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Investigating the Development of a Vocational Pre-Requisite Skills Assessment Tool for Adults with Disabilities

by

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A Thesis

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Abstract

Individuals diagnosed with disabilities impacting cognitive development often face challenges when attempting to enter the workforce in adulthood. Some supported employment models provide modifications for acquiring and retaining vocational placement positions; however, there exists a lack of structured procedures for assessing the pre-requisite skills necessary for workplace readiness. The current study describes the procedures used to develop a vocational skills pre-requisite assessment tool for individuals with disabilities, with a focus on a generalizable repertoire of skills that would be required across various workplaces. Clinicians and employers working with individuals with disabilities were interviewed and recruited to participate in a Q-sort ranking procedure to select items for inclusion on this tool. Subsequent acceptability questionnaires were distributed to collect preliminary social validity data for the developed tool. Potential applications of this assessment and suggestions for future validity testing are discussed.

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Chapter 1: Introduction and Literature Review

The body of research that investigates how to positively impact the lives of individuals with disabilities is large and continuing to expand at a rapid rate. The focus of this research is often directed towards children and youth, whereas empirical investigations into important variables for adolescent and adult-aged populations are scarce (Gerhardt & Lainer, 2011; Henninger & Taylor, 2012; Matson, Hattier, & Belva, 2012; Roth, Gillis, & Reed, 2014). Gerhardt and Lainer (2011) note that a lack of research in this area adversely impacts the quality of life of adults with disabilities. An increased emphasis on research efforts for adult populations can improve independence in a variety of areas, thus potentially reducing the costly demand for services in adulthood.

In a compilation of data from a rehabilitation services database, the number of people with an Autism Spectrum Disorder (ASD) diagnosis in the United States requesting solely vocational services increased from 1,534 to 3,397 between the years of 2002-2006 (Cimera & Cowan, 2009). In total, over 600,000 individuals with varying disabilities requested vocational rehabilitation services in this time period (Cimera & Cowan, 2009). Furthermore, the difference in cost for living and rehabilitation expenses between children and adults with ASD is substantial (Ganz, 2007). In an extensive collection of medical services data from American, British, and Canadian literature, as well as survey data from large-scale health organizations, the total cost of care for individuals into adulthood (beginning around age 23) is approximately $90,000 per year. Moreover, the cost of care in adulthood was found to cost five times as much as care in childhood (including special education and behavioural services; Ganz, 2007). As the increasing number of children diagnosed with ASD grow older, the need for interventions specifically targeting skills required in adulthood becomes increasingly urgent.

Proper integration into society requires proficiency in a broad array of skills that contribute to independent adult living. A core component of functional independence in adulthood is employment. However, in comparison to the typically developing population, the ways in which adults with disabilities acquire employment require focused planning, careful resource allocation, and individualized intervention. The current state of vocational research for adults with disabilities is reviewed below to highlight what has been done and what needs to be done to move forward.

Supported Employment for Individuals with Disabilities

Supported employment is a frequently researched model of vocational training for individuals with disabilities (Gerhardt & Lainer, 2011; Hedley et al., 2018; Hedley et al., 2017; Kaya et al., 2016; Mavranezouli et al., 2014; McClannahan, MacDuff, & Krantz, 2002; McDonough & Revell, 2010; Müller & VanGilder, 2014; Schall et al., 2015; Schaller & Yang, 2005; Wehman et al., 2012a; Wehman et al., 2017). Supported employment is described as an individual seeking, securing, and maintaining employment in a modified fashion, with additional support as needed to complete the requirements of the position. Given that the social and communicative deficits associated with various intellectual or developmental disabilities may disrupt an individual's ability to independently engage in competitive employment pursuits, supported employment has been identified as a viable option for entering the workforce (Schall, Wehman, & McDonough, 2012). In addition to helping offset the cost of living in a full-time day program (Mavranezouli et al., 2014), individuals participating in supported employment programs are often more successful in later securing full time employment in comparison to those attempting to acquire competitive employment without specific training or outside assistance (Schaller & Yang, 2005).

