EFFECTS OF BEHAVIORAL SKILLS TRAINING WITH IN SITU TRAINING ON WORKPLACE CONVERSATIONAL SKILLS OF TRANSITION-AGED HIGH SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDER

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EFFECTS OF BEHAVIORAL SKILLS TRAINING WITH IN SITU TRAINING ON WORKPLACE CONVERSATIONAL SKILLS OF TRANSITION-AGED HIGH SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDER

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

by

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I am here because of the love, support, and sacrifice of my family. When my grandparents were teenagers, they left their homes in North Carolina and Kentucky and moved to Southeastern Virginia to build better lives for themselves and for their families. They worked hard and sacrificed throughout their lives to do that. My parents continued that tradition so that my life could be better, and their support of me and my education has been unwavering. My education has been a gift, and I am forever grateful to my family for giving that gift to me.

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Abstract

EFFECTS OF BEHAVIORAL SKILLS TRAINING WITH IN SITU TRAINING ON WORKPLACE CONVERSATIONAL SKILLS OF TRANSITION-AGED HIGH SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDER

By Holly Nicole Whittenburg, Ph.D.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

Young adults with autism spectrum disorder (ASD) experience high rates of unemployment in the years immediately following high school (Hendricks & Wehman, 2009; Roux et al., 2015), yet very few studies to date have investigated approaches to teaching transition-aged high school students work-related social skills within competitive, integrated workplace settings. Furthermore, difficulties in developing relationships with coworkers within the workplace may negatively affect employment (Baldwin et al., 2014; Sperry & Mesibov, 2005). Research is needed that examines methods for improving interactions with coworkers.
This study investigated the effects of a behavioral skills training (BST) with in situ training intervention package on workplace conversational skills of four transition-aged high school students with ASD who were enrolled in a community-based internship program at a mid-sized military installation. Intervention sessions began with BST, which included direct instruction, video modeling, conversational practice, and feedback on practice performance. Intervention sessions concluded with in situ training, during which participants conversed with coworkers in their internship settings. Data were collected on participants’ accuracy in demonstrating the steps to conversing with coworkers during BST probes in training settings and in using the same steps in authentic conversations with coworkers during in situ trials in internship settings.

Findings indicated a functional relation existed between the implementation of the intervention package and increases in skill accuracy on in situ trials for all four participants. Substantive improvements in participants’ BST probe scores within training settings were also noted. During the maintenance session conducted two weeks post-intervention, all four participants maintained skill mastery on BST probes, and three out of four participants maintained skill mastery on in situ trials. Participants, their special educator, and their job coach rated the intervention package as effective and acceptable. The findings highlight the importance of in situ training in increasing workplace conversational skills in authentic settings in order to minimize difficulties with skill generalization. Results also indicate the importance of considering individualized learner needs and workplace environmental contexts in developing interventions.
Chapter I

Introduction

For youth with disabilities, the transition from high school to work has historically been difficult. In response to challenges many transition-aged students with disabilities face, federal laws have attempted to improve adult outcomes for students with disabilities through mandated transition planning and services during high school. The most recent reauthorization of the Individuals with Disabilities Education Act (IDEA; 2004) continues the requirement that IEP teams help students with disabilities plan and prepare for successful transitions to adult life through individualized decision-making and active participation in the transition process. IDEA also requires IEP teams to develop measurable IEP goals related to postsecondary employment and provide the supports and services needed to make progress toward said goals. In addition, the Workforce Innovation and Opportunity Act (WIOA; 2014) mandates the provision of specific services to better prepare transition-aged students with disabilities for work. WIOA requires state vocational rehabilitation (VR) agencies to collaborate with schools and other key stakeholders to provide pre-employment transition services (Pre-ETS) to eligible students with disabilities.
Statement of Problem

Employment Outcomes

Despite these legal mandates, young adults with autism spectrum disorder (ASD) experience high rates of unemployment and underemployment, regardless of cognitive ability (Hendricks & Wehman, 2009; Roux et al., 2015). In a comparison of National Longitudinal Transition Study-2 data on employment outcomes for transition-aged youth with communication-based disabilities, including ASD, speech language impairments, specific learning disabilities, and intellectual disability (ID), young adults with ASD experienced the lowest rates of employment (55.1%) in the six years following high school and were at the highest risk of no employment in the two years immediately following high school (Shattuck et al., 2012). Only 29% of young adults with significant disabilities, including ASD, were working two years past high school, and almost half of those who were employed were working in segregated settings (Carter et al., 2012). Other research indicates high rates of involvement in day support or sheltered workshop programs for young adults with ASD and a co-occurring ID and a heightened risk of non-involvement in any activities outside the home for young adults with ASD without co-occurring disabilities (Taylor & Seltzer, 2011). Involvement with state VR agencies may not lead to improved employment outcomes for this group of youth either. While the number of young adults with ASD accessing VR services from 2002 to 2011 increased, successful competitive employment rates through VR did not improve, with nearly two-thirds of VR participants with ASD not becoming competitively employed (Burgess & Cimera, 2014).

Social skills and Work

Sustained deficits in social communication skills, a core characteristic of ASD, may make it difficult for young adults with ASD to navigate the social demands of workplace settings.
Diagnostic criteria for ASD include deficits in social-emotional reciprocity (e.g., issues with conversational turn-taking, initiating and responding to social interactions); understanding and using nonverbal communication; and developing, sustaining, and understanding social relationships (American Psychiatric Association, 2013). In workplace settings, social communication difficulties can translate to issues in acquiring and demonstrating work-related social skills. Transition-aged youth with ASD frequently require ongoing support and instruction in order to learn new social norms and workplace expectations, accept correction and feedback, interact with customers, communicate effectively with co-workers, and adhere to social expectations within business organizations (Wehman et al., 2012).

Ultimately, difficulties in understanding social norms and developing positive relationships at work may negatively affect employment outcomes for individuals with ASD. Self-reports of individuals with ASD in the research literature describe how social skill issues, such as difficulties working in teams, getting along with others at work, and limited involvement in workplace social relationships, may lead to job loss or not being hired in the first place (Hurlbutt & Chalmers, 2002). Individuals with ASD also rate difficulties in communicating with and relating to others as one of the most negative aspects of employment (Baldwin et al., 2014) and describe challenges in getting to know coworkers and handling conflicts at work (Sperry & Mesibov, 2005). These findings suggest a need for interventions that address core social skill deficits of ASD in workplace settings in order to improve employment prospects and job retention.

**Transition Practices**

Specific issues related to the provision of transition services for high school students with ASD may also affect students’ abilities to obtain and maintain competitive, integrated
employment (CIE). In short, ineffective transition practices may leave students with ASD unprepared for work. Survey data indicate special educators have limited involvement in job development and interagency collaboration (Li et al., 2009) and do not frequently engage in transition work with students with disabilities (Knott & Asselin, 1999; Morningstar & Benitez, 2013). Special educators report feeling unprepared to do transition work, and their feelings of unpreparedness did not change with the increased number of years they taught (Knott & Asselin, 1999; Morningstar & Benitez, 2013). In addition, special educators may not be aware of workforce expectations or may not adequately target critical employment skills during instruction. While special educators polled in a national survey indicated the importance of social and communication skills to employment, significant differences existed between the skills they rated as being most important to employers and the actual time they spent teaching transition-aged students these skills (Agran et al., 2016). In an exploratory survey conducted by Moon et al. (2011), supported employment providers identified self-management, self-determination, and social and communication skills as critical employment preparation areas for high school students with developmental disabilities, but ranked academic skill development as minimally important. These findings suggest that special educators may need more training to engage more fully in transition work, and school-based instruction may not adequately address the needs and expectations of employers and adult service providers.

Rationale for Study of Problem

The social skill deficits described previously can lead to significant difficulties in obtaining and maintaining employment. Employers actively seek employees who possess strong communication skills (Society for Human Resource Management, 2019) and who work effectively with others (e.g., accept direction/correction, ask for help when needed, interact with
coworkers; Agran et al., 2016). Skill deficits in these areas may negatively affect the hiring prospects of individuals with ASD. If job applicants with ASD are unable to describe and/or demonstrate competencies in these areas, then they may not be selected for open positions. Social skill deficits may also lead to negative consequences at work, including termination. For instance, if an employee with ASD is asked by their supervisor to perform a work task differently, and they respond by refusing the correction, then they could receive a verbal or written warning from the supervisor. If this exchange is repeated over time, then the employee could experience more serious consequences, including the development of an employee improvement plan, work suspension, and/or termination from the position.

On the other hand, developing positive social relationships can facilitate workplace inclusion for young adults with disabilities (Butterworth et al., 2000). Positive personal relationships between employees with disabilities and their supervisors and coworkers can increase acceptance within the workplace environment and help individuals with disabilities maintain employment (Ellenkamp et al., 2016). For many individuals with ASD, difficulties in interpersonal communication skills may negatively affect their ability to develop positive personal relationships with coworkers and supervisors. These difficulties could diminish their job satisfaction and place them at a disadvantage if workplace issues arise.

Yet little research has been conducted thus far investigating approaches to increase the work-related social skills of individuals with ASD. Specifically, research is needed that targets social skills routinely required in employment (e.g., accepting correction from supervisors, greeting customers, responding to questions from customers, interacting with coworkers, asking for help; Wehman et al., 2012) in order to increase these skills and improve employment outcomes for individuals with ASD. Also, employers may emphasize different work-related
social skills within their businesses. For instance, while strong customer service skills may be important in a retail setting, they may be less relevant in a warehouse environment, but working effectively as a part of a team to accomplish specific job tasks may be deemed essential in both of these settings. However, little research conducted thus far describes processes for identifying core social skills required in specific work environments. Research is missing that uses robust assessment processes to tailor interventions addressing the interactions between specific job/environmental factors and the learning needs of individuals with ASD.

There is also a need for research examining the development of work-related social skills in competitive, integrated workplace settings. Over the past 40 years, federal policy has increasingly focused on improving CIE outcomes (Wehman et al., 2018). Yet very little research involving transition-aged students with ASD has taken place in competitive, integrated workplace settings (Wehman et al., 2017). The dearth of studies occurring within competitive, integrated work environments is concerning given sustained calls to increase CIE outcomes for individuals with ASD and other significant disabilities (Carter et al., 2012; Nord et al., 2013; Wehman et al., 2018). Moreover, it is unclear the extent to which social skill instruction delivered in segregated or classroom settings would generalize to, or be relevant in, CIE environments.

The needs of transition-aged students with ASD have not been sufficiently addressed in research conducted thus far. Transition-aged students with disabilities often participate in community-based work experiences to learn more about careers of interest, build personal relationships with local employers, and develop key work skills, including work-related social skills. Because WIOA requires state VR agencies to partner with local school districts to provide work-based learning experiences to students with disabilities and directs additional funding to
these experiences, these types of community-based transition programs are likely to increase in the near future. Research is needed to identify effective interventions that increase the work-related social skills of transition-aged students with ASD within these types of community-based transition programs.

Finally, work-based learning experiences for transition-aged students with ASD often involve multiple stakeholders, including school personnel, VR providers, local businesses, students, and their families. Previous research focusing on the transition process has explored the varied needs and expectations of different stakeholders. This research indicates that perceptions of what is important may vary both between and within stakeholder groups (Agran et al., 2016; Moon et al., 2011). These findings highlight the importance of collecting data from multiple stakeholders on the social validity of interventions to teach work-related social skills, in order to ensure interventions adequately address key skills required for employment success. In addition, assessing the social validity of interventions implemented within work environments is needed to confirm that interventions are both feasible and acceptable to the different parties involved.

Statement of Purpose

The purpose of this study was to investigate the effect of behavioral skills training (BST) with in situ training on the acquisition of workplace conversational skills for transition-aged high school students with ASD. The intervention package also included a video modeling component, which was implemented during the modeling step of the BST instructional sequence. The targeted skill, conversing with coworkers, was identified through a careful analysis of participants’ social skill needs and the demands of the settings in which they worked. The intervention occurred within community-based internship settings to assess the study’s relevance for and feasibility within authentic workplace environments. By explicitly teaching transition-
aged students with ASD an essential social skill required for successful CIE, this study adds to
the existing research on effective work-related social skills interventions for this population of
learners.

**Literature/Research Background**

**Conceptual Framework**

The conceptual framework for the study was derived from ecological systems theory and
social learning theory. Ecological systems theory posits human learning and development occur
within specific contexts, and interactions between individuals and the contexts within which they
participate affect their thoughts, feelings, and behaviors (Bronfrenbrenner, 1977; Bronfrenbrenner &
Evans, 2000). Ecological systems theory suggests the importance of carefully
considering specific workplace contexts when selecting targeted work-related social skills. In
other words, the targeted behavior needs to be relevant to both participants and employers. The
conceptual framework for this study highlights the importance of environmental factors and
interactions within given settings when targeting social skill development.

The conceptual framework also depicts how key elements of social learning theory (e.g.,
modeling, rehearsals, feedback on performance) facilitate the acquisition of work-related social
skills. In this study, observational learning was paired with behavioral rehearsals to teach the
targeted workplace conversational skill. Corrective feedback on participant performance of the
skill acted as the prompt for the next rehearsal trial, while positive feedback on participant
performance reinforced the target behavior (Miltenberger, 2014). The use of in situ training
within the intervention package ensured that learning occurred within the actual environments in
which the conversational skill was used.
**Work-Related Social Skills Interventions**

A review of the literature involving work-related social skills interventions for transition-aged youth and adults with ASD highlighted several themes across studies. The first was the use of group-based/curricular approaches to teach work-related social skills, including conversational skills, to this population. The majority of these studies utilized comprehensive curricula targeting a range of social skills and were delivered to groups of participants in training environments (Ashman et al., 2017; Baker-Ericzén et al., 2018; Liu et al., 2013; Oswald et al., 2018; Walsh et al., 2017). Other studies used similar formats but targeted specific subsets of work-related social skills, such as interviewing (Mathrick et al., 2017; Morgan et al., 2014) or problem-solving skills (Bonete et al., 2015). The second group of studies (Burke et al., 2018; Kandalaft et al., 2013) piloted virtual reality interventions to teach interviewing and social cognition skills. In these studies, participants interacted with avatars to practice targeted skills in virtual reality settings, and researchers documented improvements in performance over relatively short periods of time. The third group of studies used BST to teach social-vocational tasks or critical workplace social behaviors (e.g., acknowledging directions, asking for help or a model, requesting feedback, apologizing) through three single subject research design experiments (SSRD; Burke et al., 2010; Grob et al., 2019). Results from these studies indicate BST may facilitate the acquisition of work-related social skills for individuals with ASD but may also require additional individualized intervention components for skill mastery to occur. Specifically, these findings suggest BST procedures may be more effective when paired with visual supports, such as visual cueing or text prompts. Two other studies incorporated social skills measures into larger intervention packages (Gentry et al., 2015; Wehman et al., 2017), with one study documenting significant decreases in social support needs for treatment group participants (Wehman et al.,
Finally, the study conducted by White et al. (2011) demonstrated the efficacy of visual schedules in teaching three dyads of high school students with ASD to work cooperatively on vocational tasks.

These intervention studies utilized several common instructional strategies which yielded improvements in work-related social skills for individuals with ASD. Specifically, direct instruction, practice opportunities, and performance feedback all resulted in improvements in targeted skills for research participants. In addition, visually-based approaches and/or supports (e.g., virtual reality-based instruction, video modeling, and visual schedules) led to increases in work-related social skills, possibly by highlighting strengths in visual processing learners with ASD often possess (Hume et al., 2009).

**Study Intervention Components**

The current study combined the aforementioned elements of effective studies through the use of direct instruction, role plays/behavioral rehearsals, performance feedback, and visually-based presentation of instructional content in the BST with in situ training intervention package to teach transition-aged students with ASD how to converse with coworkers. BST includes four sequential steps: instruction, modeling, rehearsal, and feedback (Miltenberger, 2014). As described previously in this chapter, these instructional steps are also key aspects of social learning theory. While BST has been used extensively to teach a wide range of skills to individuals with developmental disabilities (Gunby & Rapp, 2014; Hood et al., 2017; Morgan & Wine, 2018; Nuernberger et al., 2013; Palmen & Didden, 2012), it has been used much less frequently to teach work-related social skills to transition-aged youth and adults with ASD (Burke et al., 2010; Grob et al., 2019). This study adds to the existing research on BST’s effectiveness on work-related social skills acquisition for this population.
Video modeling was incorporated into the modeling step of BST. Video modeling allows learners to watch themselves or others perform a skill prior to attempting it themselves in real-life settings (Roth et al., 2014). It has documented efficacy and has been used to teach a wide range of skills to learners with ASD (Odom et al., 2015). In this study, video modeling was incorporated into the modeling step of the BST instructional sequence to facilitate acquisition of the targeted workplace conversational skill.

Finally, in situ training was used in the current study’s intervention package. During in situ training, participants practice targeted skills in the actual settings in which the skills are used, and feedback on performance is delivered immediately to correct errors and reinforce accurate trials (Miltenberger, 2014). When used in combination with BST, in situ training promotes skill generalization to different people and settings (Gunby & Rapp, 2014; Miltenberger et al., 2013). Its use within this intervention package helped address difficulties students with ASD often experience in generalizing social skills instruction to environments outside of the training setting (Bellini et al., 2007).

**Research Questions**

The following questions guided this research study:

1. What is the effect of a BST with in situ training intervention package on the workplace conversational skills of transition-aged high school students with ASD?

2. Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in demonstrating targeted workplace conversational skills?
3. Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in using the same targeted workplace conversational skills in community-based internship settings?

**Methodology**

SSRD provided both the scientific rigor and contextual flexibility required to address the study’s research questions. Through manipulation of the independent variable over time and repeated measurement of the dependent variable across conditions, SSRD can document a causal relationship (i.e., functional relation) between the intervention and the target behavior (Horner et al., 2005). Moreover, SSRD’s emphasis on setting, individual characteristics of the participants, and the social validity of results helps ensure interventions adequately address the individualized needs of participants within specific contexts (Baer et al., 1987). Specifically, the use of SSRD enabled the researcher to directly measure the effectiveness of the BST with in situ training intervention package on participants’ observable workplace conversational skills, while also considering contextual factors such as current skill performance, skill demands of the workplace, and stakeholder perceptions, in the development and evaluation of the intervention package.

**Design and Measures**

The study utilized a specific type of SSRD, a multiple baseline across participants design (Baer et al., 1968; Barlow et al., 2009; Kazdin, 1982). Four participants were recruited for participation in the study. The researcher identified the target skill, conversing with a coworker, by administering the Work Observation – Peer Relationships, Socialization, Social Communication – Level 3 Life Seeker subscale (WO-PSS-3) and the Peer Relationships, Socialization, Social Communication Interview (PSSI) of the Virginia Commonwealth University and Autism Speaks Community Based Functional Skills Assessment for Transition
Aged Youth with Autism Spectrum Disorder (CBFSA; Schall et al., 2014) to participants, the special educator, and the job coach working with participants. Information gathered from the CBFSA assisted the researcher in operationally defining the target behavior prior to baseline data collection. The CBFSA includes both structured observations and a semi-structured interview assessment and was used to learn more about participants’ social skills in workplace settings. Employers were also asked to complete a brief survey regarding the importance of various work-related social skills within their businesses, and results from the CBFSA and employer surveys were analyzed to identify and operationally define the target skill, conversing with coworkers. After the target skill of conversing with coworkers was identified through this process, the researcher developed a task analysis of the skill by reviewing previous research literature and by observing competent models perform the skill in the actual internship settings (Nuernberger et al., 2013). Data were collected during each phase of the study on participants’ accuracy in completing each step in conversing with coworkers, using the task analysis and event recording procedures. Probes were administered at the start of each BST training session and in situ trial data were collected during each in situ training session. After the intervention ended, participants and their special educator or job coach completed questionnaires on the social validity (effectiveness, acceptability) of the intervention.

Procedure

During the baseline phase, participants were observed to measure their accuracy in performing the targeted social skill, conversing with coworkers, in the BST training location and in real-life situations within their internship environments. In the intervention phase, the BST with in situ training package was administered to participants. Specific procedures for implementing BST in this study included (Miltenberger, 2014): (a) instruction – the researcher
described the behavior to participant, using word-based visual supports; (b) modeling – the researcher showed participants video models of themselves accurately performing the skill; (c) rehearsal – the participant practiced the behavior, (d) feedback – immediately after each rehearsal, the researcher provided specific verbal praise for correct steps and specific instruction for incorrect steps. Each BST training session was conducted by the researcher in a designated training location near the internship site immediately before the start of each in situ training trial (Nuernberger et al., 2013). The criterion for moving into the in situ training portion of each intervention session was three 100% correct consecutive rehearsals within the BST portion.

After each BST session during which training criterion was met, an in situ training trial was conducted in the authentic internship setting. The researcher observed the participant converse with a coworker and collected task analysis data on the skill. If the participant completed any steps incorrectly, then the researcher intervened immediately afterwards and implemented BST for that skill with the participant. Criterion for skill mastery was three consecutive in situ training sessions with at least 80% accuracy in conversing with coworkers. A maintenance session was conducted approximately two weeks after the intervention ended, during which the researcher observed and collected data on the target behavior, without implementation of the BST with in situ training intervention package.

**Data Analysis**

Data from all experimental phases (baseline, intervention, and maintenance) were evaluated through visual analysis. Two separate line graphs for each participant were created. The first graph presented BST session probe data, and the second graph presented in situ trial data. The researcher analyzed the graphed data for trends within and across phases, overlap between adjacent phases, level change between adjacent phases, and stability within phases. The
researcher analyzed questionnaire responses from both social validity measures to assess the perceptions of participants, their special educator, and their job coach regarding the intervention. The researcher also analyzed results from the CBSFA to assess the social validity of the intervention. Comparing pre- and post-intervention scores on the WO-PSS-3 and the PSSI provided additional data on the clinical significance of the intervention.

**Summary**

This research study investigated the use of a BST with in situ training intervention package, including a video modeling component, on the acquisition of workplace conversational skills for transition-aged students with ASD. It addresses gaps in current knowledge by expanding the use of BST in work-related social skills interventions, situating the research within competitive, integrated workplace environments, and focusing on social skills interventions for transition-aged students with ASD. The study utilized a multiple baseline across participants design and measured changes in skill performance through event recording of participants’ accuracy in completing task analyzed steps of the target skill, conversing with coworkers. Conversing with coworkers was identified as the target skill through careful assessment and evaluation of participants’ repertoire of work-related social skills and the specific demands of their internship settings. Social validity data from multiple stakeholder perspectives were also collected and analyzed by the researcher. Findings from this study will assist researchers, practitioners, and policy makers in determining how to improve CIE outcomes for young adults with ASD.
Chapter II

Review of Literature

Overview of Related Areas

In this chapter, the researcher examines several critical areas related to the acquisition of work-related social skills for transition-aged students with autism spectrum disorder (ASD). The chapter begins with a review of federal laws and policies related to preparing students with ASD for competitive, integrated employment (CIE). Then the researcher describes the two theories that provide the basis for the study’s theory of change – ecological systems theory and social learning theory. The next section of the chapter includes reviews of the literature on interventions to teach work-related social skills to transition-aged youth and adults with ASD and discussions on their relevance to the intervention package. Finally, the chapter ends with definitions of key terms used throughout the study.

