one internship to the next. If anything, the presence of the PS + ASD program on a military base was a valuable experience for all stakeholders involved.

Limitations

Despite these findings, there are important limitations to the current study that bear consideration. While we opted for the waitlist control group design due to ethical problems associated with denying a successful intervention to control group participants, such a design may inadvertently elevate the treatment effect. Thus, the actual odds ratio to gain CIE after PS + ASD may be slightly less than the measured odds ratio reported in this study and more comparable to other randomized controlled designs such as Wehman et al. (2020), where the odds ratio was calculated between 4.5 and 5.84 at graduation and 1-year follow-up. Nevertheless, PS + ASD was robust in terms of the CIE outcomes achieved by those exposed to the model. A second limitation is the lower number of participants in this study. While we completed a power analysis for this study at the 0.80 level, it is possible that unidentified sources of error were introduced through the recruitment, randomization, and implementation processes. Even so, the equality of the groups across the demographic and clinical characteristics presented in this study suggest the researchers did their best to minimize such sources of error. In addition, the fact that the COVID-19 pandemic differentially affected the cohorts in this study serves as a limitation as well. The final limitation is related to fidelity to the model. While PS + ASD relies upon the provision of applied behavior analysis (ABA) to guide its implementation, ABA itself is largely an individualized problem-solving process that requires a high degree of knowledge, clinical skill, and flexibility across participants as settings and contexts require differentiated interventions (Whittenburg et al., in press). As such, there is a need for increased research regarding the scalability of the PS + ASD model beyond the Project SEARCH program to other similar programs and other populations of individuals.

Generalizability

The degree to which these results are generalizable to other military dependent and connected youth with ASD at other military installations is yet to be answered. While these results are encouraging, caution is urged regarding the wholesale generalizability of these findings. However, as this is the third randomized controlled trial of PS + ASD, and those who participate experience much higher CIE outcomes than their peers with ASD in high school, bears strong consideration of this model as an evidence-based practice for transition aged youth with ASD seeking CIE upon graduation from high school. Indeed, when considering the balance of the benefits provided through CIE to young adults with ASD and the odds of gaining CIE through PS + ASD, the next questions related to this intervention are

to measure dose and scalability (Schall et al., 2020). Indeed, this study included a third cohort who did not receive a full “dose” of the intervention. Instead of 9 months of PS + ASD, the COVID-19 pandemic resulted in only 6.5 months of intervention. Is it possible that the PS + ASD model could be altered to be part of a school year rather than a full school year? This is a critical question to be considered as PS + ASD is limited in its accessibility to all locations and applicants. Future research should explore how to increase access to the intervention to more individuals with intellectual and developmental disabilities who display challenging behaviors and across more sectors, such as rural and urban locations.

Analysis of the Potential Theory of Change in PS + ASD

We used a combination of customized and supported employment techniques to help identify, train, and support jobs for treatment participants as well as recognized transition planning techniques as the PS + ASD intervention year ended (Wehman, 2011). Additionally, all participants were simultaneously students in public schools, and active clients of their local VR office. This led to a seamless transition from school to adult services upon program exit. Finally, it is worthwhile noting the ease of knowledge translation achieved because of this study. Specifically, the Governor of Virginia, a military veteran himself, was sufficiently impressed that the state has since implemented more PS + ASD sites at different military bases in Virginia. This shows the importance of scaling up and expanding PS + ASD to more military bases across the United States.

Conclusion

The implications of this study suggest the intervention to be successful in assisting military connected and dependent youth gain CIE. First, this appears to be the first trial looking at the effects of an intensive 900-h internship on the offspring of military service members on a large U.S. military base. The outcome data shows the acquisition of CIE with an average of 24 h worked per week at 18 months post-baseline. This is an important finding given the tremendous pressure military families are under with their jobs in service to our country while raising children with ASD. Second, by using a military base, we were able to provide a level of standardization of internship training rotations across military base employers and organizations, which is meaningful given how service members are frequently moved from base to base. The logistics of completing tasks from one base to another are standardized, leading to greater portability and stability among employees with ASD as their families

relocate. Indeed, the development and implementation of the relocation and deployment plan resulted in a seamless transition for the one individual whose family was deployed after his participation in the project. Finally, this study included a majority of BIPOC participants, a group that has been highly underserved in CIE training programs. These encouraging findings from this study emphasize the need for continued research to develop more interventions for military connected and dependent youth with ASD across the spectrum in their transition from school to adulthood.

Author Contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by CS, LA, PW, and MB. The first draft of the manuscript was written by CS and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

Research Involving Human and Animals Rights This study was research involving human participants. This research trial was overseen by three institutional review boards (IRBs). The primary IRB was Virginia Commonwealth University Institutional Review Board, with secondary review provided by the Virginia Department for Aging and Rehabilitative Services Human Research Review Committee, and the Human Research Protection Office of the United States Army Medical Research and Development Command. This study was registered at clinicaltrials.gov as NCT04001790.

Informed Consent Participants were only included in this study if they provided informed consent. There were some participants who were not their own guardians. In that case, they provided assent while their legal guardian provided informed consent on their behalf.

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