Although the specific processes of supported employment may vary, some common elements across the standard model include job matching and placement, the consultation of outside experts to assist with skill teaching and workplace modifications, and the use of on-site job coaches (Gerhardt & Lainer, 2011). When an individual first seeks supported employment, they may be referred to or directly placed in a role by a vocational rehabilitation service (Kaya et al., 2016), or they may be provided with training and resources to search, apply, and interview for a potential position (McDonough & Revell, 2010). The initial consultation process typically includes a variety of assessments to match individuals with a workplace that is supportive of their individual abilities and interests (Bond et al., 2001; Hillier et al., 2007; Kaya et al., 2016; McDonough & Revell, 2010; Wehman et al., 2017).

Following placement in a position, most supported employment models use a combination of employment consultants and direct on-the-job coaches to modify work environments or to train employers directly on how to facilitate successful workplace integration (Hagner & Cooney, 2005; Hedley et al., 2018; Hillier et al., 2007; Kaya et al., 2016; McDonough & Revell, 2010; Schall et al., 2015; Wehman et al., 2014; Wehman et al., 2017). The role of the consultant varies from coordinating with the employer to modify the work environment as needed, to specifically identifying which resources are required to complete intensive on-the-job training (Hillier et al., 2007; McDonough & Revell, 2010). Conversely, on-site job coaches work directly with the employee and provide intensive teaching to employees to learn job-specific tasks and general workplace behaviours (Wehman et al., 2017). Commonly used techniques for teaching a variety of vocational skills include the use of photographic activity schedules (Dotto-Fojut, Reeve, Townsend, & Progar, 2011; McClannahan, MacDuff, & Krantz, 2002; McDonough & Revell, 2010), video modeling (Gilson, Carter, & Biggs, 2017;

Seaman & Cannella-Malone, 2016; Sung et al., 2019) and behavioural skills training (Bennett & Dukes, 2013; Grob, Lerman, Langlinais, & Villante, 2019).

Three branded supported employment programs for individuals diagnosed with ASD have been identified in the vocational training literature (Hedley et al., 2017). First, the TEACCH program is an employment-specific sector of the larger Treatment and Education of Autistic and related Communication Handicapped Children and Adults service (Keel, Mesibov, & Woods, 1997). This program uses three different supported employment models with varying levels of support and coach-to-client ratios to differentially serve the varying needs of individuals with disabilities (Keel et al., 1997; Mesibov & Shea, 2010). The individual placement model provides one job coach for one individual and is comprised of finding a placement and providing on-the-job support until services can be removed. The dispersed enclave model has one job coach assisting several individuals in a single employment location, and the mobile crew model has one job coach assisting a smaller group of individuals to work in a job that delivers a specific community service, such as housecleaning (Keel et al., 1997).

Second, Project SEARCH is a transition-focused internship program for individuals with various disabilities to learn on-the-job workplace skills in their final years of high school (Rutkowski, Daston, Van Kuiken, & Riehle, 2006). This program has been successful with modifications to specifically cater to individuals diagnosed with ASD, basing intervention efforts in strategies drawn from the principles of applied behavior analysis (ABA; Wehman et al., 2012b). Individuals participating in this specialized training are shown to obtain competitive employment at a higher rate over individuals in a control group (Wehman et al., 2017), in addition to requiring less focused intervention to obtain employment when compared with individuals solely participating in a supported employment model (Schall et al., 2015).

Third, a program called Prospects was developed under a supported employment model preparing individuals with disabilities for work and assists with locating opportunities and providing on-the-job support (Mawhood & Howlin, 1999). Success data that were compiled over eight years showed that a large number of participants in this program were successfully employed at follow-up (Howlin, Alcock, & Burkin, 2005).