Federal Laws and Policies Related to CIE

Mandates Through IDEA

Two major federal laws include provisions specifically related to youth with disabilities, the Individuals with Disabilities Education Act (IDEA) and the Workforce Innovation and Opportunity Act (WIOA). The reauthorization of IDEA (2004) strengthened several transition
provisions in order to better support students with disabilities, aged 16 and older, as they move from school to adult life. First, IDEA stresses the importance of individualized decision making and student participation in the transition planning process. The law requires students’ strengths, needs, preferences, and interests be considered during transition planning and students be invited to individualized education plan (IEP) meetings if transition is going to be discussed. In addition, IEP teams must develop measurable postsecondary goals related to training, education, employment, and when needed, independent living skills, and provide the services, supports, and access to courses of study for students to make progress towards these goals. Finally, IDEA supports interagency collaboration between school teams and adult service providers by mandating IEP teams coordinate with adult organizations who support the transition of students with disabilities to postsecondary activities. These partners often include vocational rehabilitation (VR) agencies, state agencies for developmental disability services, and community rehabilitation programs.

**Mandates Through WIOA**

While IDEA focuses on specific transition planning and services for individual students served within the special education system, WIOA (2014) seeks to improve CIE outcomes for transition-aged students with disabilities by strengthening transition services delivered through VR agencies. WIOA requires state VR agencies provide pre-employment transition services (Pre-ETS) to transition-aged students with disabilities while they are in high school. Required Pre-ETS under the law include job exploration counseling, work-based learning experiences, counseling on postsecondary education and comprehensive transition program opportunities, workplace readiness training, and self-advocacy instruction (Workforce Innovation Technical Assistance Center [WINTAC], 2016a). Two of the mandated Pre-ETS are particularly germane
to the current study – work-based learning experiences and workplace readiness training. Work-based learning experiences use authentic work environments to explore career possibilities and build specific work skills. WIOA requires work-based learning experiences be provided in integrated settings to the maximum extent possible (WINTAC, 2016b). Workplace readiness training focuses on helping students acquire the soft skills they need for employment, with particular emphases on social/interpersonal and independent living skills (WINTAC, 2016c). In order to adequately fund these services, the law mandates 15% of all federal VR grant monies received by states go to transition-aged students with disabilities (The Arc, 2015). WIOA also seeks to improve interagency collaboration for students by requiring VR agencies to coordinate and carry out services in partnership with schools, employers, local workforce development boards, and one-stop centers (WINTAC, 2016a).

**Policies to Promote CIE**

The current study takes place within the context of policy shifts aimed at increasing CIE outcomes for individuals with significant disabilities. The term CIE was most recently defined in the WIOA and has several key components. First, CIE entails full or part-time work, including self-employment, completed by individuals with disabilities. Second, to qualify as CIE, employees with disabilities must be paid minimum wage or higher, at rates comparable to what employers pay other employees without disabilities with similar skills, training, and experience who perform similar work. In addition, the work must occur in locations where employees with disabilities have opportunities to interact with others without disabilities to the same extent as employees without disabilities performing comparable work do. The final component of CIE requires workers with disabilities have similar opportunities for career advancement as other workers without disabilities in comparable positions. WIOA’s statutory language and supporting
federal guidance documents make it clear Congress intended through the law to significantly limit segregated and/or sub-minimum wage work for individuals with disabilities who receive services funded through federal VR monies (State Vocational Rehabilitation Services Program, State Supported Employment Services Program, Limitations on Use of Subminimum Wage, Proposed Rule, 2015). Federal regulations establish CIE as an achievable goal for individuals with the most significant disabilities and make CIE the measure of successful employment outcomes through state VR agencies (State Vocational Rehabilitation Services Program, State Supported Employment Services Program, Limitations on Use of Subminimum Wage, Final Rule, 2016).

**Employment First Initiatives**

In addition, many states have begun to adopt policies aimed at increasing CIE outcomes for individuals with disabilities through Employment First initiatives. The philosophy of the Employment First movement emphasizes CIE as the first and preferred option for people with disabilities who receive public services (Association of People Supporting Employment First, n.d.). The Employment First movement has grown substantively in recent years, with 33 states officially adopting Employment First policies through legislation, executive orders/directives, or a combination thereof (Association of People Supporting Employment First, 2017).

Work at the state level is critical in maximizing the promise of Employment First initiatives for youth with intellectual and developmental disabilities (I/DD), including youth with ASD. The federal Administration on Intellectual and Developmental Disabilities recently conducted a five-year study on advancing systems change across state-based systems to increase CIE outcomes for youth and young adults with I/DD. Eight states participated in the Partnership in Employment projects, which focused on identifying systems-level changes required in state
policies and infrastructure to increase high quality CIE outcomes for youth and young adults with I/DD (Butterworth et al., 2017). Study evaluation data suggest participating states were successful in their efforts to advance systems change by: establishing model demonstration programs; increasing access to postsecondary education for youth with I/DD; strengthening connections between major stakeholder groups (e.g., schools, community rehabilitation programs, state agencies, families); addressing infrastructure deficits, including lack of common data and limited training tools/resources; and developing methods to scale up and/or sustain systems change efforts (Tucker et al., 2017).

It is clear that special education and VR policies are converging to improve CIE outcomes for transition-aged students with significant disabilities, including ASD. These policy developments support better employment preparation and increased opportunities for work experience while in high school, and they have several implications for intervention research with transition-aged students with ASD. First, they suggest the importance of investigating the effectiveness of interventions which occur in integrated work-based settings. Second, these policies highlight the importance of identifying workplace demands and providing high-quality instruction to teach work-related skills. Finally, fulfilling IDEA and WIOA transition mandates require that VR and schools collaborate in new and more extensive ways. Identifying work-based interventions that can be implemented by collaborative teams is essential in fulfilling the promise of these laws.

**Conceptual Framework**

This section explores the conceptual framework undergirding this research study. Two theories provide a framework for understanding different aspects of the study. Ecological systems theory offers a compelling rationale for considering the importance of context when
developing specific interventions. Social learning theory provides an explanation of why this study should be effective in increasing the workplace conversational skills of transition-aged students with ASD.

Ecological Systems Theory

Bronfrenbrenner’s ecological systems theory (1977) describes how systems of interactions and contextual factors play critical roles in understanding human development. Ecological systems theory posits human activities occur within specific ecological environments, and interactions within and between those environments affect the behavior, thoughts, and feelings of people participating in them. The ecological systems model is defined by multiple concentric relationships that start with the individual and move further away relationally from them. These concentric relationships consist of: a). the microsystem, the relationship between an individual and their environment in an immediate setting; b.) the mesosystem, relationships among major settings that include the person; c). the exosystem, relationships between social structures that do not encompass the person but influence their more immediate surroundings; and d). the macrosystem, the blueprint for how structures and activities are organized and defined in a particular society. As individuals interact with others (including other persons, objects, and symbols) over time within their immediate environments, human development occurs (Bronfrenbrenner & Evans, 2000).

Ecological systems theory provides a framework for understanding multiple relationships influencing participants’ use of conversational skills within work environments. The microsystem encompasses specific internship sites in which participants complete assigned tasks and interact with coworkers, supervisors, customers, special educators, and job coaches. The mesosystem contains the larger internship program, including the classroom environment and
different internship experiences, along with home and community settings, for each participant. Participants’ use of work-related social skills are also indirectly affected at the exosystem level through school district, VR, and business policies, procedures, and practices. Finally, societal and cultural expectations of what it means to be a professional in the workplace also influence participants at the macrosystem level. While all of these concentric relationships are critical in understanding how individuals make sense of specific settings and interact with others, the current study focuses on factors and relationships at the microsystem level.

To that end, ecological systems theory influenced key aspects of this study. It pointed to the need for a thorough analysis of internship environments at the microsystem level to determine which social skills were both frequently used and highly valued within particular contexts. Using this analysis to carefully select work-related social skills for intervention helped increase alignment between the researcher’s, participants’, and other stakeholders’ perceptions of the internship environment (Bronfenbrenner, 1977) and helped ensure the intervention targeted skills which were meaningful and important to the participants’ specific internship settings.

**Social Learning Theory**

This study’s intervention package, like many social skills interventions, is grounded in social learning theory, which posits people learn by watching and observing others (Ormrod, 2003). As articulated by Bandura (1982), observing competent models helps individuals gain the confidence needed to learn and use new skills, makes events and contexts more predictable, and teaches learners how to deal with unusual or unfamiliar events (Bandura, 1982). In developing the theory, Bandura extended the work of behaviorists by incorporating cognition and its role in behavioral decision-making (Ormrod, 2003).
The behavioral skills training (BST) with in situ training intervention package incorporates key elements of social learning theory through modeling, rehearsal, and explicit feedback on skill performance. The modeling component of BST hinges on observational learning, the idea that individuals gain the confidence to learn and use new behavior when it is demonstrated by a competent model (Bandura, 1982). People believe themselves capable of performing actions when they see successful examples of the behavior. Modeling provides information about the event and the context, making both more predictable, while informing learners of how to deal with unusual or unfamiliar events and circumstances (Bandura, 1982). Rehearsals and explicit feedback after rehearsal performance also shape behavior and learning, as individuals begin to form expectations about future responses and observe what happens in similar situations (Ormrod, 2003). Given higher effect sizes noted for social skills training interventions involving students with ASD which occur in the settings where skills are used (Bellini et al., 2007), the in situ training component of the intervention package also facilitates skill acquisition by extending rehearsals and feedback to social interactions in authentic internship settings and novel circumstances involving unfamiliar actors.

Theory of Change

Figure 1 offers a visual depiction of the study’s theory of change model. Students with ASD often demonstrate social skill difficulties in work settings that may act as barriers to employment, such as accepting correction from supervisors, interacting with others on the worksite, and understanding employer social expectations (Wehman et al., 2012). However, specific work environments may require and value different work-related social skills, while participants’ social skills performance may also vary across settings. Therefore, the work environment encompasses this theory of change model in its entirety.
Within this model, instruction is based upon specific social skill requirements of the internship setting and participants’ prior knowledge and performance of those skills. Multiple opportunities for skill learning exist within this model. Participants may directly acquire targeted

![Diagram of Work Microsystem]

**Figure 1**
Theory of Change Model for the BST With in Situ Training Intervention Package
workplace conversational skills via observational learning after watching competent models. Observational learning from modeling may also lead to successful behavioral rehearsals, which promote social skill acquisition. The feedback component of the BST intervention also supports skill acquisition. Positive feedback after successful rehearsals reinforces targeted behaviors, while corrective feedback after incorrect rehearsals acts as the prompt for the next rehearsal trial (Miltenberger, 2014). Finally, the theory of change model acknowledges that skill acquisition is influenced by and directly affects actual interactions with others within the internship environment. These interactions influence skill acquisition and subsequent performance of the targeted workplace conversational skills.

**Work-Related Social Skills Interventions**

The purpose of this section is to describe findings from a review of the research literature on work-related social skills interventions for transition-aged youth and adults with ASD, while highlighting interventions that resulted in improved social skills outcomes and synthesizing key elements across studies. Several themes across studies emerged, including the use of group-based/curricular approaches, virtual reality, BST, social skill components within larger intervention packages, and visual schedules.

**Group-Based/Curricular Approaches**

By far, the largest number of studies to date utilized group-based/curricular programs to teach work-related social skills. These studies targeted a range of social skills with varying degrees of success. Notably, several of the studies demonstrating strong results used group-based, manualized interventions to teach specific social skills over extended periods of time. For example, Morgan et al. (2014) implemented a 12-week interview skills curriculum for 28 young
adults with ASD. They found residual gain scores were significantly higher for the experimental group receiving the treatment on both a mock interview assessment and a standardized measure of social skills. Bonete et al. (2015) developed an intervention to teach social problem-solving skills to young adults with Asperger syndrome (AS; \( n = 50 \), delivered through 75-minute weekly sessions lasting 10 weeks. The researchers compared performance on pre- and post-test measures to a randomly selected, matched comparison group of neurotypical peers. 25, or 50%, of the AS group participants demonstrated significant changes after treatment on a task-based measure of social problem solving. Parents also reported significant changes on a standardized measure of overall social behavior. Moreover, effect size differences in scores between the AS group and the peer-comparison group decreased after intervention on all but one subtest, suggesting the AS group’s social skills began to more closely resemble those of their peers’ post-treatment. The ACCESS program, created by Oswald et al. (2018), focused on workplace social functioning, development of social networks, increasing self-determination and coping skills, and decreasing anxiety in individuals with ASD aged 18 to 38. In a randomized controlled trial of the program, trend-level increases in social skills for treatment group participants (\( n = 28 \)) were reported post-intervention, after controlling for participant IQ. However, no significant differences were observed between groups on measures of coping self-efficacy and anxiety.

Other studies with promising results embedded group-based, social skills curricula within existing employment training programs. Baker-Ericzén et al. (2018) evaluated the initial outcomes of a manualized curriculum, SUCCESS, on the improvement of cognitive and social skills for nine young adults with ASD and implemented the curriculum within an existing specialized supported employment program for software testing. The researchers found moderate to large effect sizes across measures of executive functioning, social skills, and daily living
skills. Liu et al. (2013) investigated the effectiveness of a workplace training program, which included twice weekly educational sessions and work task practice for adults with ASD, ages 18 to 40, within a sheltered workshop setting (n = 14). Significant differences in pre- and post-test scores were documented on measures of social communication skills and workplace social behaviors, (e.g., appearance, self-control, and level of supervision), and small but non-significant differences were identified in work social skills and work adaption. In an interesting use of technology within an existing social skills curriculum, Walsh et al. (2017) combined direct instruction from a comprehensive curriculum with video modeling to improve work-related social skills for young adults with ASD and intellectual disability (ID) attending a VR training center program in Ireland. The researchers created and incorporated 158 video models of negative and positive examples of social skills use into the curriculum. Using a multiple probe design across behaviors, replicated across seven participants, Walsh and colleagues found dramatic improvements in peer, adult, and self-related social skills after instruction, with 8-41% of skills demonstrated pre-teaching compared to 73-100% of skills demonstrated post-teaching. In addition, the skills were maintained at 73-100% at follow up three months later.

Finally, two studies utilizing group-based/curricular approaches reported findings that were either unclear or problematic. Ashman et al. (2017) compared the efficacy of a social skills training group, which included employment-specific components related to interview communication, social situations at work, and assertiveness at work, to a more generalized social support group for adults with ASD. No significant differences between groups were found on standardized measures of social cognition, social performance, or functional skills at posttest, although there was a trend towards significance and a moderate effect size reported for increased social cognition skills for treatment group participants. The authors posited the small sample size
(n = 19) may have made it difficult to discern statistical differences between the groups, and social skills learned in the group setting may not have generalized beyond the classroom. Mathrick et al. (2017) conducted a study evaluating the effectiveness of an interview skills treatment package for youth with language disorders, including ASD (n = 12, 33% of sample had ASD diagnosis). Over the course of 12 group therapy sessions, lasting 45 to 90 minutes each, participants were instructed on answering specific interview questions, role played interviews, and received individualized performance feedback. Although the authors reported significant increases and large effect sizes for differences in positive non-verbal and verbal social communication skills over time, it was unclear if changes in performance were attributable to specific components of the training package or to practice effects, given the lack of a control group in the study design (Mathrick et al., 2017). Furthermore, different mock interviewers were used in the administration of pre- and post-test mock interview performance measure (with graduate students playing the role of interviewers for the pre-test and local businesspeople for the post-test). These differences contain potential threats to internal validity due to instrumentation and experimenter effects and may limit the utility of score comparisons (McMillan, 2016).

In general, studies focused on group-based/curricular approaches to teaching work-related social skills demonstrated improvements in a range of these skills over time. Across studies, researchers used several key instructional strategies to deliver curricular content. Common strategies included: discussion/explication of social skills, work-related examples, direct instruction on social skills, role play/rehearsals, performance feedback, and small group activities. Within this group, the Walsh et al. (2017) study was unique in its extensive use of video modeling as a means of demonstrating work-related social skills to participants. However, none of the studies took place in competitive, integrated workplace environments.
Virtual Reality in Social Skills Instruction

Two studies identified through this review used virtual reality to improve work-related social cognition and interview skills, respectively. In an investigation focused on social cognition training, Kandalaft et al. (2013) found substantive increases in social perception and improved conversational skills, although not to the level of significance, for eight young adults with ASD. Over the course of the two-week study, participants interacted with a coach and a confederate clinician in a variety of virtual reality settings, including a job interview and a workplace. The authors posited that the performance-based Social Skills Performance Assessment, Version 3.2(2), which was used to measure conversational skills through role plays, may not have been sensitive enough to changes in behavior, or may lack ecological validity when compared with real-life conversations. In the second study, Burke et al. (2018) developed a virtual reality training system to teach job interview skills to 32 young adult participants with ASD and developmental disabilities. The virtual reality system was designed to increase question difficulty and change interview scenarios as participants progressed and also included direct instruction in interview skills. Using regression analyses, the authors found a statistically significant increase in mean scores between baseline and final assessment on a researcher-developed mock interview performance-based assessment, along with significant increases in scores between three out of four training sessions. However, the study had several critical limitations, including: no measure of fidelity of implementation, only one rater, and differences in settings during baseline and final assessments (virtual versus in-person mock interviews).

These studies piloted the use of virtual reality to improve work-related social skills and described improvements in participant performance. However, results should be viewed with some caution, given the small sample size and possible issues with measure sensitivity reported.
by Kandalaft et al. (2013) and the absence of a fidelity of implementation measure and a second independent rater reported by Burke et al. (2018). While virtual reality technology is new, both interventions included several common instructional elements as studies utilizing group-based/curricular approaches. These strategies were direct instruction, individualized feedback, and multiple practice opportunities.

**Behavioral Skills Training**

BST has also been used to teach work-related social skills to young individuals with ASD. Burke et al. (2010) described results from two related studies on the use of BST, combined with a performance cue system (PCS), on the performance of social-vocational task skills for six young adults with ASD. Participants were taught how to perform the role of costumed fire safety mascots in analog fire safety assemblies using scripts, DVD instruction, feedback, and modeling (the BST part of the intervention) and a mounted i-phone attached to the interior of the costume head for real-time visual prompts (the PCS part of the intervention). Target behaviors were 63 work-related social responses measured using event recording. In the first study, BST was introduced first. If participants did not reach criterion using that approach, defined as 80% accuracy on required social responses, then PCS was implemented. One out of three participants reached criterion performance using BST alone. The other two participants showed dramatic improvement with introduction of PCS, achieving criterion after three training sessions. Performance was maintained at follow-up and was close to criterion at the generalization activity, which was a real-life fire safety assembly.

In the second study, three different participants were introduced to PCS immediately following baseline. BST was provided as alternate training if the 80% accuracy performance criterion was not met by the second training session. A reversal phase was also incorporated into
the design, in which PCS was removed and then re-introduced in the next phase. For two participants, there was immediate improvement to criterion with the introduction of PCS. Their performance dropped substantively with the removal of PCS and returned to criterion levels with PCS’ reintroduction. For the third participant, a combination of PCS followed by BST led to criterion-level performance, with comparable patterns of performance drop-off during the reversal phase and a return to criterion with the reintroduction of PCS. While these results are promising, it should be noted multiple phases across both studies did not incorporate at least three data points, making it impossible to establish trends in the data and threatening the validity of the findings (Barlow et al., 2009; Ganz & Ayres, 2018; Horner et al., 2005).

In the third study investigating the use of BST, Grob et al. (2019) combined BST with stimulus prompts to teach work-related social skills to adults with ASD in a training environment. Using a multiple baseline design across behaviors and replicated across three participants, the researchers taught a variety of skills (e.g., making confirming statements when given direction, asking for a task model, apologizing, asking for feedback, asking for help with materials). Additional training, new stimulus prompts, and monetary reinforcer use were added to the intervention package on an individualized basis if BST with stimulus prompts did not lead to skill acquisition. For two participants, BST with stimulus prompts led to multiple skill acquisition and skill generalization across settings and supervisors. For the third participant, increases in work-related job skills were not observed until the monetary reinforcer strategy was introduced. The authors noted the importance of stimulus prompts in promoting generalization across settings and supervisors, but did not see generalization to similar, non-targeted skills presented in different situations.
Findings reported in these studies indicate intervention packages utilizing BST may result in improved work-related social skills for individuals with ASD, but intervention packages may need to be individualized to the unique needs of learners for skill acquisition to occur. In these studies, BST was often paired with some type of visual support (e.g., visual cues delivered through i-phones, text prompts) to facilitate skill development. It is also important to note the intervention packages were primarily delivered and tested in training environments, outside of generalization probes.

**Targeting Social Skills Through Larger Intervention Packages**

Two studies (Gentry et al., 2015; Wehman et al., 2017) measured work-related social skill outcomes as part of intervention packages exploring other outcomes as well. Gentry et al. (2015) investigated how iPod Touch devices could reduce the need for job coach supports for young adults with ASD. In this delayed randomized control trial, 55 participants were trained to use iPod Touch devices for work-related tasks. While job coaches provided substantively fewer hours of support to participants in the iPod Touch group, no significant differences were detected between groups on a measure of support needed for workplace interactions and on a measure of work performance that evaluated relationships with co-workers and the public. Wehman et al. (2017) examined the effect of a community-based internship program, which incorporated ASD-specific instructional and behavioral strategies, on work outcomes for youth with ASD and significant support needs ($n = 54$), who were transitioning from high school to work. They found support needs, including social communication support at work, decreased significantly for treatment group participants, but not for control group participants.

Differences between these two studies could help explain discrepancies in reported social skill outcomes. The Wehman et al. (2017) study incorporated social skills instruction for all
treatment group participants, through behavioral rehearsals to teach specific work-related social skills and direct instruction in understanding workplace social expectations. The Gentry et al. (2015) study’s intervention content was more individualized, with i-pod applications and strategies determined by assistive technology assessments. Therefore, while some participants may have received specific social skills intervention components via i-pods, others may have not. Wehman and colleagues reported significant decreases in participant social support needs for treatment group participants, but Gentry and colleagues did not find differences in this same area. These findings suggest direct, systematic intervention in social skills may be needed to demonstrate improvements in social skill performance in group-based experimental designs.