Vocational Skills Interventions

Despite some documented success in supported employment programs, there is limited research on exactly how employment skills are taught. A number of researchers have conducted literature reviews analyzing the state of vocational research for individuals with disabilities (Bennett & Dukes, 2013; Nicholas, Attridge, Zwaigenbaum, & Clarke, 2015; Roth et al., 2014; Seaman & Cannella-Malone, 2016; Walsh, Lydon, & Healy, 2014). These reviews identified fewer than 20 peer-reviewed, experimentally controlled, empirical articles investigating interventions related to teaching vocational skills. Though some reviews have identified larger pools of studies in this area, much of the research included in these reviews is not recent (Cannella-Malone & Schaefer, 2017; Gilson et al., 2017). For example, of the 62 articles reviewed by Cannella-Malone and Schaefer (2017), 41 of those articles were published between 1980-1999. Similarly, in a review of research investigating strategies used to teach vocational skills, 30 of 56 reviewed studies were published before the year 2000 (Gilson et al., 2017). Furthermore, some reviewers have found that many articles in this area of research consist of poorly defined outcomes and methodologically flawed research elements (Hedley et al., 2017; Test et al., 2009).

Despite the limited foundation of research in this area, numerous studies have used behaviour-analytic procedures to structure vocational skill-acquisition interventions (Bennett &

Dukes, 2013; Dotto-Fojut et al., 2011; Gilson et al., 2017; Grob et al., 2019; Lerman, White, Grob, & Laudont, 2017; Matson et al., 2012; McCuller, Salzberg, & Lignugaris, 1987; Roth et al., 2013; Seaman & Cannella-Malone, 2016). Many researchers have also consulted with experts in ABA for consultation or on-the-job support (Hedley et al., 2017; Jauss, Wacker, Berg, Flynn, & Hurd, 1994; McClannahan et al., 2002; Wehman et al., 2017).

A core component of ABA is the use of thorough and continuous assessment procedures. The purpose of behavioural assessment is to ideally identify skills of importance to guide intervention efforts (Cooper, Heron, & Heward, 2007). Despite the frequent use of ABA to teach vocational skills in this area of research, adequate assessment processes are rarely used to better refine, and perhaps improve the efficiency of, these teaching procedures. Indeed, the time and additional resources required to effectively train and support employees with disabilities is a common consideration in this research (Hagner & Cooney, 2005; McDonough & Revell, 2010; Nesbitt, 2000; Scott, Falkmer, Girdler, & Falkmer, 2015) and a concern for employers hiring these individuals (Kaye, Jans, & Jones, 2011; Lemaire & Mallik, 2008; Lindsay, McDougall, Menna-Dack, Sanford, & Adams, 2015).

Specifically, when barriers to sustained employment for individuals with developmental delays were examined, individualized issues in workplace behaviours were found to be the most frequently cited barrier (Lemaire & Mallik, 2008). The researchers note that properly implemented assessments and subsequent treatments are necessary to address these individual barriers to employment. As the previously reviewed literature demonstrates, supported employment models have the capacity to successfully integrate individuals with disabilities into the workforce. However, the dissemination of precise assessments with properly researched validity are necessary to further inform effective and efficient intervention strategies.

Assessment of Vocational Skills

Often, supported employment literature does not specifically highlight the processes used to assess an individual's vocational skills repertoire. Kaya et al. (2016) evaluated supported employment programs in the United States for clients diagnosed with ASD in terms of employment outcomes and related variables. The variable that was most predictive of success (as defined by the acquisition of competitive employment) was undergoing various assessment procedures. Assessment was defined as activities related to matching candidates with a particular vocational rehabilitation service. However, this description does not provide specific information on which skills are important to target for entry into a workplace setting.

Some assessment tools exist in the empirical research, but they do not appropriately address observable behaviours that are required for entry into a workplace. For instance, Murray, Hatfield, Falkmer, and Falkmer (2016) identified and evaluated 10 different career planning tools in terms of their usefulness for assisting with career planning for individuals with ASD. The tools that were identified consisted of evaluations of task preferences and measurements of loosely defined constructs like career maturity and vocational identity. The subjective characterization of these constructs does not serve to reliably or objectively measure the skills that a person has or needs to learn in order to function independently in a workplace setting.

Similarly, Hillier et al. (2007) evaluated how a vocational program focusing on job preparation and coaching for individuals with ASD contributed to positive employment outcomes. As part of the assessment process, a questionnaire was provided to participants and their parents to assess competencies in areas such as personal hygiene, language comprehension, basic math skills, and manners. While the relative importance of these skills is not to be discounted, an over-reliance on associating various functional living skills with employment

readiness or proficiency in a workplace does not adequately address this construct. Specifically, which particular responses contribute to successful integration in the workplace have yet to be identified.