**Visual Schedules**

White et al. (2011) investigated how activity schedules could be used to teach youth with ASD to work cooperatively on vocational tasks. Six males with ASD, ranging in age from 16 to 19, all of whom experienced significant deficits in language, self-care, and socialization, participated in the multiple baseline across pairs of participants study. Activity schedules were used to teach participants to clean a kitchen, clean an office, or replenish kitchen supplies. The study also incorporated edible reinforcers, a system of most to least prompting during instructional sessions, constant time delay procedures during probes, and fading. All three pairs of participants met the 80% criterion level for completing tasks cooperatively using a single schedule. In addition, task step completion became more equivalent, meaning the number of steps completed by each participant during the vocational task moved closer to being equal, indicating participants were not repeating steps their partners had already completed. As with previously described studies in this chapter, this study demonstrates how the use of visual supports may facilitate the acquisition of work-related social skills, such as working
cooperatively. However, the study did not include maintenance or generalization probes, making it impossible to evaluate intervention effectiveness over time and across settings.

**Effective Interventions for Improving Work-Related Social Skills**

The limited number of studies and wide range of intervention approaches and targeted social skills make it difficult to draw far-reaching conclusions about the effectiveness of specific interventions. Research on work-related social skills interventions is fairly new, and studies identified in this literature review were often characterized by small samples, exploratory research designs, and investigations into the use of new technologies. However, a few trends in interventions to improve the work-related social skills of youth and adults with ASD emerged from the research literature and point to promising approaches for future research.

First, comprehensive training programs and curricula that included work-related social skills produced moderate to large effect sizes on measures of social cognition (Ashman et al., 2017), social skills performance (Bonete et al., 2015), or both (Baker-Ericzén et al., 2018), along with significant increases in social adaptive functioning (Oswald et al., 2018). Other curriculum-based interventions focused solely on improving interview skills through instruction, role plays, and feedback and found large effect sizes for positive non-verbal and verbal behaviors over time during mock interviews (Mathrick et al., 2017) and significantly higher mock interview scores for experimental group participants (Morgan et al., 2014). All of these curriculum-based interventions incorporated key aspects of social learning theory through modeling, practice, and performance feedback. The promising results from these studies suggest sustained opportunities for modeling, practice, and explicit feedback may assist individuals with ASD in improving work-related social skills.
Researchers have also incorporated technology use into interventions to increase work-related social skills for youth and adults with ASD. Studies utilized instruction in virtual reality settings to teach interview skills (Burke et al., 2018; Kandalaft et al., 2013) and social skills related to interacting with coworkers and managing workplace conflicts (Kandalaft et al., 2013). These studies found statistically significant gains in social perception scores over time, along with improvements in conversational skills (Kandalaft et al., 2013) and significant increases in mock interview scores (Burke et al., 2018). In their study that incorporated video models into an existing work-related social skills curriculum, Walsh and colleagues (2017) described dramatic improvements in social skills performance for seven young adults with ASD and ID. Like the curriculum-based interventions discussed previously, these technology-based studies provided multiple opportunities for instruction, practice, and individualized feedback. In addition, these studies utilized technology in order to minimize potentially distracting stimuli and maximize key aspects of social interactions – features that may be particularly helpful for learners with ASD, who often struggle to identify pertinent social cues. Using technology to teach social skills may also play to visual processing strengths that individuals with ASD often possess, by situating instruction within distinctively visual environments (Hume et al., 2009).

Components of the Current Study

The current study examined how an intervention which incorporates critical aspects of social learning theory and ecological systems theory can be tailored to meet the individualized learning needs of young adults with ASD and the specific social demands of competitive, integrated workplace environments. It investigated the effectiveness of a BST with in situ training intervention package which included modeling, rehearsal, and feedback on the acquisition of workplace conversational skills in community-based internship settings for
transition-aged students with ASD. The intervention package also utilized visually-based technology, through video self-modeling, during the BST portion of the intervention.

**Use of BST With in Situ Training**

BST consists of four sequential steps: instruction, modeling, rehearsal, and feedback (Miltenberger, 2014); these are key components in work-related social skills instruction. However, BST differs from other intervention approaches in both the explicit inclusion of all these instructional strategies and the sequential ordering in which they are implemented. Although its use in interventions to teach work-related social skills is limited (Burke et al., 2010; Grob et al., 2019), BST packages have been shown to be effective instructional approaches for teaching a variety of skills, including safety skills (Gunby & Rapp, 2014), job skills (Morgan & Wine, 2018), and on-task behaviors (Palmen & Didden, 2012).

Researchers sometimes incorporate an in situ training component into BST intervention packages. During in situ training, targeted skills are practiced in the authentic settings in which skill use occurs. As participants are observed engaging in targeted skills within these real-life contexts, in situ training is implemented to quickly address any performance errors and increase skill acquisition (Miltenberger, 2014). Studies have demonstrated incorporating in situ feedback in BST packages can be effective in developing skills when generalization to other settings or people is difficult (Gunby & Rapp, 2014; Miltenberger et al., 2013). Given the difficulties students with ASD often experience in generalizing social skills to other settings (Bellini et al., 2007) and the unique social skill requirements of specific work environments (Wehman et al., 2012), incorporating in situ training elements into this BST intervention package may facilitate skill development within community-based internship settings.
Two recent studies used BST (Hood et al., 2017) and BST with in situ training (Nuernberger et al., 2013) to teach conversational skills outside of workplace settings to young adults with ASD. Hood and colleagues (2017) investigated the use of BST, combined with textual prompts, to increase greetings and non-scripted conversational skills of two adolescents (ages 15 and 16) and one child (aged 8) with ASD in a university clinic-based setting. BST was used to teach the targeted conversational skills, and textual prompts were presented to participants by the trainer to provide corrective feedback during teaching sessions. Results from this multiple baseline across responses study indicated that the use of BST with textual prompts alone increased greeting and conversational skills for one participant. For the two remaining participants, skills increased when differential reinforcement was added to the intervention package, and in the case of one participant, when textual prompts were presented continuously. In the Nuernberger et al. (2013) study, three young adults with ASD, aged 18 to 23, two of whom were also diagnosed with ID, were taught conversational skills to use with peers in a comprehensive rehabilitation facility. In this multiple baseline across participants study, BST sessions occurred before each in situ training session, which were conducted in the common leisure area of the facility. Reinforcement, in the form of access to identified preferred activities, was provided to participants immediately after in situ training sessions in which consistent or improved performance was observed. All three participants demonstrated immediate improvements in conversing with peers in the in situ setting when the intervention package was implemented. Performance gains were maintained during maintenance sessions (conducted one to two weeks post-intervention) and follow-up sessions (conducted six to eight weeks post-maintenance).
Use of Video Modeling

For some learners with ASD, traditional instructional approaches which rely heavily on auditory presentation of information may be ineffective. Video modeling, in which learners view video of themselves or others successfully completing the steps of a given task, has demonstrated efficacy in the acquisition of a variety of skills (Roth et al., 2014). Moreover, skills acquired through video modeling tend to generalize well to other settings (Hume et al., 2009). Researchers posit video modeling is an effective intervention for several reasons: individuals with ASD may understand and recall information better when it is presented visually; the video helps learners to focus on relevant stimuli, which may facilitate learning and ameliorate issues with stimulus discrimination; and it does not require learners to interact with others during instruction (Hume et al., 2009).

As described previously, Walsh and colleagues (2017) used video modeling extensively in their study and documented substantive gains in a variety of work-related social skills for young adults with ASD. In a recent study examining the use of video-based instruction on employment-related social behaviors of five high school students with ID, Gilson and Carter (2018) found that participants’ use of individualized, targeted social behaviors during the operation of a school-based supply cart delivery service increased substantively with the introduction of the intervention, while rates of task engagement remained high. The video-based instruction intervention package included elements of video prompting, video modeling, and self-regulation training, delivered through an iPad application. In other studies, video modeling interventions resulted in improvements in independent transitions between locations (Cihak, 2011; Cihak et al., 2010), problem-solving during functional and vocational tasks (Yakubova & Zeleke, 2016), vocational skill performance (Allen et al., 2010), and in use of cell phones for
community safety skills (Basette et al., 2018). Video modeling shows promise as an approach to teach work-related social skills because it provides an antecedent-based, visually-focused strategy for targeted instruction prior to encountering similar situations in authentic settings.

**Gaps in Current Research**

Findings from this review of the related literature reveal gaps in current research. First, work-related social skills intervention research thus far has been conducted primarily in segregated or training environments. Very little research has occurred in integrated workplace settings. Second, work-related social skills interventions have often used group-based/curricular approaches or have focused primarily on teaching interview skills. Research is needed that targets and measures social skills required for success within specific business contexts. More specifically, while a small number of studies have used BST and/or BST with in situ training to teach work-related social skills or peer-focused conversational skills to young adults with ASD, no identified studies to date have used BST with in situ training to improve the workplace conversational skills of transition-aged students with ASD within community-based internship programs. Similarly, video modeling has been used extensively to teach a wide range of skills to learners with ASD, but it has yet to be included within a BST with in situ training intervention package. Finally, the majority of research conducted on work-related social skills thus far has included adult participants with ASD who have exited high school. Given federal mandates to expand community-based work experiences for youth with disabilities, research is needed that includes transition-aged high school students with ASD and investigates the effectiveness of interventions implemented within community work experience programs.

This study addresses gaps in the current research by examining the effects of a BST with in situ training intervention package, including a video modeling component, on the workplace
conversational skills of transition-aged students with ASD using a multiple baseline across participants research design. Video modeling was incorporated into the modeling step of BST to facilitate skill acquisition, and in situ training was used to increase skill performance accuracy in real-life internship settings. The study included several pre-intervention measures to ensure the targeted work-related social skill, conversing with coworkers, was deemed important by stakeholders (e.g., business supervisors, participants, special educator, job coach) within specific community-based internship environments. It also included post-intervention measures to evaluate the effectiveness and acceptability of the work-related social skills intervention across stakeholders.

Terms and Definitions Critical to the Study

Below are terms and definitions deemed critical to the study:

- **Work-related social skills** - Skills related to interpersonal communication, social behavior, conversation, cooperation, social communication, social initiation, social response, eye contact, or social reciprocity (Bellini et al., 2007), which are performed in a workplace setting. Specific examples of work-related social skills include accepting correction and supervision, communicating professionally with co-workers and customers, asking for help, and following specific social rules or expectations at work (Wehman et al., 2012).

- **Autism spectrum disorder** – A developmental disability characterized by sustained deficits in social communication skills and the presence of restrictive, repetitive patterns of behavior, interests, or activities, which cause significant impairments in functioning. Deficits in social communication skills may manifest as issues with conversational turn-taking; initiating and responding to social interactions; limited sharing of emotions,
affect, or interests; difficulties understanding or using nonverbal communication; and issues in developing, participating in, and maintaining social relationships (American Psychiatric Association, 2013).

- Transition-aged – The IDEA definition of transition-aged is used in this study. IDEA requires transition services begin by the time students turn 16 and continue until they exit school, which occurs when they graduate with a standard diploma or when they reach the age of 22. Therefore, within the context of this study, transition-aged is defined as students between the ages of 16 and 21.

- Behavioral Skills Training – BST is an instructional sequence; it is often used to teach skills that can be simulated (Miltenberger, 2014). BST consists of four steps, which include instruction, modeling, rehearsal, and feedback.

- Video modeling – Video modeling is an instructional strategy in which learners view video of themselves or others performing a targeted skill (Roth et al., 2014). The videos can be watched on computers, tablets, smart phones, or other handheld technological devices.

- Integrated workplace setting – An integrated workplace setting refers to a business environment in which individuals with disabilities have sustained opportunities to work and interact with individuals without disabilities (WIOA, 2014).
Chapter III

Methodology

Study Purpose

The purpose of this study was to determine if a behavioral skills training (BST) intervention package, which included video modeling and in situ training, increased the ability of transition-aged high school students with autism spectrum disorder (ASD) to converse with coworkers in community-based internship settings. The following research questions guided the study: What is the effect of a BST with in situ training intervention package on the workplace conversational skills of transition-aged high school students with ASD? Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in demonstrating targeted workplace conversational skills? Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in using the same targeted workplace conversational skills in community-based internship settings?
Study Design

Multiple Baseline Across Participants Design

The design of this study was a multiple baseline across participants single subject research design (SSRD). In a multiple baseline across participants design, the same behavior is targeted for intervention across several participants. The independent variable is introduced to each participant sequentially, with the baseline phase continuing for subsequent participants until everyone has experienced the intervention (Barlow et al., 2009). If changes in behavior occur after the independent variable is implemented with each participant, and not before, then this provides evidence the intervention, and not some other extraneous factor, is responsible for the observed changes, thus demonstrating a functional relation between the independent variable and the targeted behavior (Barlow et al., 2009; Kazdin, 1982). In multiple baseline across participant designs, at least three demonstrations of behavioral change after the introduction of the independent variable at three different points in time across participants are required to show experimental control (Horner et al., 2005). It is only by showing the targeted behavior changes each time the independent variable is introduced (across multiple participants at different points in time) that researchers can confidently conclude that the intervention caused the observed behavioral changes.

In this study, all four participants began in the baseline phase, during which observational data on the participants’ workplace conversational skills were collected. The BST with in situ training intervention package was then introduced sequentially to each participant on a one-by-one basis. In other words, the first participant began the intervention while the other three participants remained in the baseline phase. Then the second participant started the intervention at a later date, while the remaining two participants stayed in the baseline phase. This process
continued until everyone received the intervention. Throughout each phase of the study, observational data were collected on participants’ workplace conversational skills to determine if changes in these skills occurred once the intervention was introduced. Maintenance data were collected approximately two weeks after the intervention ended to investigate whether or not the acquired conversational skills persisted after instruction was withdrawn.

**Design Rationale**

A multiple baseline across participants design was selected for the study because it provides a careful and exhaustive method to answer the research questions posed by the researcher. Specifically, this design provides multiple opportunities for demonstrating the efficacy of the treatment package, if behavior changes occur after the introduction of the intervention for each participant. The multiple baseline across participants design sidesteps ethical concerns that may arise when reversal designs are used, since it does not require treatment withdrawal. Furthermore, it addresses issues that may arise with reversal designs when skills, once learned, prove resistant to reversal. Research also indicates multiple baseline designs may be particularly effective in social skills interventions. Wang et al. (2013) conducted a meta-analysis of single subject studies focused on teaching social skills to individuals with ASD. They found multiple baseline and reversal designs demonstrated larger effect sizes in social skills interventions than other types of single case designs. Although the meta-analytic method did not allow for conclusions to be drawn about why multiple baseline and reversal designs were more effective, Wang and colleagues surmised that these types of designs may be better equipped to demonstrate intervention efficacy.

Results from a pilot study conducted by the researcher suggest the multiple baseline across participants design may be well-suited for use with this intervention package. In the pilot
study, a 21-year-old student with ASD was taught to ask coworkers questions to gain work-related assistance (e.g., what to do next, where to find more work materials, how to perform a task) using the BST with in situ training intervention package. The researcher used an A-B-A-C-A reversal design. The second intervention phase included video modeling and specific instruction on when to use the target behavior during the BST portion of the training. Results showed a significant increase in the target behavior when the BST with in situ training package was implemented. Skill performance decreased when the intervention was removed during the first reversal phase. When video modeling was included with BST in the second intervention phase, the participant performed the behavior with 100% accuracy on three consecutive sessions and continued to ask questions to gain work-related assistance with high levels of accuracy (range of 30, with values from 70% to 100%) when the intervention was withdrawn. He also maintained the behavior with 100% accuracy at two weeks post-intervention. Please see Figure 2 for a graph of the pilot study results.

**Figure 2**

Use of BST With in Situ Training to Ask Questions to Gain Work-Related Assistance

*Note. M = Maintenance session.*
These pilot study findings are of particular interest for this study’s design. First, they suggest that once a work-related social skill is acquired, the behavior may not return to baseline levels when the intervention is withdrawn. Second, video modeling within the BST instructional sequence facilitated target behavior acquisition. Both of these factors influenced the researcher’s decision to use a multiple baseline across participants design in the current study. The multiple baseline across participants design negates the need for a reversal phase to demonstrate a functional relation between the intervention and the targeted behavior. It also provides a method for examining the effectiveness of the BST and in situ training package, including video modeling, across different individuals.

**Independent Variable**

The independent variable in the study was a multi-component intervention package, comprised of BST with video modeling and in situ training. The BST portion of the intervention utilized four sequential instructional steps – instruction, modeling, skill rehearsal, and performance feedback (Miltenberger, 2014). During the first step, instruction, the researcher described the key components of conversing with coworkers to participants, using word-based visual supports. The visual supports consisted of charts describing key components related to conversing with coworkers (e.g., who are coworkers, what to say to them, when to converse with them, and why conversing with coworkers was important) and a 10-step, simplified version of the conversing with coworkers task analysis. Next, participants viewed a video model of themselves practicing a conversation with a coworker for the modeling step of BST. Participants then rehearsed conversing with a coworker with the researcher. During the BST rehearsal trials, the researcher pretended to be the coworker and participants conversed with her. After each BST
rehearsal trial, the researcher provided participants with explicit verbal feedback on the steps to conversing with a coworker that they performed correctly and incorrectly.

Once the performance criterion for each BST session was met (three consecutive BST rehearsal trials with 100% accuracy), participants returned to their internships for the in situ training portion of the intervention. During each 10-minute in situ training session, the researcher observed to see if participants conversed with coworkers when naturally occurring opportunities arose. If a naturally occurring opportunity did not emerge during the 10-minute in situ training session, then the researcher arranged for a contrived opportunity to be presented to participants. If participants made errors during the in situ training sessions (i.e., did not greet a coworker in their immediate vicinity, did not continue a conversational exchange, did not return to work after the conversation ended), then the researcher intervened immediately and provided participants with a targeted indirect verbal prompt to facilitate skill performance (i.e., “Who can you talk to?” “What could you say next?” “Where do you go now?”).

**Dependent Variable**

The dependent variable in the study was conversing with a coworker, which was measured by a task analysis of the skill sequence. Conversing with a coworker was defined as gaining the coworker’s attention, initiating a greeting to or responding to a greeting from a coworker to start a conversation, participating in at least three conversational exchanges with the coworker, and then ending the conversation by saying farewell and leaving the area or returning to work tasks. A conversational exchange occurred when each conversational partner took a turn by speaking in the conversation (i.e., the participant spoke and then the coworker responded, or the coworker spoke and then the participant responded).
The content of the conversational exchanges was also considered to ensure conversational exchanges included workplace-appropriate topics. Workplace-appropriate conversational topics were defined as topics that were suitable for discussing with coworkers in work settings. They included talking about the weather, asking coworkers how they were doing, commenting on a work routine or work-related event, and talking with coworkers about the coworkers’ interests. Conversely, inappropriate conversational topics were topics that were not suitable for discussing with coworkers in work settings. They included sharing private information, talking about personal areas of interest that were unrelated to the conversation, asking coworkers to purchase items or do favors, and complaining or making negative comments about work routines or work-related events.

**Population**

The population of the study was transition-aged high school students with ASD participating in internships in integrated workplace settings. This population was chosen because of the previously described gap in research on interventions to increase work-related social skills of transition-aged students with ASD in integrated workplace settings, and because of the researcher’s access to this population for recruitment purposes.

**Participants**

All potential participants attended a community-based internship program for students with ASD in their last year of high school. Potential participants were all part of a larger research study investigating the effect of the Project SEARCH internship model, when combined with ASD-specific supports and strategies (PS + ASD), on outcomes for youth with ASD (Whittenburg et al., 2020). Once approval from the university’s Institutional Review Board was obtained, recruitment activities occurred two weeks before the study’s start. The researcher
contacted participants and their legally authorized representatives (LARs), when applicable, by phone or in-person and described the study to them, using a recruitment letter that explained the study’s purpose, the intervention procedures, the use of video recording during the study, and the steps that would be taken to protect participants’ privacy and data confidentiality. If potential participants or their LARs expressed interest in being in the study, then the researcher scheduled follow-up meetings to obtain consent and assent for study involvement. Consent was obtained from individuals who were their own legal guardians. Assent was obtained from the two individuals who were not their own legal guardians, along with consent from their LARs. Four transition-aged students with ASD were recruited to participate in the study.

**Inclusion Criteria**

To be included in PS + ASD research study, all participants had to receive special education services under the category of Autism or have a medical diagnosis of ASD or other ASD-related diagnosis (e.g., Aspergers Syndrome, Autism, Pervasive Developmental Delay – Not Otherwise Specified). Diagnoses were verified through reviews of educational and/or medical records (Whittenburg et al., 2020). Therefore, all participants in the current study had confirmed ASD diagnoses. In addition, all participants had to be between the ages of 18 and 22 years old and give their consent or assent to participate in this study. To be included in the study, participants also had to demonstrate deficits in workplace conversational skills, as identified by the Virginia Commonwealth University and Autism Speaks Community Based Functional Skills Assessment for Transition Aged Youth with Autism Spectrum Disorder (CBFSA). A deficit was defined as requiring prompting to perform the skill, performing the skill incorrectly, or not performing the skill at all, and was indicated by scores of four or lower for that skill on the
CBFSA. Finally, participants could not have received previous instruction within the integrated workplace setting on workplace conversational skills.

**Rodney**

Rodney was a White, 21-year-old male, who was diagnosed with ASD. Rodney used phrases and sentences to communicate verbally but struggled with word choice and descriptors when conveying his thoughts. His special educator reported that he was able to accurately read materials written at the fourth grade level. Rodney was adept at using his cell phone to set alarms, find his way places via map applications, and to check the weather. He was independent in self-care tasks and was actively involved in his community through church and local non-profit organizations.

Pre-intervention observations and an interview with Rodney’s job coach provided additional information about Rodney’s work-related social skill performance. Rodney consistently followed verbal and written directions given by his supervisor and job coach, and he demonstrated use of workplace etiquette when appropriate (i.e., saying “Thank you,” and “You’re welcome.”). With verbal prompting from his job coach, he asked questions to gain clarification or assistance on his internship. Rodney’s job coach reported that making eye contact with others was difficult for him. During pre-intervention observations, Rodney rarely initiated conversations with his coworkers or customers. He typically responded to coworker conversational exchanges with one-word replies.

**Thomas**

Thomas was a White, 21-year-old male, diagnosed with ASD. Thomas responded to questions and comments from others using short (typically one to three word) phrases but rarely initiated communication. Thomas frequently spoke in a soft tone of voice, which made it difficult
for others to hear and understand him. Thomas was able to read familiar sight words, some safety signs, and some consonant-vowel-constant words. He followed established routines well and used of picture- and text-based visual supports to accurately complete assigned internship tasks. Thomas sometimes needed reminders about personal grooming and was able to fix simple meals using a microwave oven.

The researcher interviewed Thomas’ special educator and observed him at his internship prior to the start of the study to learn more about his work-related social skills. Thomas’ special educator reported that he accepted correction well, typically responding by saying “I’m sorry,” and trying to fix the error. The use of picture or photograph cues helped Thomas understand and follow directions given to him by his educational staff and his internship supervisor. His special educator also stated that Thomas had difficulty with verbal communication and struggled to find the words to ask for help or problem solve on his internship. During pre-intervention observations conducted by the researcher at his internship site, Thomas did not greet or engage in conversations with coworkers or customers, although he was presented with multiple opportunities to do so.

**Terrence**

Terrence was a 21-year-old African American male, who had been diagnosed with ASD. Terrence was an established verbal communicator, who used a variety of statements and questions to make comments, articulate how he was feeling, and gain clarification when needed. Terrence demonstrated solid reading skills and was able to read and accurately answer comprehension questions about passages written at the fifth grade level. He was independent in self-care tasks and able to use money to make purchases on his own in stores and restaurants. Terrence used his cell phone through texting and calling to seek help and gain information.
Pre-intervention observations and an interview with Terrence’s job coach provided additional information about his current social skills performance. Terrence’s job coach reported that he possessed strong verbal communication skills and was able to remember and apply work-related information presented to him verbally. The job coach also stated that Terrence sought clarification when he did not understand something and accepted changes in routines well. He required intermittent verbal prompts to use a quiet voice volume in his internship setting. During observations, Terrence responded to customer greetings and directions from his internship supervisor with verbal prompts. He did not initiate greetings or engage in conversations with his coworkers within the observation timeframes.

Chris

Chris was a 21-year-old African American male, diagnosed with ASD. Chris used simple sentences and questions to verbally communicate his wants and needs and to seek clarification or support from familiar individuals. His special educator reported that Chris was able to accurately read short texts at the second grade level but struggled with comprehending those same texts. He required intermittent reminders about personal grooming and bringing needed items (i.e., lunch, identification card, visual supports) with him to the internship program.

Additional information on Chris’ work-related social skills came from pre-intervention observations and an interview with his special educator. His special educator described Chris as an established verbal communicator who was able to make his wants and needs known to others. Chris was able to follow verbal multi-step directions at work and accepted correction by apologizing and trying to fix the mistake. He used work-appropriate etiquette when needed (i.e., saying, “Thank you, and “You’re welcome.”). Chris’ special educator stated that Chris’ conversations tended to focus on his personal interests, specifically cell phones, or
concerns/worries he was experiencing. In the internship setting, Chris was observed to occasionally initiate greetings with customers and coworkers and to regularly respond to greetings from coworkers. However, he did not initiate conversations with coworkers, and he typically replied to coworker conversational questions with one-word responses.

**Setting**

*Project SEARCH + ASD Supports Program*

The setting for the study was a mid-sized military installation in the southeastern United States, which was the location of the larger PS + ASD research study. The PS + ASD model combines traditional Project SEARCH components (immersion in a community-based business, participation in internship experiences within the business) with disability-specific supports and instructional techniques often needed by students with ASD to address barriers to employment (Wehman et al., 2019). Instead of attending local high schools, students in PS + ASD reported to the military installation daily, for the duration of the school year. They received instruction in employability skills and participated in three 10 to 12 week internships at different locations to build work skills and identify work preferences (Daston et al., 2012; Wehman et al., 2017).

The PS + ASD model uses ASD-specific supports and strategies to prepare participants for employment. Applied behavior analytic techniques, including functional behavior assessment, positive reinforcement, and self-monitoring strategies, are used to address interfering behaviors and teach appropriate replacement behaviors at work (Wehman et al., 2014; Wehman et al., 2019). Task analyses, visual supports and schedules, structured work areas, stimulus transfer strategies, and discrete trial training are used to assist participants to increase work accuracy and independence when completing assigned internship tasks (Wehman et al., 2014). PS + ASD staff received training and technical assistance in applied behavior analytic techniques
to help students develop skills and behaviors needed to be successful in competitive, integrated employment settings (Wehman et al., 2019).

**Internship Settings for Participants**

The military installation provided the internship experiences for the participants. During the course of this study, participants held internships on the military installation at a museum, a medical office, and a hotel. The intervention took place at each participant’s assigned internship site.

**The Museum.** Rodney worked at the installation museum for his internship. The museum included multiple walk-through historical exhibits, a small gift shop at the entrance to the museum, and a back office area for museum staff to work. The back office area held a receptionist desk, seven cubicle areas, office space for the museum director, an archival storage room, and a small archival library. All BST sessions with Rodney were conducted in the small archival library room. Instruction occurred at the large conference table centered in the room. In one corner of the room was a desk with a computer and phone, and one wall was completely taken up by movable library shelves. Rodney’s in situ training sessions took place at the gift shop counter area and the receptionist desk. The gift shop counter area held the cash register, where museum guests made their purchases. The area formed a square in the middle of the museum lobby, with three sides comprised of glass counters displaying small items for purchase, and the fourth side comprised of the back lobby wall, displaying bumper stickers and logos. The receptionist desk area was situated at the entrance of the back office area. It was immediately adjacent to the cubicle areas and contained a L-shaped desk with counters and an office chair.

**The Hotel Supply Room.** Thomas’ internship was in the supply room of the installation’s hotel. The hotel was a four-story structure with three wings. All of Thomas’ BST
session occurred in the supply room. It was located on the ground floor of the hotel building in the back of the building, adjacent to the hotel’s linen delivery room. The supply room was a small, rectangular-shaped room. The walls of the supply room were lined with shelves, holding an assortment of items for guest rooms and cleaning supplies. BST occurred at the small, oblong T-shaped table placed at the center of the room. Thomas’ in situ sessions took place in several different locations within the hotel, based on where the first naturally occurring opportunity to converse with a coworker arose. These locations included the supply room, hotel hallways, the employee break room, and the linen room. The employee break room was located in the rear middle of hotel’s first floor, down the hall from the supply room. It included a large dining room table, two refrigerators, a microwave on a small table, and two banks of lockers on two walls. The linen room was adjacent to the supply room. On one side of the linen room, doors led out to one of the first floor guest wings. Two garage doors that opened out onto the back parking lot were on the other side. The interior of the room was filled with large, portable linen containers. There was a small desk area and round table with chairs in the room too.

**The Medical Office.** Terrence’s internship was housed within a small medical office in the outpatient medical center on the military installation. The office included a reception desk and large waiting area with multiple rows of seats for patients. The office formed a square, around which patient rooms were interspersed with staff and doctor offices. Terrence’s BST sessions occurred in the employee break room. Instruction occurred at a small circular table, with four chairs, located in one corner of the room. The room also contained a refrigerator, a small sink, a table with a microwave, and a coffee stand with a Keurig coffee maker. Terrence’s in situ sessions occurred at the receptionist area and in the office hallway. The receptionist area consisted of a large, rectangular desk with counters and two desktop computer stations. The
sessions that occurred in the office hallways took place on the side and back hallways, just outside of two staff members’ offices.

**Hotel Housekeeping.** Chris’ internship took place in the same hotel as Thomas, but in the housekeeping department. Chris worked on two wings of the first floor in guest room hallways and in the hotel lobby area. Chris’ BST sessions took place in the same supply room and employee break room as Thomas, although at separate times. Some of Chris’ BST sessions also occurred in the hotel conference room, which consisted of a large conference table surrounded by chairs and a white board on one wall. Chris’ in situ sessions took place in different areas of the hotel, based on when the first naturally occurring opportunity to converse with a coworker arose. Like Thomas, he had in situ sessions in the employee break room, the linen room, and hotel hallways.

**Materials**

The researcher developed several different instructional materials for use during BST sessions. First, the researcher used Microsoft Word to create a chart on an 8 1/2 by 11 inch piece of white paper. The word-based chart described the basic components of conversing with coworkers (i.e., who are coworkers, what you can say to them in conversations, when you can have conversations, why it is important to talk with coworkers). Three versions of the chart were developed, based on participants’ reading levels, their baseline conversation skills, and their internship settings. Rodney used the chart presented in Appendix A, and Terrence used the chart presented in Appendix B. A simplified version of the chart was used with Thomas and Chris, and it is presented in Appendix C. The researcher described the components of the chart to all participants during direct instruction on the target skill of conversing with coworkers.
The researcher also created a document outlining the specific steps to conversing with a coworker and reviewed this with participants in the instruction step of BST sessions. The word-based document was presented on an 8 1/2 by 11 inch piece of white paper. As with the chart described above, the researcher created two versions of the document describing the steps to conversing with a coworker. Rodney and Terrence used the document included in Appendix D, and Thomas and Chris used the document displayed in Appendix E.

Finally, the researcher created individualized videos of each participant performing the steps to conversing with a coworker within their respective internship settings. The videos were created after the baseline phase but before the start of the intervention phase, to prevent the potential influence of making the video model on participant skill performance during baseline. The videos were made on seventh generation iPads with the iMovie application. The researcher recorded video segments of participants as they performed each step in the conversing with a coworker skill sequence. Performance errors were edited out of videos using iMovie, and video segments were combined together to create seamless, error-free videos of each participant performing all steps to conversing with coworkers. Participants viewed the videos of themselves during the modeling portion of BST sessions on the seventh generation iPad through the iPad’s Photos application.

**Measures and Data Collection**

The study utilized several measures across different phases of the study. The Participant Demographic Profile recorded demographic information about each participant. The Work Observation – Peer Relationships, Socialization, Social Communication – Level 3 Life Seeker subscale (WO-PSS-3), the Peer Relationships, Socialization, Social Communication Interview (PSSI), and the Employer Social Skills Rating Form were used in identifying the target work-
related social skill, conversing with a coworker. The conversing with a coworker task analysis was used to record accuracy of workplace conversational skill usage on BST probes and in situ trials during baseline, intervention, and maintenance phases. Finally, social validity data on the practical significance of the intervention were collected from participants and their job coaches and/or teachers, using the researcher-developed Social Validity Measure for Participants, the modified Treatment Acceptability Rating Form-Revised (TARF-R; Reimers et al., 1991), and pre- and post-intervention administrations of the WO-PSS-3 and the PSSI.

**Participant Demographic Profile**

This researcher-developed questionnaire form asked participants to report their age, gender, race/ethnicity, and the disabilities for which they currently receive special education and/or vocational rehabilitation (VR) services. The researcher administered this questionnaire to each participant in a private setting. The researcher read aloud each item to the participant, and the participant wrote in his response or the researcher recorded it for them, based on their preference. Thomas was unsure of the disability category he received special education services under, so the researcher confirmed the category with his LAR. Appendix F provides a copy of the Participant Demographic Profile.

**CBFSA**

The CBFSA is an assessment tool created to assess the functional life skills and abilities of transition-aged youth with ASD. It measures skills in the areas of career and employment; self-determination/advocacy; health and safety; peer relationships, socialization, and social communication; community participation and personal finance; transportation; leisure/recreation; and home living skills (Schall et al., 2014). The CBFSA uses both criterion-based observations and semi-structured interviews to assess the knowledge, skills, and behaviors of transition-aged
youth with ASD in each of these areas (Schall et al., 2014). Items from the CBFSA were developed through a review of the literature on the needs of youth with ASD and a review of existing instruments that measure functional skills of individuals transitioning into adulthood (Schall et al., 2014).

This study utilized the observation and interview subscales of the CBFSA that assess social skills within work settings. The WO-PSS-3 is a 12-item observational rating scale specifically tailored to identify critical social skills needed by transition-aged youth with ASD post-high school who seek employment or post-secondary educational opportunities. Because participants were enrolled in a community-based internship program which took place outside of traditional high school environments and the majority of their time in the program was spent in real life workplace settings, the WO-PSS-3 was selected by the researcher as the most appropriate CBFSA observational subscale to use in this study. The WO-PSS-3 utilizes a five-point independence rating scale, where a score of 1 = does not do, 2 = requires physical prompting to complete, 3 = requires extensive prompting, 4 = requires limited prompting, and 5 = requires no support. While the WO-PSS-3 also provides a three-point generalization scale of different environments where the skill is performed, it was not used in the study, since the internship setting was the only environment in which the intervention occurred. The WO-PSS-3 can be found in Appendix G. The researcher conducted three structured observations using the WO-PSS-3 with each participant prior to the start of the intervention and again post-intervention. Observation sessions occurred over the course of several days, with no more than two observation sessions occurring within one day. The duration of individual observation sessions ranged from 40 minutes to one hour.
The PSSI portion of the CBFSA was also administered to each participant’s special educator or job coach pre-and post-intervention. The PSSI consists of 14 semi-structured interview questions about the participant’s social communication skills and is conducted with someone who knows the participant well. It utilizes the same five-point independence scale and offers the same three-point generalization scale as the WO-PSS-3. As with the WO-PSS-3, the generalization scale was not used in this study. Please see Appendix H for items from the PSSI. The primary researcher conducted the PSSI with Rodney’s and Terrence’s job coach and with Thomas’ and Chris’ special educator pre-intervention. A doctoral candidate, who had experience in interviewing participants and was familiar with the PSSI, conducted the post-intervention interviews. Using the PSSI, she interviewed Rodney’s and Terrence’s job coach and Thomas’ and Chris’ special educator post-intervention.

**Employer Social Skills Rating Form**

The Employer Social Skills Rating Form measures employers’ perceptions of the social skills that are most important within their specific business contexts. It was adapted by the researcher from the WO-PSS-3, and the form asks employers to rate the importance of social skills described in the WO-PSS-3 within their workplaces. The Employer Social Skills Rating Form uses a five-point scale adapted from Brown (2010), in which a score of 0 = not important at all, 1 = of little importance, 2 = of average importance, 3 = very important, and 4 = absolutely essential. This measure is presented in Appendix I. The researcher gave employers the Employer Social Skills Rating Form and reviewed its purpose with them. To better accommodate the busy schedules of employers, the researcher left the form with the employer to complete and returned within two to three days to collect it. Prior to collecting the form, the researcher checked with the
employer to see if they had any questions about specific items. None of the employers had questions or needed clarification on measure items.

**Conversing With Coworkers Task Analysis**

The researcher developed a task analysis of the steps to conversing with coworkers as the primary measure of changes in participant skill performance (Nuernberger et al., 2013). Task analyzing the skill of conversing with coworkers served two purposes. First, it broke the skill down into its component parts, which formed the basis for instruction during BST. Second, it ensured the same observable and discrete skill sequence was used for data collection during baseline, intervention, and maintenance phases across all participants. In developing the task analysis, the researcher utilized portions of task analyses for conversational skills described in the existing literature (Hood et al., 2017; Nuernberger et al., 2013). The researcher also observed participants’ special educator and job coach converse with internship coworkers and supervisors on the different internship sites and wrote down each of the steps they followed in these workplace conversations. The researcher developed the conversing with coworkers task analysis using this information, along with the two conversational skills task analyses described in the research literature. Then, the task analysis was reviewed with the participants’ special educator and job coach to ensure contextual accuracy.

The conversing with coworkers task analysis was used to measure participant skill performance on BST probes and in situ trials throughout all phases of the study. At the beginning of each session, the researcher administered a BST probe to the participant in the BST setting. All probes were video recorded by the researcher. At the start of each probe, the researcher verbally directed participants to show how they would have a conversation with their coworkers, and then recorded their performance of the skill. The researcher also video recorded all in situ
trials across participants. Participants were recorded on the first naturally occurring opportunity they had to converse with a coworker during the 10-minute observational period within their authentic internship settings. At the end of each day, the researcher watched the video recordings of the BST probes and in situ trials and coded them using the conversing with coworkers task analysis measure.

Event recording was used to code the steps on the task analysis completed accurately and independently by participants. If a participant completed a step accurately and independently, without any form of prompting, then a “+” was placed beside that step on the task analysis form. If a participant did not complete a step accurately or required prompting to complete, then a “-” was placed beside that step on the task analysis form. If a participant skipped a step, then a “. -” was placed beside that step on the task analysis form. If a participant did not have an opportunity to perform a step, then a “N/O” for “no opportunity” was placed beside that step on the task analysis form. The target number of exchanges for each conversation was set at three, based on previous research (Nuernberger et al., 2013) and observations conducted during the development of the task analysis. If a participant engaged in more than three conversational exchanges, then only the first three exchanges were coded. Once all steps were coded, then the researcher added together the number of steps performed correctly, as indicated by a “+” beside the step on the task analysis chart. That number was divided by the total number of steps in the task analysis, multiplied by 100, and rounded to the nearest tenth place, in order to calculate the accuracy percentage for that trial. Appendix J includes the conversing with coworkers task analysis that was used for the study. Appendix K provides the task analysis definitions used during the coding process.
**Social Validity Measures**

Participants, the special educator, and the job coach completed questionnaires designed to measure the intervention’s social validity post-intervention. Participants completed the Social Validity Measure for Participants to describe their perceptions of the intervention (Appendix L). This eight-item, researcher-developed survey asked participants to rate their agreement with various statements about the intervention and its effects on their social skill performance at work. The researcher administered the Social Validity Measure for Participants to participants separately in private settings. Directions to the measure and all questionnaire items were read aloud to participants.

The special educator and job coach who worked with participants in the internship program completed a modified version of the TARF-R post-intervention. The TARF-R measures practitioners’ perceptions of an intervention’s acceptability, focusing specifically on the intervention’s reasonableness, effectiveness, potential side effects, possible disruption/time it takes to implement, intervention cost, practitioners’ willingness to implement it, severity of participants’ difficulties, and practitioners’ understanding of the intervention (Reimers et al., 1991). The TARF-R demonstrates strong reliability, with an internal consistency of .92 (Carter, 2007). The modified TARF-R used in this study consisted of 19 items, which asked respondents to rate their agreement with statements about the intervention’s acceptability. The modified TARF-R utilized a five-point Likert-type scale, with different anchor descriptors for items (Carter, 2007). The doctoral candidate who interviewed the participants’ special educator and job coach using the PSSI post-intervention also administered the modified TARF-R to them during those same sessions. Please see Appendix M for the modified version of the TARF-R.
Procedure

Identification of Target Skill

The researcher identified conversing with coworkers as the target skill through a multistep process. First, the researcher completed three separate observations for each participant within their internship settings using the WO-PSS-3. Then, the researcher conducted semi-structured interviews with each participant’s special education teacher or job coach using the PSSI. Finally, the researcher administered the Employer Social Skills Rating Form to business representatives from each internship site.

The researcher selected conversing with coworkers as the target skill based on participants’ skill performance and employer relevance ratings. In order to be selected, the skill had to be: (a) rated as a “4” or lower on the WO-PSS-3 or the PSSI for all participants, (b) observed to be absent at least three times within one week when the opportunity to perform the skill was presented naturally or through contrived situations in the internship environments, and (c) rated as “of average importance” or higher by business representatives for that workplace setting. Data collected by the researcher indicated participants’ performance on the skill described in the CBFSA as “Maintains appropriate social relationships within the workplace” met the selection criteria. Because maintaining appropriate social relationships was a broad concept, it required operational definition for skill measurement. The researcher used behavioral definitions and examples from the CBFSA, anecdotal notes from observations and interviews, and information from the Employer Social Skills Rating Form to behaviorally operationalize the skill as conversing with coworkers for the study.
Baseline Phase

Concurrent baselines were used in the study, in order to control for threats to internal validity through history (Watson & Workman, 1981) and to meet the limited timeline parameters of the study. All participants began the baseline phase at the same time, but the timing of the intervention phase was staggered across participants to increase experimental control. During the baseline phase, all participants completed a BST probe with the researcher within the training setting and immediately following that, they participated in an in situ trial with a coworker in their internship settings. No participants received instruction on the conversing with a coworker skill during baseline.

Video Creation Session

After the baseline phase concluded but before the intervention phase began, participants participated in a single video creation session. During the video creation session, participants were video recorded performing the steps to conversing with a coworker within their respective internship settings. These recordings were later used as video self-models in the BST portion of intervention sessions. The researcher recorded the videos in segments that corresponded to the steps of the conversing with coworkers task analysis. Before each video segment was recorded, the researcher gave participants verbal instructions on what to do and say in the segment (i.e., before recording the step related to ending the conversation, the researcher directed participants to say “Goodbye” or “I have to get back to work now”). After the separate segments were recorded, the researcher spliced them together to create an errorless version of the participant performing the skill. Before the intervention phase began, the researcher conducted a single BST probe to gauge the immediate effect of creating a video self-model on participants’ demonstration of workplace conversational skills.
**Intervention Phase**

The order in which participants took part in the intervention phase was chosen randomly, using a random number generator. The first participant, Rodney, began the intervention phase after four baseline sessions. The intervention phase for each participant continued until the criterion for skill mastery was met, which was defined as three consecutive in situ training sessions with at least 80% accuracy for the targeted behavior. Subsequent participants began the intervention after the previous participant completed five intervention sessions or achieved skill mastery, whichever came first. As described previously, each intervention session consisted of two parts. Intervention sessions began with BST and ended with in situ training, which mirrored procedures used by Nuernberger et al. (2013). The researcher conducted a BST probe before the start of the BST portion of each session, and the in situ trial occurred during the in situ training part of each intervention session.

**BST Portion of the Intervention Session.** The BST portion of the intervention session took place in the training settings (Nuernberger et al., 2013), which were the designated private areas within each internship environment described in the Setting section of Chapter III. Each BST session followed the same four sequential steps: instruction on conversing with a coworker, watching the video model of themselves performing the steps to conversing with a coworker, rehearsing the steps to conversing with a coworker with the researcher, and receiving feedback on their rehearsal performance.

**Instruction.** In the first step of the BST sequence, instruction, the researcher described the target behavior to the participant (Miltenberger, 2014). The researcher began by reading aloud to the participant the chart describing workplace specific situations in which conversing with coworkers would be needed, what they could say during these conversations, with whom
they might have conversations at work, and why it was important to converse with coworkers. Then the researcher reviewed the steps to conversing with a coworker with the participant, using the researcher-developed document that described the steps.

**Video Self-Modeling.** Next, the participant watched a video recording of themselves performing the steps to conversing with a coworker. Participants viewed the videos on an iPad in the training setting. The video self-model followed the steps outlined in the task analysis for conversing with coworkers and showed the participant performing each step of the target behavior in the actual internship setting.

**Rehearsal.** In the third step in the BST instructional sequence, rehearsal, participants practiced performing the steps to conversing with coworkers using pretend situations until they achieved the performance criterion for moving into the in situ training portion of the intervention (Miltenberger, 2014). The performance criterion for moving into in situ training was three consecutive 100% accurate trials in the BST setting. For each rehearsal trial, the researcher directed participants to pretend the researcher was a coworker and show how they would have a conversation with the coworker. Then participants practiced the steps to conversing with a coworker with the researcher. After each rehearsal trial, the researcher recorded participants’ accuracy in completing each step of the conversing with a coworker sequence on the task analysis form. Once the performance criterion was met for each daily BST session, the participant moved into the in situ training portion of the day’s intervention session.

**Feedback.** After each rehearsal trial, the researcher provided participants with explicit performance feedback (Miltenberger, 2014). The researcher gave participants specific verbal praise for correctly performing steps to conversing with a coworker (e.g., “You did a great job waving to let your coworker know you wanted to talk them,” “I really like how you asked your
coworker about how their day is going”). The researcher also provided participants with specific corrective feedback on all incorrect steps (e.g., “Remember to say ‘I’ve got to get back to work,’ when you are ready to finish the conversation,” “Remember you can also ask your coworker if they had a good night to keep the conversation going”).

**In Situ Training Portion of the Intervention Session.** The in situ training portion of the intervention was implemented immediately after each BST portion, once the performance criterion for moving into in situ training was met. In situ training took place in the participants’ internship settings and utilized naturally occurring or contrived opportunities for participants to converse with real life individuals with whom they worked (Miltenberger, 2014).

During in situ training, the researcher observed participants in their internship settings for 10 minutes. If a naturally occurring opportunity to converse with a coworker occurred within the 10-minute observation period, the researcher recorded the participant’s use (or non-use) of each step of conversing with a coworker on the task analysis form. If a naturally occurring opportunity did not occur within the 10-minute observation period, then the researcher created a contrived opportunity for the participant to converse with a coworker. When contrived opportunities were needed, the researcher coordinated with confederates in the workplace setting (e.g., coworker, supervisor, customer) to create opportunities for participants to demonstrate the target skill. For example, when a naturally occurring opportunity did not arise during one in situ training period, the researcher asked one of Thomas’ coworkers to enter the hotel supply room and stand near him without saying anything, to give Thomas an opportunity to converse with him. Participants’ responses to contrived opportunities were recorded on the task analysis form.

If participants completed any steps incorrectly during in situ trials, then the researcher implemented BST immediately afterwards with the participant back in the training setting.
(Miltenberger, 2014). These follow-up BST sessions consisted of all four BST instructional components, including instruction, watching the video model, rehearsing with the researcher, and receiving explicit feedback from the researcher on their rehearsal performance. If participants failed to initiate steps to conversing with a coworker during in situ trials (i.e., they were in their coworkers’ immediate vicinity and did not stop to gain their attention, they did not initiate a third conversational exchange with a coworker during a conversation), then the researcher intervened in the trial and provided participants with an indirect verbal prompt (i.e., “Who can you talk to?” “What can you say next?”). Feedback was also provided to participants after each in situ training session, even when all steps of the target behavior were performed accurately.

**Maintenance Session**

Two weeks after the intervention phase ended, one maintenance session was conducted. Maintenance session procedures mirrored those during the baseline phase. The researcher met participants in the training setting at their internship site and administered a BST probe. Then, the researcher set a timer for 10 minutes and observed participants as they worked within their internship settings. In situ trial data on conversing with a coworkers were collected on the first observed opportunity. The maintenance session was discontinued once data were recorded.

**Validity and Reliability of Results**

The researcher took additional steps to enhance the validity and reliability of study results. The fidelity of implementation of the intervention package was assessed to determine if the intervention was implemented as planned. Also, a secondary coder independently coded a random sample of 25% of BST probes and in situ trials across participants and study phases, which the researcher used to calculate interobserver agreement. The study design addressed
major threats to internal validity, and the external validity of the study was enhanced through operational descriptions and the use of follow-up measures.

**Fidelity of Implementation**

The researcher assessed fidelity of implementation to provide evidence the intervention was put into effect as described. The researcher video recorded all intervention sessions, and each recording was assigned a sequential number. The researcher then used an online random number generator to select a random sample of 25% of the numbered intervention sessions for fidelity checks. Then the researcher trained a doctoral candidate, who was skilled in BST and in situ training and observational techniques, to complete the researcher-developed Fidelity of Implementation Checklist on the random sample of recorded sessions. The doctoral candidate viewed the recording of each randomly selected intervention session. Using the researcher-developed Fidelity of Implementation Checklist, she rated implementation of each step of the intervention package using a 0-2 point scale, where 0 = step was not implemented at all, 1 = step was partially implemented, 2 = step was fully implemented, and N/O = there was no opportunity to perform the step. The researcher calculated a fidelity percentage for each observed session by dividing the total number of points awarded for the session by the total number of possible points and multiplying that number by 100. The Fidelity of Implementation Checklist is provided in Appendix N.

**Interobserver Agreement**

To enhance the reliability of results, a secondary coder independently coded a random sample of 25% of the BST probe and in situ trial video recordings in each phase using the conversing with coworkers task analysis form. The researcher assigned all BST probe and in situ trial video recordings sequential numbers and then used an online random number generator to
select a random sample of 25% of the numbered BST probes and 25% of the numbered in situ trials for secondary coding. The same doctoral candidate who conducted the fidelity of implementation review was also trained by the researcher to code BST probes and in situ trials. The secondary coder attended an in-person training on data coding procedures, and she practiced coding BST probes and in situ trials with the researcher using the task analysis form, until she and the researcher coded the same recordings with 100% interobserver agreement on three consecutive recordings. After the secondary coder completed coding the random sample of BST probes and in situ trials, the researcher calculated interobserver agreement. Because frequency data that are not time-based were collected in the study, the researcher calculated interobserver agreement using the total agreement method, by dividing the number of agreements into the number of possible responses and multiplying by 100.

**Internal and External Validity**

The researcher considered and addressed, whenever possible, threats to the internal and external validity of the experiment. The design of the study helped control for threats to internal validity by demonstrating experimental effects at four different points in time across four participants (Horner et al., 2005). The researcher utilized concurrent baselines to reduce the threat of history (Watson & Workman, 1981), and the number of sessions in each phase was also described. To limit the threat of instrumentation through coder drift, all sessions were video recorded, and the researcher reviewed early session recordings and coded responses to ensure consistency in coding across phases. These steps reduced the possibility that performance changes reflected a drift in coder behavior over time, versus actual participant skill acquisition (Kazdin, 1982).
The external validity of the study was enhanced in several ways. First, the researcher recruited and included four participants in the study in order to demonstrate the generality of the findings beyond a single participant (Horner et al., 2005). The researcher also included operational descriptions of participants and settings to show for whom and under what conditions behavioral changes were likely to occur (Ganz & Ayres, 2018; Horner et al., 2005). Finally, the use of maintenance sessions enabled the researcher to assess the intervention’s generality across times by demonstrating that participants were able to demonstrate and use the target skill after the intervention ended (Kazdin, 1982).

Data Analysis

The researcher used several methods to analyze data gathered from the study. These methods focused on visual analysis of the data, using both within condition and between condition analyses. A descriptive analysis of social validity data was also conducted. The descriptive analysis included calculating the frequency distribution of responses to items on the Social Validity Measure for Participants, reporting the mean score for items on the TARF-R, and reporting participant mean scores on the WO-PSS-3 and the PSSI pre- and post-intervention.

Visual Analysis

The researcher prepared line graphs detailing BST and in situ probe data for each participant. One series of graphs presented BST probe data, and the second series of graphs presented in situ trial data. The graphs visually displayed data points throughout each phase for each participant. Phase change lines were used to denote changes in conditions (e.g., baseline, intervention, maintenance).

Within Condition Analysis. The researcher utilized several techniques for the within condition visual analysis of the graphs. The researcher conducted a trend analysis for each phase
and included trend lines for graphed data in each phase. The trend analysis focused on examining the slope of trend lines, direction of trend lines, and stability of the data surrounding the lines. The researcher described level stability for each phase and calculated the level change within each phase. The mean and range of data points within each phase for each participant was calculated. The researcher also noted the length of each phase (e.g., the number of sessions) experienced by each participant.

**Between Condition Analysis.** The researcher conducted a between condition analysis. Changes in level between adjacent conditions were analyzed by calculating and comparing the differences between the last data point and the first data point of adjacent phases. The researcher also analyzed changes in trend between phases, noting visual differences in the direction, slope, and stability of trend lines. The direction and slope of each trend line was calculated and compared across phases. Stability of trend lines were examined across all phases to compare differences in stability. In addition, percentage of all non-overlapping data (PAND; Parker et al., 2011) was calculated between adjacent phases to evaluate the relative effects of the phases on the target behavior (Barlow et al., 2009).

**Social Validity Data Analysis**

The researcher analyzed social validity data through tables and descriptive analyses. Data from the Social Validity Measure for Participants and the TARF-R were reported in tables which listed the frequency distribution of respondents’ response selections per item and the mean score per item, respectively. In a separate table, the researcher displayed each participant’s mean scores on the WO-PSS-3 and the PSSI pre- and post-intervention. The researcher also described key responses to questions about the intervention’s acceptability from participant, special educator, and job coach perspectives.
Chapter IV

Results

The purpose of this study was to investigate the effects of a behavioral skills training (BST) with in situ training intervention package on the workplace conversational skills of four transition-aged high school students with autism spectrum disorder (ASD). The following questions guided this study: What is the effect of a BST with in situ training intervention package on the workplace conversational skills of transition-aged high school students with ASD? Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in demonstrating targeted workplace conversational skills? Does the BST with in situ training intervention package increase the accuracy of transition-aged high school students with ASD in using the same targeted workplace conversational skills in community-based internship settings?

Intervention sessions began with BST and ended with in situ training within internship settings. During each session’s BST portion, participants were instructed on conversing with coworkers, watched video models of themselves performing the skill, rehearsed the skill of conversing with coworkers with the researcher, and received explicit feedback on their rehearsal performance. Then participants moved into the in situ training portion of the intervention
session. During each in situ training session, the researcher observed participants in their internship settings as they conversed with their coworkers on the first opportunity. If participants made errors during the in situ trial, then the researcher conducted a BST review with the participant immediately afterward. BST probe data were collected across all study phases at the start of each BST session; in situ data were collected across all phases during the internship observation period of the session. The researcher also collected BST probe data on the video self-model creation session, which occurred after the baseline phase ended but before the intervention phase began.

Results demonstrate a functional relation between the introduction of the intervention and an increase in workplace conversational skills accuracy during in situ training across all four participants. Substantive increases in conversational skills accuracy on BST probes from baseline to intervention were also observed. Three out of four participants maintained skills at mastery levels during follow-up sessions conducted approximately two weeks post-intervention.

**Effect of BST With in Situ Training on Workplace Conversational Skills**

**BST Probes**

During BST probes, participants demonstrated the steps to conversing with a coworker in the training setting with the researcher. Baseline range scores for Rodney and Terrence highlighted variability in BST probe data (Rodney’s baseline range equaled 58, with probe scores ranging from 10% to 70%; Terrence’s baseline range equaled 50, with probe scores ranging from 40% to 90%). Data for three out of four participants (Rodney, Terrence, and Chris) indicated an immediate, positive level change in performance accuracy on the BST probe conducted after the creation of the video self-model.
Analysis of BST probe scores conducted during the intervention phase indicate that all four participants improved in their ability to demonstrate how they would converse with coworkers. BST probe data for three participants (Rodney, Terrence, and Thomas) showed an immediate response to the intervention package, with high levels of accuracy (80% to 100%) documented within the first two intervention sessions. Chris required three sessions to achieve higher levels of accuracy (90% to 100%) but maintained BST probe performance at those levels after that. Clear changes in trend line slope and/or direction between baseline and intervention were observed for Thomas, Terrence, and Chris. Rodney’s baseline trend line was affected by the first BST probe data point, as his first BST probe score was substantially lower than subsequent baseline probe scores. Rodney appeared to have difficulty understanding researcher directions (e.g., “Show me how you have a conversation with a coworker”) during the first baseline BST probe, but not on subsequent probes. There were two overlapping data points between baseline and intervention phases across all participants. Chris, on his second BST probe during the intervention phase, scored 40%, which overlapped with his baseline BST probe scores. However, Chris’ BST probe score increased to 100% on the third intervention phase session, and probe scores remained between 90% and 100% for the rest of the intervention phase. Thomas scored 0 (zero) on the BST probe conducted after the creation of the video self-model, but his BST probe scores increased immediately with the introduction of the full intervention package and remained between 80% to 100% accuracy.

Graphed results for Rodney, Terrence, and Chris demonstrate increases in level between the baseline phase and the video creation session. BST probe scores increased by 30% for Rodney and Terrence and by 20% for Chris. Three out of four participants’ BST probe scores
increased between the video creation session and the first data point of the intervention phase. The positive change in level was 80% for Thomas and 20% for Terrence and Chris.

Participants also maintained their skills in demonstrating how to converse with coworkers during follow-up sessions conducted post-intervention. One maintenance session was conducted for each participant in the training setting with the researcher approximately two weeks after the intervention phase ended for the participant. All four participants achieved BST probe scores of 100% accuracy in these follow-up sessions. Figure 3 displays graphs of BST probe accuracy across the four participants.

**In Situ Trials**

During in situ trials, participants were observed in their internship settings to assess their skills in conversing with coworkers on the first naturally occurring opportunity. The researcher created contrived opportunities for participants to demonstrate the skill if naturally occurring opportunities did not present during the ten-minute observation periods. Compared with the BST probes, much less variability in skill accuracy was observed across participants during in situ trial baseline phases. Baseline in situ trial range was 33 for Chris (with scores from 0 to 33%), 0 (zero) for Thomas (with all scores at 0), 20 for Terrence (with scores from 0 to 20%), and 30 for Chris (with scores from 0 to 30%).

A functional relation was demonstrated between the introduction of the intervention package and increases in skill accuracy in conversing with coworkers across all four participants, when compared with conversational skill accuracy during baseline phases. Clear changes in both the direction and slope of trend lines between baseline and intervention phases were seen for Rodney, Thomas, and Terrence. There was an increase in the slope of the trend line in the intervention phase compared to the slope of the trend line during the baseline phase for Chris.
Figure 3

BST Probe Accuracy Across Participants
during in situ trials. The researcher also documented increases in level between baseline and intervention phases for all four participants, and there was no data overlap for any participant between baseline and intervention phase in situ trials. In situ trial scores from the last baseline data point to the first intervention phase data point increased by 90 percentage points for Rodney and Terrence, 50 for Thomas, and 60 for Chris. Two participants, Rodney and Terrence, achieved skill mastery criteria in three intervention sessions. Thomas achieved skill mastery in nine sessions, and Chris achieved skill mastery in 13 sessions.

The researcher also assessed skill maintenance post-intervention within the participants’ internship settings. Three out of four participants (Rodney, Terrence, and Chris) maintained skills at the follow-up in situ trial session conducted approximately two weeks post-intervention. Although Thomas demonstrated the skill of conversing with a coworker at a higher level of accuracy than baseline (56%), he did not meet skill mastery criteria at follow-up. Figure 4 displays in situ trial accuracy across participants for each phase of the study.

**Participants’ Demonstration of Workplace Conversational Skills During BST Probes**

**Rodney**

Rodney’s BST probe scores during the intervention phase ($M = 95\%, Mdn = 95\%$) were substantially higher than his BST probe score in the post-video creation session and his BST probe scores during the baseline phase ($M = 50\%, Mdn = 60\%$). The visual analysis of Rodney’s BST probe data showed some variation within baseline phase data points. This variation was due largely to the first BST probe score (10%). During the initial BST probe, Rodney had difficulty responding to the verbal stimulus given by the researcher. To improve baseline level stability, the researcher added a fourth baseline data collection session. Rodney’s performance on BST probes stabilized during the second through fourth baseline BST probes. With three consecutive, similar
Figure 4

In Situ Trial Accuracy Across Participants
data points during baseline (ranging from 60% to 70%), the researcher then implemented the intervention package. The overall slope of the baseline trend line was positive ($m = 0.14$) when all data points were used in slope calculation, and if the first data point was not included, then the slope of the baseline trend line decreased ($m = -0.05$) and all data points fell within 15% of the trend line.

There was an immediate, positive change in level between the last baseline BST probe and the post-video creation BST probe. Rodney’s skill accuracy in demonstrating how to converse with a coworker continued to improve on the next two intervention phase BST probes. The visual analysis indicated a positive change in trend line slope between the baseline and intervention phases; a change in trend line direction was also noted between the baseline and intervention phases if the first baseline data point was not included. There was no overlap between baseline data points and intervention phase data points for Rodney during the BST probes. Percentage of all non-overlapping data (PAND) between the baseline and post-video creation phases equaled 1.0; PAND between the post-video creation and intervention phases equaled 0.67.

Because Rodney achieved skill mastery after three intervention sessions, he only completed two intervention phase BST probes. Intervention phase BST probes began on the second day of intervention in order to measure skill performance after completion of the first intervention session. The limited number of BST probe data points reflects Rodney’s quick acquisition of workplace conversational skills within the actual internship setting; the intervention was discontinued once Rodney achieved the criterion for skill mastery (three consecutive in situ trials with 80% accuracy). The slope of the intervention phase trend line was positive ($m = .05$), and all intervention data points fell within 15% of the trend line, indicating
level stability. Rodney maintained high levels of skill accuracy at the two-week maintenance session post-intervention, scoring 100% accuracy on the BST probe administered at that time.

**Thomas**

Thomas’ baseline phase consisted of five sessions. Thomas was absent from the internship program on two days during the baseline phase, so data were collected over the course of seven days. Very low BST probe scores were noted during baseline data collection ($M = 8\%, Med = 10\%$), along with a slight, upward trend for the phase ($m = 0.01$). The visual analysis indicated level stability, with all data points falling within 15% of the trend line during the baseline phase.

Thomas’ skill accuracy did not improve on the BST probe conducted after the video creation session; in fact, it fell to 0 (zero). However, immediate improvement in his conversing with coworker skill accuracy occurred after the introduction of the intervention package, as indicated by an 80 point increase in BST probe scores from the post-video creation session to the first intervention session. The visual analysis showed change in trend line slopes between baseline and intervention phases, with the slope increasing during the intervention phase. Although data point overlap occurred between baseline and post-video creation BST probes, there was no overlap between baseline and intervention BST probe scores. Between the baseline and post-video creation phases, PAND equaled 0.83. PAND was calculated at 1.0 from post-video creation to intervention.

After the BST with in situ training intervention was implemented, Thomas’ BST probe scores improved ($M = 92.5\%, Med = 100\%$). The researcher noted a strong, positive trend within the intervention phase ($m = 0.09$). The visual analysis also indicated that the data were stable; no
data points fell outside of 15% of the intervention phase trend line. Thomas demonstrated skill maintenance with 100% accuracy on the BST probe administered two weeks post-intervention.

**Terrence**

Terrence remained in the baseline phase for 12 sessions. His intervention BST probe scores were higher ($M = 100\%$, $Med = 100\%$) than his intervention phase probe scores ($M = 66\%$, $Med = 70\%$). There was considerable variation in Terrence’s baseline data points; this was due largely to inconsistency in his use of workplace-appropriate topics during baseline BST probes. In other words, Terrence scored lower on the BST probes during baseline in which he talked about topics that were not appropriate for workplace conversations, such as a medical condition and being bored at work. Despite the variability in data, a decreasing baseline trend was noted ($m = -0.01$).

There was an immediate, positive change in level from the last baseline BST probe to the BST probe taken after the video creation session. A similar positive change in level occurred between the post-video creation BST probe and the first intervention session BST probe. The researcher also noted differences in mean (+34) and median (+30) BST probe scores between baseline and intervention phases. Furthermore, the direction of the trend line changed from decreasing to horizontal. The post-video data creation data point did overlap with baseline data points; however, no overlap was present between the baseline and intervention phases. PAND between baseline and the post-video creation phase was 0.69, and PAND between post-video creation and the intervention phase was 1.0.

Like Rodney, Terrence participated in two BST probes during the intervention phase. At that point, the intervention was discontinued, because Terrence met the criterion for skill mastery (three consecutive in situ trials with 80% or higher accuracy). Terrence scored 100% accuracy on
both BST probes administered during the intervention phase. This high level of accuracy (100%) was maintained on the follow-up BST probe given two weeks post-intervention.

Chris

Chris’ baseline phase consisted of 15 sessions; he was absent from the internship program one day during this phase. During baseline BST probes, Chris’ overall accuracy in demonstrating how to converse with a coworker was low ($M = 31\%, Med = 30\%$). The researcher observed variation in data points within the baseline phase, this was due largely to the first data point. Chris’ score on the first baseline phase BST probe was 0 (zero). If all data points are considered, then there was a slight upward trend ($m = 0.01$) during baseline. However, if the first data point was not included, then the trend line moved closer to zero ($m=0.005$), and the data became more stable.

The visual analysis indicated an immediate change in level on BST probes from baseline to the post-video creation session, and again from the post-video creation session to the intervention phase. Positive changes in mean (+56.5) and median (+60) occurred with the implementation of the intervention package. One data point overlapped between the baseline and intervention phases. PAND between baseline and post-video creation was 1.0; it was 0.92 between post-video creation and the intervention phase.

The intervention phase consisted of 12 BST probe sessions, and Chris was absent from the internship program for two days during this phase. His intervention BST probe scores were much higher than baseline ($M = 87.5\%, Med = 90\%$), and there was also a mild increase in the slope of the trend line during intervention ($m = 0.02$). As with baseline BST probe data, variability was noted during the intervention phase, with lower BST probe scores in the first two intervention sessions contributing substantively to the observed variability. Beginning with the
third intervention BST probe data point, and continuing until the end of the intervention phase, Chris’ BST probe scores remained between 90% and 100% accuracy. He maintained this high level of accuracy during the maintenance session, which was conducted two and a half weeks after the intervention phase ended.

**Participants’ Use of Workplace Conversational Skills During in Situ Trials**

**Rodney**

During the in situ trials conducted within the museum internship setting, Rodney’s skill accuracy during the intervention phase was substantively higher ($M = 97\%$, $Med = 100\%$) than in situ trials conducted during the baseline phase ($M = 13\%$, $Med = 10\%$). The researcher noted variation within in baseline data points, but the overall direction of the baseline trend line was decreasing ($m = -0.07$).

Immediate and substantive improvement in Rodney’s conversing with coworker skill performance occurred with the introduction of the intervention package. The change in level between the last baseline in situ trial and first intervention in situ trial was 90. Changes in mean and median also reflected these differences in skill performance between phases, with mean change equaling 84, and median change equaling 90. The visual analysis indicated a clear change in the direction of baseline and intervention phase trend lines, with Rodney’s performance on the conversing with a coworker in situ trials improving with the implementation of the intervention. No overlap occurred between baseline and intervention phase data points, and PAND was calculated at 1.0.

As discussed previously, Rodney achieved criterion for skill mastery after the first three in situ trial sessions. In contrast to the baseline phase, the slope of the trend line within the intervention phase was positive ($m = 0.05$). Solid level stability was noted within the intervention
phase; all data points fell within 15% of the phase trend line. Performance gains were maintained at follow-up session conducted two-weeks post-intervention; Rodney scored 100% accuracy on the in situ trial conducted at that point in time.

**Thomas**

Thomas scored 0 (zero) on all five baseline in situ trials measuring his skills in conversing with coworkers during naturally occurring opportunities in the hotel setting. With the beginning of the intervention phase, there was an immediate change in level. The researcher also observed a change in the direction and slope of trend lines, from a horizontal trend line during baseline to strong, upward trend line during intervention. Differences in mean and median scores were also substantive between the two phases, (change in mean = 75, change in median = 70). No overlap occurred between baseline and intervention phase data points, and PAND was 1.0.

Within the intervention phase, Thomas achieved skill mastery after eight sessions. In situ trial scores were substantively higher during intervention ($M = 75\%$, $Med = 70\%$) than baseline. The intervention trend line was strong ($m = 0.06$), and level stability was noted within this phase too. Thomas did not maintain skill mastery at the two-week post-intervention follow-up session, but the maintenance in situ trial score (56%) was higher than any of his baseline scores.

**Terrence**

Terrence did not regularly converse with coworkers within the medical office internship setting during baseline in situ trials. On the two trials in which he scored 20% accuracy, he briefly responded to coworkers’ greetings and their initial conversational questions (i.e. “How are you doing?”). His overall baseline in situ trial scores reflect this lack of interaction with coworkers during naturally occurring opportunities on the internship site ($M = 3\%$, $Med = 0$). There was minimal variation in baseline data points, and the trend line was flat ($m = 0.00$).
A dramatic increase in level was observed between the last baseline in situ trial and the first intervention phase in situ trial. The researcher noted substantive differences between baseline and intervention phase mean (+94) and median (+90) in situ trial scores. In addition, no overlap occurred between baseline and intervention phase data points, and PAND was calculated at 1.0.

Terrence quickly achieved skill mastery after three intervention sessions. His mean and median intervention in situ trial scores were significantly higher than baseline \((M = 97\%, \ Med = 100\%)\). The visual analysis showed a positive trend \((m = 0.05)\) within the intervention phase, and all data points fell within 15% of the trend line. Terrence maintained the skill of conversing with coworkers at 100% accuracy on the follow-up in situ trial conducted two weeks post-intervention.

**Chris**

Within the hotel housekeeping department internship setting, Chris’ scores on baseline in situ trials \((M = 5\%, \ Med = 0)\) were lower than his baseline BST probe scores. The researcher noted some variation in data points as the phase progressed, with most of the variation occurring during the last five baseline sessions. However, even within the last five baseline sessions, Chris’ performance accuracy never rose above 30%. The visual analysis indicated a slight positive trend \((m = 0.009)\) during baseline.

With introduction of the intervention, Chris experienced an immediate and substantive positive change in performance. Specifically, there was an increase in level of 60 percentage points between the last baseline in situ trial and first intervention in situ trial. Substantive, positive differences were also seen between baseline and intervention means (+74) and medians.
Furthermore, there was no overlap between baseline data points and intervention phase data points. The PAND between these two phases was 1.0.

Once the BST with in situ training intervention package was implemented, Chris achieved skill mastery after 13 sessions. The visual analysis indicated variability within intervention data points; four data points fell outside of the stability envelope. However, mean and median intervention phase in situ trial scores were much higher \((M = 79\%, \text{Med} = 80\%)\) than baseline in situ trial scores. The intervention phase trend line also had a steeper positive slope \((m = 0.01)\) than the baseline phase trend line. Finally, Chris maintained his conversing with coworkers skill post-intervention, as indicated by the 100\% accurate in situ trial conducted two and a half weeks after the intervention ended. Table 1 reports mean BST probe and in situ trial task analysis scores across phases of the study for each participant.

### Table 1

**Participants’ Mean Percentage Accuracy on Task Analysis Across Phases**

<table>
<thead>
<tr>
<th></th>
<th>BST probes</th>
<th></th>
<th>In situ trials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Post-video*</td>
<td>Intervention</td>
</tr>
<tr>
<td>Rodney</td>
<td>50</td>
<td>90</td>
<td>95</td>
</tr>
<tr>
<td>Thomas</td>
<td>8</td>
<td>0</td>
<td>92.5</td>
</tr>
<tr>
<td>Terrence</td>
<td>66</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Chris</td>
<td>31</td>
<td>50</td>
<td>87.5</td>
</tr>
</tbody>
</table>

* Reflects that the reported score is not the mean. Rather, the reported score is the single score obtained for that phase.

### Behavioral Changes Across BST and in Situ Settings

#### Rodney

Rodney’s performance improved substantively with the implementation of the intervention package. During baseline BST probes, Rodney greeted the researcher and responded
to questions/comments from her. However, he did not ask the researcher any questions or use workplace-appropriate topics in conversational initiations. Instead, Rodney listed the tasks he had completed at his internship thus far during the day (i.e. “I started cleaning all the glass,” “I dusted everything”). In two out of four baseline in situ trials, Rodney did not converse with coworkers when naturally occurring opportunities arose. Once the intervention package was implemented, the content of Rodney’s conversational exchanges improved substantively on both BST probes and in situ trials. He incorporated workplace-appropriate topics taught in the BST sessions into practice probes and in situ conversations with his coworkers by asking how the conversational partner’s day was going, commenting on upcoming holidays and the weather, and ending the conversation by saying he had to get back to work. These improvements in conversational content were also noted in the maintenance session conducted post-intervention.

**Thomas**

Overall, Thomas’ workplace conversational skills during baseline were limited. He did not converse with coworkers during baseline in situ trials, and he did not attempt to gain his conversational partner’s attention or initiate greetings or farewells during baseline BST probes. Thomas did initiate a few conversational exchanges during the BST probes. These attempts primarily consisted of telling the researcher the internship task he was working on at that point in time (i.e., “Going this way with the vacuum cleaner,” “Special delivery.”). After the intervention package was implemented, Thomas’ conversational skills during BST probes improved dramatically and quickly. He engaged in both greetings and farewells, and consistently initiated conversational exchanges by asking “How are you?” “How is your day going?” and “Did you have a good night?”. Thomas’ conversational skill accuracy during in situ trials also increased with the implementation of the intervention, although improvements did not occur as quickly as
with BST probes. In initial intervention phase in situ trials, he required indirect verbal prompts to initiate and maintain conversations with coworkers in his immediate vicinity, but ultimately achieved the skill mastery criterion for conversing with his coworkers in his internship setting. During conversations with coworkers, Thomas used the same questions he practiced with the researcher during BST sessions (i.e., asking coworkers, “How are you?” “How is your day going?” “How was your night?”).

**Terrence**

The researcher noted distinct differences in Terrence’s baseline performance across BST probes and in situ trials. When demonstrating with the researcher during BST probes how to have a conversation with a coworker, Terrence regularly initiated conversational exchanges. However, the choice of conversational topics was often not workplace appropriate (discussing a medical condition, describing work as boring, sharing details about the stomach flu). During baseline in situ trials, Terrence did not converse with coworkers during naturally occurring opportunities, unless a coworker spoke to him first. Then his answer was frequently a one-word reply. With the introduction of the intervention package, Terrence’s conversational skills during both BST probes and in situ trials improved. Across both measures, he initiated greetings and ended conversations with farewells. He also began to ask questions (i.e., “How are you doing?”) and to talk about workplace appropriate topics, such as upcoming events and holidays.

**Chris**

Chris’ workplace conversational skills improved substantively over the course of the intervention. During baseline BST probes, Chris typically relied on a previously learned communication skill – introducing himself to someone new. He regularly began the BST probes by saying, “Hi, my name is Chris, and I’m a Project SEARCH intern,” which was not an
appropriate greeting for coworkers who would already know him. Chris initiated communication exchanges during baseline BST probes, but the topics were not workplace appropriate. He repeatedly stated how he was feeling or listed items/activities that he enjoyed (i.e., “I like Skittles,” “I like Chuck E. Cheese,” “I like the movies.”). Chris did not initiate workplace appropriate greetings or farewells or ask the researcher questions during the BST probes. On 11 out of 15 baseline in situ trials, Chris did not converse with his coworkers at all during naturally occurring opportunities. He briefly responded to coworker greetings on three trials, but he only continued a conversational exchange once, when he asked his internship manager how he was doing.

With the implementation of the intervention package, Chris’ conversational skills initially fluctuated, but then improved substantively. Consistent improvement was noted first within the BST training environment. Chris consistently scored 90% to 100% accuracy on BST probes from the third intervention probe onward. It took Chris longer to achieve high levels of accuracy, and ultimately, meet skill mastery criterion, on intervention in situ trials. He did not reach three consecutive in situ trials with 80% accuracy or higher until session 13. Like Thomas, Chris used the same conversational questions that had been taught during instruction (i.e., “How are you doing?” “Are you having a good day?” “Did you have a good night?”) to initiate conversational exchanges in both BST probes and in situ trials during the intervention phase.

**Interobserver Agreement**

As described in Chapter III, a random sample of 25% of all study sessions across participants was double coded by a doctoral candidate skilled in single subject research design (SSRD) and behavioral analysis. The secondary coder followed the same coding process as the researcher by viewing video recordings of the sessions and coding each session using the task
analysis form for conversing with a coworker. Task analysis scores obtained by the secondary coder and the researcher were compared to determine interobserver agreement. Specifically, interobserver agreement was calculated using total agreement, by dividing the number of agreements into the number of possible responses and multiplying by 100, for each double-coded session. Interobserver agreement scores ranged from 50% to 100%, with an overall interobserver agreement mean score of 90%.

**Fidelity of Implementation**

The fidelity of implementation of the intervention package was also evaluated. The same doctoral candidate reviewed a random sample of 25% of the intervention sessions across participants via video recordings. For each session, she used the fidelity of implementation checklist to rate implementation of each step of the intervention package using a zero to two point scale, where 0 = step was not implemented at all, 1 = step was partially implemented, 2 = step was fully implemented, and N/O = there was no opportunity to perform the step. Then, the researcher used the completed fidelity of implementation checklists to calculate a fidelity percentage for each observed session by dividing the total number of points awarded for the session by the total number of possible points and multiplying that number by 100. Fidelity percentages ranged from 88.9% to 100%, with an overall mean fidelity percentage of 96.8%.

**Social Validity Results**

*Social Validity Measure for Participants Results*

The researcher administered the Social Validity Measure for Participants to participants post-intervention to assess their perceptions of the intervention package. Table 2 provides the frequency distribution of responses to each item on the Social Validity Measure for Participants. All participants agreed that their workplace social skills improved from being in the study and
that being in the study helped them do their jobs better. When asked about specific components of the intervention package, all participants agreed that telling them about the social skill and practicing the skill helped them learn it. A few areas of disagreement between participants did emerge from the results of the Social Validity Measure for Participants. Terrence was unsure if showing him the skill helped him learn it, and he did not feel that receiving feedback on his performance of the skill was helpful. Terrence was also uncertain if communicating better with others at work was important to him. Rodney indicated that he was not sure if understanding social rules at work was important to him.

**Table 2**

*Frequency Distribution of Responses on the Social Validity Measure for Participants*

<table>
<thead>
<tr>
<th>Item</th>
<th>Agree (%)</th>
<th>Not Sure (%)</th>
<th>Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My social skills at work improved from being in this study.</td>
<td>4 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Communicating better with others at work is important to me.</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0</td>
</tr>
<tr>
<td>Understanding the social rules at work is important to me.</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0</td>
</tr>
<tr>
<td>Being in this study helped me do my job better.</td>
<td>4 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Telling me about a workplace social skill helped me learn it.</td>
<td>4 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Showing me how to use a workplace social skill helped me learn it.</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0</td>
</tr>
<tr>
<td>Practicing a workplace social skill helped me learn it.</td>
<td>4 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Giving me feedback on a workplace social skill helped me learn it.</td>
<td>3 (75)</td>
<td>0</td>
<td>1 (25)</td>
</tr>
</tbody>
</table>
performance of the skill was helpful. Terrence was also uncertain if communicating better with others at work was important to him. Rodney indicated that he was not sure if understanding social rules at work was important to him.

**TARF-R Results**

Each participant’s special educator or job coach completed the modified version of the Treatment Acceptability Rating Form-Revised (TARF-R), which gauged educational staff members’ perceptions of the intervention. Mean scores for each item on the TARF-R are reported in Table 3. A one through five point rating scale was used for each item on the TARF-R.

Overall, the special educator and job coach rated the intervention package as effective, feasible, and usable. They reported they understood the intervention, liked the intervention procedures, and thought it would be effective in improving their students’ social skills. The special educator and job coach also indicated that the intervention package was inexpensive, would take little time to implement, and would cause very little disruption to the internship program. The biggest differences in respondent scores on the modified TARF-R were noted on items rating the significance of each participant’s social skill difficulties. Special educator and job coach scores ranged from one to four on items rating the seriousness of social skill deficits for each participant compared to other students, the severity of social skill deficits for each participant, and the respondent’s level of concern about specific participants’ social skill deficits.

**CBFSA Results**

Two portions of the Virginia Commonwealth University and Autism Speaks Community Based Functional Skills Assessment for Transition Aged Youth with Autism Spectrum Disorder (CBFSA), the Work Observation – Peer Relationships, Socialization, Social Communication –
Table 3

*Mean Scores of Items on the TARF-R*

<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
</tr>
</thead>
<tbody>
<tr>
<td>How clear is your understanding of this intervention?</td>
<td>5.00</td>
</tr>
<tr>
<td>How acceptable is this intervention for addressing your student’s needs?</td>
<td>5.00</td>
</tr>
<tr>
<td>How willing are you to use this intervention?</td>
<td>5.00</td>
</tr>
<tr>
<td>How reasonable is this intervention for addressing your student’s needs?</td>
<td>5.00</td>
</tr>
<tr>
<td>How costly would it be to use this intervention?</td>
<td>1.00</td>
</tr>
<tr>
<td>How likely are there to be disadvantages in using this intervention?</td>
<td>1.00</td>
</tr>
<tr>
<td>How likely is the intervention to make permanent improvements in your student’s social skills?</td>
<td>4.75</td>
</tr>
<tr>
<td>How much time will you need each day to carry out this intervention?</td>
<td>1.75</td>
</tr>
<tr>
<td>How confident are you that this intervention will be effective?</td>
<td>5.00</td>
</tr>
<tr>
<td>Compared to other students with social skill difficulties, how serious are your student’s social skill problems?</td>
<td>3.00</td>
</tr>
<tr>
<td>How disruptive will it be to the internship program to carry out this intervention?</td>
<td>1.25</td>
</tr>
<tr>
<td>How effective is this intervention likely to be for your student?</td>
<td>4.75</td>
</tr>
<tr>
<td>How much do you like the procedures used in this intervention?</td>
<td>5.00</td>
</tr>
<tr>
<td>To what extent are undesirable side effects likely to occur from using this intervention?</td>
<td>1.00</td>
</tr>
<tr>
<td>How much discomfort is your student likely to experience during this intervention?</td>
<td>1.50</td>
</tr>
<tr>
<td>How severe are your student’s social skill difficulties?</td>
<td>2.75</td>
</tr>
<tr>
<td>How willing would you be to change your regular instruction routine to carry out this intervention?</td>
<td>5.00</td>
</tr>
<tr>
<td>How well will carrying out this intervention fit within your existing instructional routine?</td>
<td>5.00</td>
</tr>
<tr>
<td>To what degree are your student’s social skill difficulties concerning to you?</td>
<td>3.00</td>
</tr>
</tbody>
</table>
Level 3 Life Seeker (WO-PSS-3) subscale and the Peer Relationships, Socialization, Social Communication Interview (PSSI) subscale, were used pre- and post-intervention as measures of practical significance. The researcher conducted pre- and post-intervention observations of participants using the WO-PSS-3. All four participants demonstrated overall gains in social skill scores within their internship settings. While Chris’ pre-intervention observation scores were lower than the other three participants, he made gains that placed his post-intervention observation scores near Rodney and Terrence. Thomas also demonstrated improvements in observed social skills, but not to the same extent as other participants.

Thomas’ and Chris’ special educator and Terrence’ and Rodney’s job coach were interviewed pre- and post-intervention about a broad range of participants’ social communication skills using the PSSI. Three out of four participants’ social communication skills were scored higher by their special educator or job coach on the post-intervention interview rating. Thomas’ and Terrence’s scores on this measure increased (by 1.3% and 3.3% respectively) on the measure, while Rodney’s PSSI scores reflected the highest increase post-intervention (by 13.1%). However, the special educator’s rating of Chris’ overall social communication skills decreased from 78.7% pre-intervention to 62.7% post-intervention. Table 4 provides pre- and post-intervention scores on both subscales of the CBFSA for all participants.
Table 4

Pre- and Post-Intervention CBFSA Scores

<table>
<thead>
<tr>
<th></th>
<th>WO-PSS-3 Observation Scores</th>
<th>PSSI Interview Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
<td>Post-Intervention</td>
</tr>
<tr>
<td>Rodney</td>
<td>73.2%</td>
<td>94.8%</td>
</tr>
<tr>
<td>Thomas</td>
<td>73.6%</td>
<td>82.5%</td>
</tr>
<tr>
<td>Terrence</td>
<td>69.8%</td>
<td>92.3%</td>
</tr>
<tr>
<td>Chris</td>
<td>56.5%</td>
<td>93.8%*</td>
</tr>
</tbody>
</table>

* Indicates two observation sessions, instead of three, were conducted.
Chapter V

Discussion

Key Findings

The researcher conducted this study using a multiple baseline across participants design to examine the effect of a behavioral skills training (BST) with in situ training intervention package, with embedded video modeling, on the workplace conversational skills of four transition-aged students with autism spectrum disorder (ASD). A functional relation was demonstrated between the introduction of the intervention package and improvements in workplace conversational skills across all four participants within the in situ setting. Increases in conversational skill accuracy during BST probes were also noted with the four participants; however, there were insufficient data points to establish a trend in documenting a functional relation in this area. Three out of four participants demonstrated immediate improvements in skill performance after the creation of a video self-model; those gains were subsequently strengthened with full implementation of the intervention package. All four participants maintained skills at mastery level within the BST setting at two weeks post-intervention; three out of four participants maintained skills at mastery level in the in situ setting two weeks post-intervention.
Effectiveness of Intervention Package on Skill Acquisition

BST Settings

Each intervention session began with BST in a private setting adjacent to the internship site. BST sessions included direct instruction on conversing with a coworker, watching a video self-model of having a workplace conversation, repeatedly practicing the steps to conversing with a coworker, and receiving explicit feedback on each practice trial. All participants’ performance on BST probes within this setting immediately improved with introduction of the intervention. These gains were cemented early on in the intervention phase for all participants, and BST probe scores remained high for the duration of the intervention phase ($M$ intervention BST probe scores ranged from 87.5% to 100% accuracy).

Specific aspects of the BST portion of the intervention package may explain the rapid increase in conversational skill accuracy observed across participants within the BST setting. First, the criterion for moving into the in situ portion of each intervention session was three consecutive BST trials with 100% accuracy. The criterion ensured participants had multiple opportunities to practice skills and receive feedback on their performance, which could have enabled participants to demonstrate skills accurately and quickly during the BST probes. For instance, it took Thomas 11 practice trials during the first BST session to achieve the criterion for moving into in situ trials (the longest of any participant), but once he achieved that initial criterion during the first BST session, his accuracy on subsequent BST probes never fell below 80%. In addition, the BST training sessions provided a controlled environment for practicing conversational skills. Throughout BST, the researcher was the conversational partner, and the training occurred in the same private locations. These conditions were mirrored during BST probes. Familiarity with the conversational partner, the setting, and the conditions under which
participants demonstrated skills (i.e., responding to the same direction to “Show me how you have a conversation with a coworker”) may have contributed to participants’ rapid increases skills in the BST setting. These findings align with previous research, which found high success rates for social skills training approaches for individuals with ASD that are researcher-implemented (92%) and involve the researcher as the social partner (90%; Ledford et al., 2018).

**In Situ Settings**

The second part of each intervention session consisted of in situ training, during which participants used the skills practiced in the BST session to have a workplace conversation with a coworker in their actual internship settings. If participants were unable to independently complete a step in conversing with a coworker during in situ trials, then the researcher intervened with an indirect verbal prompt (e.g., “Who can you talk to?” “What else can you say?”). When performance errors occurred during the in situ trial, then the researcher and the participant returned to the BST area after the conversation ended and held a follow-up BST session.

All participants met criterion for skill mastery during the intervention phase (three consecutive in situ trials with 80% or higher accuracy on the conversing with coworkers task analysis), and $M$ intervention in situ trial scores ranged from 75% to 97%. Rodney and Terrence met skill mastery criterion after the first three in situ sessions. It took Thomas and Chris considerably longer to demonstrate skill mastery (nine sessions for Thomas and 13 sessions for Chris), and more variability was observed in their in situ trial performances.

Differences in participants’ skill repertoire and internship environmental factors may explain the varying amounts of time needed to achieve skill mastery. With the introduction of the intervention, Terrence and Rodney quickly incorporated workplace appropriate topics into their conversational exchanges with coworkers during in situ trials, and with these changes, achieved
the skill mastery criterion after three intervention sessions. In contrast, Chris and Thomas required intermittent indirect prompts from the researcher to begin conversations with coworkers who were in their immediate vicinity and to initiate conversational exchanges after greetings before their in situ trial scores improved and stabilized. Chris also required instruction on keeping conversation topics workplace appropriate, by refraining from asking coworkers for candy or snacks. In contrast with the other three participants, Thomas’ maintenance in situ trial score did not meet skill mastery criterion. During the maintenance session, Thomas’ coworker took the lead in initiating conversational exchanges and spoke very quickly, which may have contributed to decreases in Thomas’ in situ trial accuracy.

Across all participants, in situ trials introduced more variability into workplace conversations. Coworkers were less predictable in how they initiated and/or responded to participant greetings and exchanges, and workplace conversations took place with different people in different settings. This was particularly true for Chris and Thomas, since interning at the hotel meant they worked with a larger pool of coworkers within a wider context. Given lower levels of conversational skill proficiency and greater amounts of variability within their internship environments, Chris and Thomas may have benefited from an increased dosage of in situ trials during the intervention phase in order to acquire and demonstrate skills more quickly within the less predictable real life setting.

**Importance of in Situ Training**

Findings from this study point to the importance of in situ training in improving the workplace conversational skills of transition-aged high school students with ASD. If BST probe data had been considered solely, then the results would have suggested participants improved conversational skills more quickly than they actually did. Instead, skills increased more slowly
within in situ settings than BST settings during the intervention phase for two of the four study participants. Participants’ performance in BST and in situ settings differed pre-intervention too, with scores trending higher on baseline BST probes than on baseline in situ trials. Differences between BST probes and in situ trials highlight how the two portions of the intervention package targeted different aspects of the conversing with coworkers skill. BST probes measured participants’ ability to demonstrate how they would converse with coworkers, while in situ trials measured participants’ ability to actually use conversational skills in real life workplace situations with coworkers. The BST portion of the intervention taught participants what to say and do during workplace conversations, but participants learned how to apply and respond to novel conversational situations within real life workplace settings through in situ training (Gresham et al., 2001). During in situ trials within internship settings, participants experienced interruptions, unscripted conversational exchanges, and chances to converse with unique partners in different contexts. This type of real life variability is important for students with ASD who have difficulty generalizing communication skills to different settings and partners (Bellini et al., 2007). The use of in situ training in this intervention package supported participants in moving beyond skill knowledge and demonstration to skill application in authentic workplace environments.

Previous studies have found that BST with in situ training intervention packages facilitate skill acquisition for learners with ASD in real life contexts (Gunby & Rapp, 2014; Kornacki et al., 2013; Nuernberger et al., 2013). The current study extends those findings by demonstrating the effectiveness of a BST with in situ training intervention package in improving the workplace conversational skills of transition-aged high school students with ASD within community-based internship settings. This study adds to the growing body of evidence that supports teaching social
skills in the contexts in which skills are used and including real life communication partners in social skill interventions (Bellini et al., 2007; Gilson & Carter, 2016; Gilson & Carter, 2018; Gresham et al., 2001; Ledford et al., 2018). Teaching social skills in workplace contexts with typical communication partners may help learners with ASD increase their independent functioning by providing them with multiple opportunities to learn and practice relevant skills in the contexts in which the skills are used, thus eliminating the need for learners to generalize skills from the classroom to the workplace.

Findings from this study also support the theory of change model described in Chapter II. With the introduction of the intervention, all participants improved in their ability to converse with coworkers in their internship settings and ultimately met skill mastery criterion. Researcher feedback after in situ trials may have shaped learning and reinforced future behavioral responses, with corrective feedback preceding additional BST trials and positive feedback reinforcing target behaviors (Miltenberger, 2014). It could also be that interactions with coworkers were in themselves socially reinforcing for participants and motivated participants to use those same conversational skills in future encounters (Miltenberger, 2014).

**Use of Video Modeling Within the Intervention Package**

After baseline but prior to the introduction of the intervention package, all participants worked with the researcher to develop a video self-model of the steps to conversing with a coworker. Data collected after the video creation session showed that scores increased for three participants (except Thomas) on the BST probe following the singular video creation session. Moreover, probe scores increased with the introduction of the full intervention package across all participants. Due to the multi-component nature of the intervention package, the researcher was not able to discern which component(s) of the intervention were responsible for behavior change.
However, these data offer supporting evidence that creating and watching a video of themselves conversing with coworkers helped most participants learn the skill. This finding is in keeping with participant self-reports. Three out of four participants agreed with the statement that showing them the skill helped them learn it; Terrence was unsure if showing him helped him. This finding also aligns with previous research, documenting the effectiveness of video modeling with learners with ASD across a wide range of skills (Allen et al., 2010; Basette et al., 2018; Cihak, 2011; Cihak et al., 2010; Roth et al., 2014; Yakubova & Zeleke, 2016). Future research utilizing multiple-treatment designs, which seek to measure the specific effects of different intervention components, could be useful in determining the specific impact of video modeling within this larger intervention package.

**Increases in Conversational Question Asking**

An unexpected finding from this study was the improvement in conversational question asking demonstrated by all participants. Interestingly, none of the participants used questions during baseline BST probes. Instead, participants described tasks they were working on, listed items/activities they liked, and made statements and/or shared information about their personal lives. The use of questions increased substantively across all participants during the intervention phase. This increase likely reflects the intervention’s instructional focus on asking questions of coworkers during workplace conversations. Providing examples of questions to ask coworkers, watching video models that included the use of questions to initiate conversational exchanges, and practicing question asking within conversations all occurred regularly during BST sessions. While Terrence and Rodney utilized a variety of questions in their conversations in both the BST and in situ settings, Chris and Thomas used the same conversational questions practiced in BST sessions when conversing with coworkers in their internship settings. Participants in future
studies with similar learner profiles to Chris and Thomas may benefit from instruction on a wider range of topics for conversations with coworkers and more opportunities to practice these skills within in situ settings.

**Practical Significance of the Findings**

Social validity data taken after the study ended indicate the intervention package was effective from participant, special educator, and job coach perspectives. Participants agreed with statements that the intervention package helped them improve their work-related social skills and that these skills were important for employment. The special educator and the job coach indicated they would be likely to use this intervention package themselves and that it would be effective for students they support. Furthermore, the special educator and job coach noted it would not cost much nor take an excessive amount of time to implement. These findings suggest the intervention package has solid evidence of social validity and would likely have practical significance for individuals with disabilities who use it. Results from the Treatment Acceptability Rating Form-Revised (TARF-R) indicate it would be both usable and feasible for special educators and job coaches to implement too. However, further research is needed to train typical agents on implementing the BST with in situ training package and then measure the results in order to determine if similar effects are found.

Results from the pre-and post-intervention administration of the Work Observation – Peer Relationships, Socialization, Social Communication – Level 3 Life Seeker subscale (WO-PSS-3) and the Peer Relationships, Socialization, Social Communication Interview subscale (PSSI) showed sharper increases in work-related social skills on the WO-PSS-3 than the PSSI. It could be that the WO-PSS-3 scores more accurately reflect observable changes in participants’ broader work-related social skills performance post-intervention. However, the observed
increase in skills could also be potentially affected by observer bias. Due to limited time and resources, the primary researcher served as the observer and rater for the WO-PSS-3’s administration. Because the primary researcher was not blind to the nature of the study, ratings could have been unintentionally influenced by the researcher’s knowledge of and involvement in the intervention. Also, participants, post-intervention, were aware of the researcher’s presence during observation sessions and the researcher’s interest in their work-related social skills. These factors may have influenced their behavior during the observation sessions and may have led to artificially higher post-intervention observation scores on the WO-PSS-3.

The special educator and job coach reported modest gains in broad, work-related social skills during PSSI interviews for Terrence, Rodney, and Thomas. Increases on the PSSI from pre- to post-intervention ranged from 1.3 to 13.1%. However, Chris’ score decreased by 16% on this measure. His special education teacher, who completed the PSSI, stated that Chris experienced issues with medication management during the study period, which Chris’ school team worked to address with Chris, his family, and his doctor. Chris’ special education teacher reported that these issues negatively affected Chris’ social communication and behavioral skills in substantive ways, and her scores on the PSSI reflected the decline in skills she observed during this period. Specifically, Chris’ special education teacher rated him lower post-intervention on items related to expressive and receptive language skills, his ability to follow directions and accept changes in routine, participation in group activities, his ability to apologize and correct behavior, use of strategies to manage emotions and feelings, and ability to accept responsibility for his actions. While these are important skills for workplace success, they were not specifically targeted by the intervention package.
Implications for Research

Research Within Competitive, Integrated Workplace Settings

More intervention research is needed that focuses on teaching work-related social skills within competitive, integrated workplace settings to students with ASD who are still in high school. It will be important to determine the effectiveness of this intervention package in teaching other social skills that have been identified as being important to workplace success (i.e., accepting correction and direction, requesting assistance from coworkers, interacting with customers; Wehman et al., 2012). Future research should also include a wider range of work-related social skills within the intervention package than the single skill set focused on within this study, in order to maximize learning for students with ASD, who may experience social skill instructional needs in more than one area. Ultimately, rigorous experimental designs, such as randomized controlled trials, are needed to compare the efficacy of intervention approaches which focus on skills instruction within competitive integrated workplace settings to traditional classroom-based social skills instructional models. Given the importance of social skills in finding and maintaining employment, it is important for researchers to determine which approaches are more likely to improve the work-related social skills of transition-aged students with ASD.

Expanding the Intervention Package

This study focused explicitly on how BST with in situ training affected the workplace conversational skills of transition-aged students with ASD. However, as described in the ecological model, interactions between individuals within the immediate environment affect learning in multiple ways (Bronfenbrenner & Evans, 2000). In the current study, coworker communication skills could have hindered participants’ communication efforts, by not allowing
sufficient wait time for participants to respond, by asking participants closed questions which could be answered by yes or no responses, and by consistently taking the lead during conversational exchanges. Coworkers may benefit from training on how to improve their workplace conversational skills when interacting with interns and employees with ASD. Research is needed that adds a coworker training component to the current intervention package and then investigates its effect on the conversational skills of students with ASD and their coworkers. Also, the present study required the researcher to be present on the internship site. Previous research indicates that the presence of staff may inhibit social exchanges between individuals with ASD and their typical peers (Giangreco et al., 2001; Koegel et al., 2014). Future research should examine alternate delivery models for this intervention package (i.e., use of video calling, bug-in-ear technology) to determine the effectiveness of the intervention package using other delivery models, while limiting the potential influence of the researcher’s presence in the workplace.

**Implications for Policy**

*Transition Policy and Practices*

Findings from this study suggest transition-aged students with ASD benefit from opportunities to participate in competitive, integrated work experiences while in high school to develop social skills needed for employment success. Federal vocational rehabilitation (VR) and special education policy guidance should continue to emphasize that student work experiences take place within integrated, community-based locations to the maximum extent possible (WINTAC, 2016b). Technical assistance, through online resources and training opportunities, should be made widely available to transition teams to assist them in developing competitive, integrated work experiences within their local communities. To help ensure individual students
have access to these types of work experiences while in high school, competitive, integrated employment (CIE) goals should be written into students’ IEP transition plans (Wehman et al., 2018). In addition, special education and VR federal policy guidance should stress that transition assessments include work-related social skill components. Transition assessment measures such as the Virginia Commonwealth University and Autism Speaks Community Based Functional Skills Assessment for Transition Aged Youth with Autism Spectrum Disorder (CBFSA), which use observations and interviews with people who know the students well, provide in depth, contextualized evaluations of student strengths and instructional needs. This recommendation is consistent with guidance from the Council for Exceptional Children’s Division on Career Development and Transition, which endorses the use of multiple transition assessment methods in helping students with disabilities identify the strengths they possess and the skills they will need in order to achieve their goals for adult life (Neubert & Leconte, 2013).

**Provision of Pre-ETS**

As discussed in Chapter II, the Workforce Innovation and Opportunity Act (WIOA) requires state VR agencies to collaborate with schools and other community partners to provide pre-employment transition services (Pre-ETS) to transition-aged students with disabilities while they are in high school. It will be important to determine how this intervention package can be used within the Pre-ETS structure when providing work-based learning experiences and workplace readiness training to youth with ASD. This can be done by developing model programs which incorporate embedded social skills interventions into work-based learning experiences and workplace readiness training and then testing the effectiveness of these programs. These types of model programs will require federal funding for development and implementation, for research on their effectiveness in improving social skills acquisition and
employment outcomes, and for knowledge translation to special education and VR agencies working with transition-aged students with ASD.

**Implications for Practice**

This study offers several implications for practice. First, these findings indicate the importance of teaching work-related social skills in the settings in which they are used. Differences in baseline workplace conversational skill usage on BST probes and in situ trials and differences in skill increases post-intervention across these same settings suggest that learners need to practice conversational skills in real life workplace settings in order to use them effectively. Second, learners may have different social skill instructional needs, based on their skill understanding and usage. Identifying the specific areas in which students need to develop skills and providing instruction to target those areas is critical. Third, this study highlights a process for identifying contextually-relevant skills by using the CBFSA and obtaining employer input on which social skills are deemed important within specific workplace settings. Engaging in careful assessment of both learner needs and workplace values will help ensure that the social skills taught are relevant and meaningful within the work environment. Fourth, this study demonstrates how video modeling can be situated within BST to help transition-aged students with ASD more readily acquire workplace conversation skills. BST provides a method for incorporating video self-modeling in an existing instructional sequence, and findings from this study suggest that creating and watching videos of themselves perform a work-related social skill may help learners with ASD improve their skill usage.
Limitations

Sample Limitations

In general, single subject research design (SSRD) findings are not generalizable to a larger population, due to small sample sizes. This limitation is true of the present study. However, operationalized descriptions of participants and settings provided by the researcher allow other researchers and practitioners to decide if the intervention is applicable to the individuals with whom they work (Ganz & Ayres, 2018; Horner et al., 2005). Furthermore, the external validity of the findings is enhanced by repeated demonstrations of the intervention’s effects on the in situ performance of workplace conversational skills across all four participants (Horner et al., 2005). Limitations exist, however, in determining the effectiveness of the intervention package on skills demonstrated within BST settings. Specifically, only two intervention phase BST probe data points were collected for Rodney and Terrence. During the intervention phase, in situ trials occurred at the end of each intervention session, and BST probes were taken at the beginning of the next intervention session. Because Terrence and Rodney achieved the criterion for skill mastery after three in situ sessions, the intervention was discontinued, and data were only collected for two intervention phase BST probes. Given that this study primarily focused on the ability of participants to use workplace conversational skills in their authentic internship settings, this limitation is concerning, but the results still demonstrate strong increases in BST probe performance across all four participants.

Also, the sample for this study only included male participants. While the sample makeup reflects the greater prevalence of males with ASD than females with ASD within the population (Maenner et al., 2020), it is a limitation to the study. Specifically, it is unclear if young women with ASD would experience the same kind of increases in workplace conversational skills.
through the BST with in situ training intervention package as the young men in this study did. Previous research indicates male and female young adults with ASD may benefit from different combinations of supports and services to achieve successful employment outcomes (Sung et al., 2015). Future research is needed that examines the effects of this intervention package when young women with ASD are included in the sample.

**Coding Limitations**

This study taught participants to engage in three exchanges per conversation. Sometimes coworkers and participants extended conversations past three exchanges, particularly during in situ trials. However, the researcher only coded the first three exchanges, as specified in the task analysis, in order to maintain consistency of results across BST probes and in situ trials. In addition, teaching participants to adhere strictly to three exchanges would not have reflected social norms and pragmatic conversational expectations. While a review of the BST and in situ session video recordings did not indicate major differences in skill performance in conversational exchanges occurring after the third one, future studies may want to consider coding all exchanges in each conversation.

The researcher also identified limitations related to coding procedures. Specifically, four double-coded sessions fell beneath 80% interobserver agreement. In two sessions, this was due to inconsistencies in how the researcher and secondary coder designated prompts to initiate conversations with coworkers. The researcher coded it as a prompt for the first step of the task analysis (gaining the coworker’s attention), while the secondary coder coded it as a prompt for the second step of the task analysis (greeting the coworker). In the third session, a participant engaged in conversations with two coworkers during the same observation period, which required clarification on coding procedures. In the final session that fell below 80% interobserver
agreement, a contrived opportunity was created for the participant to converse with a coworker, because a naturally occurring opportunity did not present itself within the 10-minute in situ session. The coworker immediately greeted the participant, so the participant did not have an opportunity to gain the coworker’s attention. The two coders coded this situation differently, with the researcher coding it as “No opportunity” and the secondary coder coding it as a (-). After reviewing interobserver agreement data, the researcher retrained the secondary coder on procedures for each of these specific situations.

These limitations highlight the complexities involved in coding conversations and the benefits of video recording conversations for coding purposes. Conversations occurred very quickly, and multiple exchanges between conversational partners were common. The use of video recording when coding conversations allows researchers to review specific exchanges, to pause conversations in order to document codes, and evaluate codes for accuracy (Kazdin, 1982). The coding limitations identified here also point to the importance of planning for problematic or unclear coding situations ahead of time. In the future, the researcher will include explicit plans for coding these types of situations in the intervention manual and will widen the range of video examples used in training sessions with secondary coders to include these types of situations.

**Time and Resource Limitations**

The researcher identified a few limitations related to available time and resources while conducting the study. First, although maintenance data were collected, generalization trials were not conducted. Incorporating generalization trials into the study would have assisted the researcher in further evaluating the effectiveness of the intervention, by assessing participants’ use of workplace conversational skills in new internship settings with new coworkers. Due to time constraints, the study ended before participants began new internship experiences. Future
research on this intervention package should include generalization trials post-intervention. Also, due to time and resource constraints, in situ trials were conducted immediately after BST sessions, during 10-minute in situ observations. This provided only a brief snapshot of participants’ skill usage, which may or may not have reflected participants’ skill usage during other portions of their day. In future iterations of this study, it would be helpful to increase the length of time for in situ observations and training or conduct multiple in situ training sessions within the course of a day, to see if participants’ skill use is affected by delays between BST and in situ training.

**Conclusion**

In this multiple baseline across participants study, the researcher investigated the use of a BST with in situ training intervention package to teach workplace conversational skills to four transition-aged high school students with ASD who were enrolled in a community-based internship program. A functional relation was demonstrated between the introduction of the intervention package and increases in workplace conversational accuracy within in situ settings for all participants. All participants also experienced strong increases in BST probe scores within training settings. Three of four participants maintained skills in the situ setting at follow-up, and all four participants maintained skills in the BST setting. Participants agreed that the intervention helped them improve their workplace conversation skills, and the participants’ special educator and job coach found the intervention to be effective, feasible, and usable. Results from this study indicate the importance of teaching social skills in the real life work environments in which they are used. Furthermore, careful assessment of student skills and the social skill requirements of specific workplace environments is needed in order to ensure a match between the skills targeted for intervention and the skills needed for workplace success within those same contexts.


Appendix A

Talking With a Coworker Chart (Rodney)

<table>
<thead>
<tr>
<th>Who</th>
<th>People you work with at the museum.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td>You can talk about:</td>
</tr>
<tr>
<td></td>
<td>• How they are doing</td>
</tr>
<tr>
<td></td>
<td>• The weather</td>
</tr>
<tr>
<td></td>
<td>• Things happening at work</td>
</tr>
<tr>
<td></td>
<td>• Special events</td>
</tr>
<tr>
<td></td>
<td>• Plans for the night</td>
</tr>
<tr>
<td></td>
<td>• Plans for the weekend</td>
</tr>
<tr>
<td></td>
<td>• Things your coworker likes</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td>• When you walk past the coworker</td>
</tr>
<tr>
<td></td>
<td>• When the coworker walks past you</td>
</tr>
<tr>
<td>Why</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Your coworkers want to talk to you.</td>
<td></td>
</tr>
<tr>
<td>• It makes work more fun.</td>
<td></td>
</tr>
<tr>
<td>• It’s a nice break from working.</td>
<td></td>
</tr>
<tr>
<td>• You get to know your coworkers better.</td>
<td></td>
</tr>
</tbody>
</table>


Appendix B

Talking With a Coworker Chart (Terrence)

<table>
<thead>
<tr>
<th><strong>Who</strong></th>
<th>People you work with at Dermatology.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td>You can talk about:</td>
</tr>
<tr>
<td></td>
<td>• How they are doing</td>
</tr>
<tr>
<td></td>
<td>• The weather</td>
</tr>
<tr>
<td></td>
<td>• How work is going (keep it positive)</td>
</tr>
<tr>
<td></td>
<td>• Special events</td>
</tr>
<tr>
<td></td>
<td>• Plans for the night</td>
</tr>
<tr>
<td></td>
<td>• Plans for the weekend</td>
</tr>
<tr>
<td></td>
<td>• Things your coworker likes</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td>• When you walk past a coworker in the hall</td>
</tr>
<tr>
<td></td>
<td>• When you go into your office</td>
</tr>
<tr>
<td></td>
<td>When your coworker comes into your office</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Why</td>
<td>Your coworkers want to talk to you.</td>
</tr>
<tr>
<td></td>
<td>It makes work more fun.</td>
</tr>
<tr>
<td></td>
<td>It’s a nice break from working.</td>
</tr>
<tr>
<td></td>
<td>You get to know your coworkers better.</td>
</tr>
</tbody>
</table>
Appendix C

Talking With a Coworker Chart (Thomas and Chris)

<table>
<thead>
<tr>
<th>Who</th>
<th>People you work with.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td>You can say:</td>
</tr>
<tr>
<td></td>
<td>• How are you?</td>
</tr>
<tr>
<td></td>
<td>• Are you having a good day?</td>
</tr>
<tr>
<td></td>
<td>• Did you have a good night?</td>
</tr>
<tr>
<td></td>
<td>• Do you have plans for the weekend?</td>
</tr>
<tr>
<td></td>
<td>• I’ll see you later.</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• When you see a coworker in the hall.</td>
</tr>
<tr>
<td></td>
<td>• When you see a coworker in the linen room.</td>
</tr>
<tr>
<td></td>
<td>• When you see a coworker in the break room.</td>
</tr>
<tr>
<td>Why</td>
<td>Why</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• Your coworkers want to talk to you.</td>
</tr>
<tr>
<td></td>
<td>• It makes work more fun.</td>
</tr>
<tr>
<td></td>
<td>• It’s a nice break from working.</td>
</tr>
<tr>
<td></td>
<td>• You get to know your coworkers better.</td>
</tr>
</tbody>
</table>
### Steps to Talking With a Coworker (Rodney and Terrence)

1. **Get their attention**  
   (Stand near them, wave, make eye contact)

2. **Say Hi**

3. **Ask a question or tell them something**  
   (weather, plans, how they’re feeling, things happening at work, things they like, special events)

4. **Wait and listen to what they say**

5. **Ask another question or tell them something else**  
   (weather, plans, how they’re feeling, things happening at work, things they like, special events)

6. **Wait and listen to what they say**

7. **Ask another question or tell them something else**  
   (weather, plans, how they’re feeling, things happening at work, things they like, special events)
<table>
<thead>
<tr>
<th>8. Wait and listen to what they say</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Say goodbye or say “I need to get back to work now”</td>
</tr>
<tr>
<td>10. Go back to work or leave the area</td>
</tr>
</tbody>
</table>
### Appendix E

Steps to Talking With a Coworker (Thomas and Chris)

<table>
<thead>
<tr>
<th>Step</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stand near them and wave</td>
</tr>
<tr>
<td>2.</td>
<td>Say Hi</td>
</tr>
<tr>
<td>3.</td>
<td>Say How are you?</td>
</tr>
<tr>
<td>4.</td>
<td>Wait and listen</td>
</tr>
<tr>
<td>5.</td>
<td>Say Are you having a good day?</td>
</tr>
<tr>
<td>6.</td>
<td>Wait and listen</td>
</tr>
<tr>
<td>7.</td>
<td>Say Did you have a good night?</td>
</tr>
<tr>
<td>8.</td>
<td>Wait and listen</td>
</tr>
<tr>
<td>9.</td>
<td>Say See you later!</td>
</tr>
</tbody>
</table>
10. Go back to work or leave
Appendix F

Participant Demographic Information Form

Directions: Please answer each question. You can ask for help if you need it.

1. What is your first and last name?

2. What is your birthdate?

3. What gender do you identify as?

4. What race/ethnicity do you identify as?

5. For what disabilities do you currently receive special education and/or vocational rehabilitation services?
## Appendix G

CBFSA WO-PSS-3

<table>
<thead>
<tr>
<th>LIFE SEEKER</th>
<th>Level of Independence</th>
<th>Environments Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Demonstrates the ability to ask conversationally/contextually appropriate questions</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>22. Demonstrates conversationally appropriate receptive skills</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>23. Demonstrates the ability to tolerate changes in routine</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>24. Demonstrates socially appropriate non-verbal skills during conversation (eye-contact, tone of voice, body orientation)</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>25. Demonstrates the ability to follow directions from multiple people in multiple settings</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>26. Demonstrates the ability to generalize socially acceptable behavior in multiple settings</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>27. Demonstrates the ability to use phone and email</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>28. Demonstrates the ability to send and receive text messages</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>29. Treats others with dignity and respect</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PEER RELATIONSHIPS, SOCIALIZATION, SOCIAL COMMUNICATION</th>
<th>Level of Independence</th>
<th>Environments Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Effectively communicates personal boundaries and respects the boundaries of others</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>31. Maintains appropriate social relationships within the workplace</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>32. Has various networks for outreach and knows how and when it is appropriate to access each one</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

Total _____ out of 60 = _____%  
Total _____ out of 36 = _____%
### Appendix H

**CBFSA PSSI**

<table>
<thead>
<tr>
<th>Peer Relationships, Socialization, Social Communication</th>
<th>Level of Independence</th>
<th>Environments Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>For individuals in Level 1 LIFE AWARE, please complete questions 36-48; Level 2 LIFE EXPLORER and Level 3 LIFE SEEKER, please complete questions 36-50.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Level of Independence</th>
<th>Environments Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. Describe the person’s social life (does he/she make plans with others? Identify 3-5 people and activities in which he/she likes to participate).</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td><strong>NOTES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Describe the person’s method of communication. Is it functional and spontaneous?</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
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<td><strong>NOTES:</strong></td>
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<td></td>
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<tr>
<td>PEER RELATIONSHIPS, SOCIALIZATION, SOCIAL COMMUNICATION</td>
<td>Level of Independence</td>
<td>Environments Performed</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>38. Describe the person’s communication skills, use of nonverbal communication skills (eye contact, tone of voice) and use of social conversation (please, thank you and you’re welcome).</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Describe the person’s receptive language skills, his/her ability to make distinctions between literal and figurative language. Do they seek clarification of idioms and expressions?</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Describe the person’s ability to follow directions (spoken and written).</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
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<tr>
<td>41. Discuss the person’s ability to accept changes in routine.</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
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<tr>
<td>NOTES:</td>
<td></td>
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<tr>
<td>42. Describe how the person participates in structured group activities.</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
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<td>NOTES:</td>
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<tr>
<td>43. Describe the person’s use of socially acceptable behavior in multiple settings.</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
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<tr>
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<td>Level of Independence</td>
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<tr>
<td>44. Describe the person’s use of bullying prevention strategies (as a victim or bystander).</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NOTES:</td>
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<tr>
<td>45. Describe the person’s ability to apologize and correct his/her behavior.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>NOTES:</td>
<td></td>
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<tr>
<td>46. Does the person use social media? If so, what and how?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. Does the person have strategies to manage social anxiety, frustration, sadness, anger and excitement?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48. Discuss the person’s ability to take responsibility for his/her actions.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. Does the person have various networks and know how to access them (social, professional, family, support)?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NOTES:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL |   |   |   |   |   |   |   |   |
<table>
<thead>
<tr>
<th>PEER RELATIONSHIPS, SOCIALIZATION, SOCIAL COMMUNICATION</th>
<th>Level of Independence</th>
<th>Environments Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>50. Describe the person's familiarity and use of a calendar, email and phone (maintains a calendar and contact list, can place a call and leave a meaningful voicemail message).</td>
<td>1 2 3 4 5</td>
<td>1 2 3</td>
</tr>
<tr>
<td>NOTES:</td>
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</table>
Appendix I

Employer Social Skills Rating Form
(adapted from the Community Based Functional Skills Assessment; Schall et al., 2014)

Directions: For each item below, rate its importance for the workplace setting in which you work.

0 = Not Important At All, 1 = Of Little Importance, 2 = Of Average Importance, 3 = Very Important, 4 = Absolutely Essential

1. Ask conversationally/contextually appropriate questions
   
   0  1  2  3  4

2. Demonstrate conversationally appropriate receptive skills
   
   0  1  2  3  4

3. Tolerate changes in routine
   
   0  1  2  3  4

4. Demonstrate socially appropriate non-verbal skills during conversation (eye-contact, tone of voice, body orientation)
   
   0  1  2  3  4

5. Follow directions from multiple people in multiple settings
   
   0  1  2  3  4
6. Demonstrate socially acceptable behavior in multiple settings
   0 1 2 3 4

7. Use phone and email
   0 1 2 3 4

8. Send and receive text messages
   0 1 2 3 4

9. Treat others with dignity and respect
   0 1 2 3 4

10. Effectively communicate personal boundaries and respects the boundaries of others
    0 1 2 3 4

11. Maintain appropriate social relationships within the workplace
    0 1 2 3 4

12. Have various networks for outreach and know how and when it is appropriate to access each one.
    0 1 2 3 4
### Appendix J

Conversing With a Coworker Task Analysis Data Sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Type of Session</th>
<th>B</th>
<th>I</th>
<th>B</th>
<th>I</th>
<th>B</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conversing with a Coworker</td>
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<tr>
<td>1</td>
<td>When coworker is within hearing distance (3-7 feet away from participant), gain their attention.</td>
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<tr>
<td>2</td>
<td>Initiate greeting or respond to greeting from coworker.</td>
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</tr>
<tr>
<td>3</td>
<td>Ask coworker question/make comment to coworker about a workplace-appropriate topic OR respond to coworker question or comment.</td>
<td></td>
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<td></td>
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<tr>
<td>4</td>
<td>Wait for coworker’s response.</td>
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<tr>
<td>Type of Session</td>
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</tbody>
</table>

5 | Ask coworker a different question/make a different comment to coworker about a workplace-appropriate topic OR respond to coworker question or comment. |

6 | Wait for coworker’s response. |

7 | Ask coworker a different question or make a different comment to coworker about a workplace-appropriate topic OR respond to coworker question or comment. |

8 | Wait for coworker’s response. |

9 | End the conversation by saying farewell or stating you need to get back to work. |

10 | Return to performing tasks or leave area. |

Total: |

+ = independent and accurate response  
- = incorrect response  
- = prompted response  
- = skipped response/no response  
N/O = step not observed/no opportunity to perform step
### Appendix K

Conversing With a Coworker Task Analysis Definitions

<table>
<thead>
<tr>
<th>Step</th>
<th>Conversing with a Coworker</th>
<th>Definition of Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When coworker is within hearing distance (3-7 feet away from participant), gain their attention.</td>
<td>3 feet is arm’s length, 7 feet is midway across a small room. Important point is that the coworker should be close enough to hear the participant, if they spoke. Attention can be gained verbally (by calling the person’s name, greeting them) or physically (by waving at them, gesturing to them, standing near them, or making eye contact with them). If the participant gains attention by greeting the coworker, count it as a + here and count it as a + on the next step.</td>
</tr>
<tr>
<td>2</td>
<td>Initiate greeting or respond to greeting from coworker.</td>
<td>Say greeting (Hi, Hello) or respond to greeting from coworker by saying a greeting (Hi, Hello, etc.) back to them if the coworker greets first. Mark as a – full introductions, such as, “Hi, my name is __________, and I’m a Project SEARCH intern.” Mark as a + if the participant replies back to the coworker if the coworker asks how the</td>
</tr>
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</tr>
</tbody>
</table>
| **3** | **Ask coworker question or make comment to coworker about a workplace-appropriate topic or respond back to coworker’s comment or question.** | **Workplace-appropriate topics include:** questions about the coworker’s well-being (i.e., How are you doing?); the weather; work routines, procedures, and events; coworker plans inside/outside of work, special events inside/outside of work (i.e., upcoming holidays, work parties), talking with coworkers about the coworkers’ interests. Inappropriate workplace topics include: sharing private information about yourself, talking about personal areas of interests that are unrelated to the conversation, asking coworkers to purchase items or to do favors, and complaining or making negative comments about work routines or work-related events.  

*Mark as a + if participant adds this first statement/question immediately after initiating or responding to the greeting with the coworker.*  

*Mark as a – if the participant lists what work tasks they completed/are working on that day, unless in response to a direct question from coworker about their work for the day.*  

*Mark as a – if the participant talks about how they are feeling or how they are doing without the coworker asking them a question about this first.* |
| **4** | **Wait for coworker’s response.** | **The participant remains in the area and does not talk while the coworker is replying.** |
Ask coworker a different question or make a different comment to coworker about a workplace-appropriate topic or respond back to coworker’s comment or question.

The participant asks a DIFFERENT question or makes a DIFFERENT comment about the same workplace-appropriate topic or a new workplace-appropriate topic.

Workplace-appropriate topics include: questions about the coworker’s well-being (i.e., How are you doing?); the weather; work routines, procedures, and events; coworker plans inside/outside of work, special events inside/outside of work (i.e., upcoming holidays, work parties), talking with coworkers about the coworkers’ interests.

Inappropriate workplace topics include: sharing private information about yourself, talking about personal areas of interests that are unrelated to the conversation, asking coworkers to purchase items or to do favors, and complaining or making negative comments about work routines or work-related events.

Mark as a – if the participant lists what work tasks they completed/are working on that day, unless in response to a direct question from coworker about their work for the day.

Mark as a – if the participant talks about how they are feeling or how they are doing without the coworker asking them a question about this first.
<table>
<thead>
<tr>
<th></th>
<th>Wait for coworker’s response.</th>
<th>The participant remains in the area and does not talk while the coworker is replying.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Ask coworker a different question or make a different comment to coworker about a workplace-appropriate topic or respond back to coworker’s comment or question.</td>
<td>The participant asks a DIFFERENT question or makes a DIFFERENT comment about the same workplace-appropriate topic or a new workplace-appropriate topic. Workplace-appropriate topics include: questions about the coworker’s well-being (i.e., How are you doing?); the weather; work routines, procedures, and events; coworker plans inside/outside of work, special events inside/outside of work (i.e., upcoming holidays, work parties), talking with coworkers about the coworkers’ interests. Inappropriate workplace topics include: sharing private information about yourself, talking about personal areas of interests that are unrelated to the conversation, asking coworkers to purchase items or to do favors, and complaining or making negative comments about work routines or work-related events. Only code the first three conversational exchanges in the conversation. Any additional conversational exchanges are not coded. Mark as a – if the participant lists what work tasks they completed/are working on that day, unless in response to a direct question from coworker about their work for the day. Mark as a – if the participant talks about how they are feeling or how they are doing without the coworker asking them a question about this first.</td>
</tr>
<tr>
<td></td>
<td>Wait for coworker’s response.</td>
<td>The participant remains in the area and does not talk while the coworker is replying.</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 9 | End the conversation by saying farewell or stating why you need to finish the conversation. | The participant tells the coworker goodbye or makes a statement indicating that they need to finish the conversation (i.e., to go back to work, do the next task, leave, etc.)

*Mark as a + if participant ends the conversation within 5 seconds of the last conversational exchange. Mark as a – if the participant does not end the conversation or waits longer than 5 seconds to end the conversation.* |
| 10 | Return to performing tasks or leave area. | The participant begins to perform tasks again or leaves the conversation area. |
Appendix L

Social Validity Measure for Participants

_Circle the best answer that describes what you think or feel._

1. My social skills at work improved from being in this study.
   Agree  Not Sure  Disagree

2. Communicating better with others at work is important to me.
   Agree  Not Sure  Disagree

3. Understanding the social rules at work is important to me.
   Agree  Not Sure  Disagree

4. Being in this study helped me do my job better.
   Agree  Not Sure  Disagree

5. Telling me about a workplace social skill helped me learn it.
   Agree  Not Sure  Disagree

6. Showing me how to use a workplace social skill helped me learn it.
   Agree  Not Sure  Disagree
7. Practicing a workplace social skill helped me learn it.
Agree   Not Sure   Disagree

8. Giving me feedback on a workplace social skill helped me learn it.
Agree   Not Sure   Disagree
Appendix M

Modified TARF-R
(Adapted from the Treatment Acceptability Rating Form-Revised; Reimers et al., 1991)

Please complete the items listed below by circling the number that best describes how you feel about the intervention.

1. How clear is your understanding of this intervention?

<table>
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<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all clear</td>
<td>Neutral</td>
<td>Very clear</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How acceptable is this intervention for addressing your student’s needs?

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<tr>
<th></th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all acceptable</td>
<td>Neutral</td>
<td>Very acceptable</td>
<td></td>
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</table>
3. How willing are you to use this intervention?

<table>
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<tr>
<th>1</th>
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<tbody>
<tr>
<td>Not at all</td>
<td>Neutral</td>
<td>Very willing</td>
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</table>

4. How reasonable is this intervention for addressing your student’s needs?

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<tbody>
<tr>
<td>Not at all</td>
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5. How costly would it be to use this intervention?

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</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Neutral</td>
<td>Very costly</td>
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6. How likely are there to be disadvantages in using this intervention?

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<tbody>
<tr>
<td>Not at all</td>
<td>Neutral</td>
<td>Very likely</td>
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7. How likely is the intervention to make permanent improvements in your student’s social skills?

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<tbody>
<tr>
<td>Not at all</td>
<td>Neutral</td>
<td>Very likely</td>
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</table>
8. How much time will you need each day to carry out this intervention?

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<tbody>
<tr>
<td></td>
<td>Little time</td>
<td>Neutral</td>
<td>Much time</td>
<td>will be needed</td>
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9. How confident are you that this intervention will be effective?

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<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very confident</td>
<td>confident</td>
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</table>

10. Compared to other students with social skill difficulties, how serious are your student’s social skill problems?

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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very serious</td>
<td>serious</td>
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</table>

11. How disruptive will it be to the internship program to carry out this intervention?

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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very disruptive</td>
<td>disruptive</td>
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</table>

12. How effective is this intervention likely to be for your student?

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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very effective</td>
<td>effective</td>
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</table>
13. How much do you like the procedures used in this intervention?

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<td></td>
<td>Do not like</td>
<td>Neutral</td>
<td>Like them</td>
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<tr>
<td></td>
<td>them at all</td>
<td></td>
<td>very much</td>
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14. To what extent are undesirable side effects likely to occur from using this intervention?

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</thead>
<tbody>
<tr>
<td></td>
<td>No side effects</td>
<td>Neutral</td>
<td>Many side effects</td>
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</tr>
<tr>
<td></td>
<td>are likely</td>
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<td>are likely</td>
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</table>

15. How much discomfort is your student likely to experience during this intervention?

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No discomfort</td>
<td>Neutral</td>
<td>Very much</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>at all</td>
<td></td>
<td>discomfort</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. How severe are your student’s social skill difficulties?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very severe</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>severe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. How willing would you be to change your regular instructional routine to carry out this intervention?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Neutral</td>
<td>Very willing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>willing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
18. How well will carrying out this intervention fit within your existing instructional routine?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Neutral</td>
<td>Very well</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. To what degree are your student’s social skill difficulties concerning to you?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>No concern</td>
<td>Neutral</td>
<td>Great concern</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

at all
Appendix N

Fidelity of Implementation Checklist

Rater: __________________ Date:______________ Time:_________

Rate each step of the intervention package, using the following codes (0=step not implemented, 1=step partially implemented, 2=step fully implemented, N/O = no opportunity).

<table>
<thead>
<tr>
<th>Step</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1a: Meet with participant in area immediately adjacent to or within workplace setting.</td>
<td></td>
</tr>
<tr>
<td>Step 1b: Describe behavior to participant, using task analyzed steps.</td>
<td></td>
</tr>
<tr>
<td>Step 2: Model the behavior for the participant.</td>
<td></td>
</tr>
<tr>
<td>Step 3: Have the participant practice the behavior using pretend situations for at least 3 trials.</td>
<td></td>
</tr>
<tr>
<td>Step 4a: After each trial, provide specific verbal praise for correct steps.</td>
<td></td>
</tr>
<tr>
<td>Step 4b: After each trial, provide specific instruction for incorrect steps.</td>
<td></td>
</tr>
<tr>
<td>Step 5a: Move to workplace setting (if not there already).</td>
<td></td>
</tr>
<tr>
<td>Step 5b: Observe participant in workplace setting.</td>
<td></td>
</tr>
</tbody>
</table>
### Step 5c

If participant completes steps incorrectly during naturally occurring or contrived opportunity in workplace setting, repeat Steps 1b - 4b.
Vita

Holly N. Whittenburg

PERSONAL INFORMATION

Name: Holly N. Whittenburg

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          Hayes, Virginia 23072
          757.692.5308
          whittenburhn@vcu.edu

LICENSES/CERTIFICATIONS

Virginia Postgraduate Professional License (License # PGP-0615428) – Admin and Supervision
PreK-12, Emotional Disturbance K-12, Intellectual Disabilities K-12, Special Education General
Curriculum K-12, Specific Learning Disabilities K-12, Middle Education 6-8: English, Middle
Education 6-8: Math

Post Baccalaureate Certificate in Autism Spectrum Disorders, Virginia Commonwealth
University

Virginia Endorsed Positive Behavior Support Facilitator (Provider #202)

Wilson Reading Level I Certified Teacher

EDUCATION

Ph.D. (Special Education), Expected 2020, Virginia Commonwealth University

M.Ed. (Educational Leadership), 2011, The College of William and Mary
M.A.Ed. (Special Education), 2004, The College of William and Mary

B.A. (Sociology), 1997, University of Virginia

ACADEMIC APPOINTMENTS AND OTHER WORK EXPERIENCE

Research Coordinator, Virginia Commonwealth University - Rehabilitation Research and Training Center, Virginia Commonwealth University, Richmond, VA, July 2013-Present

Special Education Coordinator, Programming for Students with Autism Spectrum Disorder and Early Childhood Special Education, Hampton City Schools, Hampton, VA, July 2011-July 2013

Special Education Teacher, Communication Support Classroom, Mt. Vernon Elementary School, York County School Division, Yorktown, VA, 2008-2011

Special Education Teacher, Inclusive Program for Students with High-Incidence Disabilities, Yorktown Middle School, York County School Division, Yorktown, VA, 2004-2008

Employment Specialist, Eggleston Services, Norfolk, VA, 10/2001-5/2003

AREAS OF SPECIAL INTEREST

Transition, autism, intellectual and developmental disabilities, educational policy, inclusive postsecondary education, employment.

SCHOLARSHIP

BIBLIOGRAPHY

Refereed Articles:


**Manuscripts in Progress:**


**Book Chapters:**


Other Scholarly Publications:


**REFEREED PROFESSIONAL PRESENTATIONS**


Pickover, G., & **Whittenburg, H. N.** (October 26, 2018). WIOA, Pre-ETS, and Interagency Collaboration. Poster presentation at Council for Exceptional Children, Division of Career Development and Transition International Conference, Cedar Rapids, IA.


McDonough, J., Ham, W., **Whittenburg, H.,** & Thoma, C. (October 21, 2016). Strategies for Success in Helping Young Adults with Autism Spectrum Disorder (ASD) Obtain
Employment. Presentation at Council for Exceptional Children, Division of Career Development and Transition International Conference, Myrtle Beach, SC.


NON-REFEREED PROFESSIONAL PRESENTATIONS


GRANTS AND CONTRACTS

Internal Grants:

Seed Funding for Graduate Student Initiatives, Virginia Commonwealth University, School of Education, Office of Research and Faculty Development. 2019. Amount awarded: $1,015.

Graduate Student Travel Grant. Virginia Commonwealth University, Graduate School. 2019. Amount awarded: $300.

Ph.D. Student Travel Award. Virginia Commonwealth University, School of Education. 2018. Amount awarded: $400.

TEACHING AND ADVISING

COURSES TAUGHT

At VCU

SEDP 601: Methods I – Teaching Students in Special Education and General Education, Summer/Fall 2019 (Co-Instructor).

SEDP 603: Theories, Assessments, and Practices in Reading for Students with High Incidence Disabilities, Spring 2018 (Graduate Assistant).

SEDP 711: Single Subject Research Methods, Fall 2018 (Guest Lecturer) – Topic: Single case design.

Virginia Commonwealth University, Autism Center for Excellence, Online Course: Autism Spectrum Disorders for Paraprofessionals: Providing Effective Instruction and Supports; Fall 2018, Summer 2019, Fall 2019 (*Instructor*).

Virginia Commonwealth University, Rehabilitation Research and Training Center Online Course: Supported Employment Web-Based Certificate Series; Fall 2016, Summer 2017, Fall 2017, Spring 2018 (*Instructor*).

**Elsewhere**

College of William and Mary, CRIN X83: Individualized Education Program Transition Planning and Services, Spring 2018 (*Guest Lecturer*) – Topic: High tech is not always the best: Low tech supports that work.


**SERVICE**

**MAJOR COMMITTEES**

**School:**
Search Committee Member, Special Education Associate Professor/Professor, Virginia Commonwealth University, 2019

VCU School of Education Doctoral Student Service Organization (LaunchPAD), Community Partnership Committee Co-Chair, 2016-2018

**Regional:**
Virginia Council for Exceptional Children Division on Career Development and Transition, Programs Committee Chair (2019); Board Member At-Large (2018)

**EDITORIAL ACTIVITY**

- 2020, Guest Reviewer, *Inclusion*
- 2019-present, Guest Reviewer, *Journal of Autism and Developmental Disorders*
- 2019-present, Guest Reviewer, *Journal of Child and Family Studies*
- 2017-present, Guest Reviewer, *Journal of Vocational Rehabilitation*
- 2016-present, Guest Reviewer, *Career Development and Transition for Exceptional Individuals*

**OTHER SIGNIFICANT PROFESSIONAL EXPERIENCE**

Grant Experience:
Co-Project Coordinator (2017-present) - Effect of a 9-month internship intervention for military dependents with ASD. Granted by the Congressionally Directed Medical Research Program (CDMRP) through the Department of Defense (DoD) Autism Research Program.

Research Assistant (2016-present) - An in-depth case study of a large health system’s employer practices to promote employment outcomes: An employer-led intervention to change behavior. Granted by the National Institute on Disability, Independent Living, and Rehabilitation Research at the United States Department of Education.

Research Site Coordinator (2013-2018) - Facilitating employment for youth with autism: A replication study of an internship model to identify evidence based practices. Granted by the National Institute on Disability Rehabilitation and Research at the United States Department of Education.

National Policy Experience:

Policy Intern (Summer 2018) – Autism Society of America.

MEMBERSHIPS IN ORGANIZATIONS AND SOCIETIES

Professional:
- Council for Exceptional Children - Division on Career Development and Transition, Division on Autism and Developmental Disabilities
- American Educational Research Association
- Virginia Council for Exceptional Children Division on Career Development and Transition

SPECIAL AWARDS, FELLOWSHIPS AND OTHER HONORS

Doctoral Fellowship, U.S. Department of Education Office of Special Education Programs (VCU-Research to Policy Advocacy Leadership Project), 2015-present

Currents of Change Award, Exemplary Partnership – Student Initiated, Virginia Commonwealth University, 2018

Edward E. Brickell Scholarship, The College of William and Mary, 2011

York County School Division Apple Award Winner for Outstanding Service, 2008-2009

York County School Division Middle School Teacher of the Year, 2007-2008