Three assessment tools were identified in the literature as being developed to specifically measure vocational skills in individuals with disabilities. The Autism Work Skills Questionnaire (AWSQ) was developed by clinicians with experience with ASD and rehabilitation efforts through drawing on their own experiences, consulting other experts, reviewing previous literature, and interviewing adults diagnosed with ASD (Gal, Meir, & Katz, 2013). The AWSQ is comprised of six sub-scales, including categories like working styles and interpersonal skills. Discriminant validity testing has been conducted with this tool, demonstrating that the AWSQ appropriately distinguishes between people with and without disabilities in terms of employment skills (Gal, Landes, & Katz, 2015).

A second tool identified for use to measure vocational skills is the Work Performance Evaluation (WPE), a tool that was developed specifically to evaluate individuals participating in a work placement study (Katz, Dejak, & Gal, 2015). This tool was described briefly by the researchers as a 31-statement tool measured on a Likert scale, consisting of items pertaining to relationships with employers, relationships with coworkers, and efficiency (Katz et al., 2015). A third tool similarly using a Likert scale is The Job Readiness Assessment Tool (JRAT), developed in conjunction with Project SEARCH to measure whether participation was related to overall job readiness and higher rates of permanent, paid employment (Müller & VanGilder, 2014). Three sets of skills are addressed in this tool, including job specific tasks (such as scanning and data entry), workplace behaviours (meets deadlines, ability to travel to and from work), and workplace culture (work ethic and self-esteem). Despite the development of these

tools, mention of their use in the literature does not extend beyond these preliminary articles. Additionally, the persistent inclusion of task-specific skills and vaguely defined questionnaire items does not provide clinicians with an objective way to measure employment-relevant skills.

Conversely, two published curriculum guides and assessment tools are available for use that include assessment information for vocational skills. The Assessment of Functional Living Skills (AFLS; Partington & Mueller, 2012) contains an assessment protocol pertaining to vocational skills, with a wide variety of subsections including interviewing skills, workplace safety, relations with co-workers, and workplace specific tasks such as computer skills, restaurant skills, and warehouse skills. The Essential for Living (EFL; McGreevy, Fry, & Cornwall, 2012) book is a detailed assessment and teaching guide with a specific focus on functional skills needed for everyday living based on Skinner's analysis of verbal behaviour. Despite their frequent use in clinical practice, both assessment guides require significant time to complete and heavily emphasize the assessment of setting-specific skills. For the purposes of the current research focus, these assessment tools are limited in their ability to efficiently determine whether an individual has the pre-requisite skills to learn setting-specific skills required of individual jobs.

An additional limitation of tools described in the literature, the AFLS and EFL, and of much of the remaining research in this area, is a tendency to focus on higher-order cognitive skills. Not only does this focus overshadow the inclusion of core behavioural skills, but it does not adequately address the full spectrum of individuals with disabilities who have the right and the potential to work in a specific capacity. In fact, many researchers note that most vocational skills research is limited to individuals of higher cognitive functioning (Cannella-Malone & Schaefer, 2017; Gilson et al., 2017; Nicholas et al., 2015; Walsh, Holloway, McCoy, & Lydon,

2016; Walsh et al., 2014). One issue related to this limitation may be a narrowed focus on job-specific tasks, rather than general employability skills related to independence in a vocational setting regardless of the task. Multiple researchers have identified the need for generalized repertoires of vocational skills needing to be empirically addressed (Dotto-Fojut, Reeve, Townsend, & Progar, 2011; Gladh & Sjölund, 2014; Grob et al., 2019, Hedley et al., 2017; Ju, Zhang, & Pacha, 2012; Walsh et al., 2014).

Some recent examples of behaviour analytic research represent a shift towards more reliable assessments being developed for vocational skills training. Lerman et al. (2017) conducted observation-based assessments for individuals diagnosed with ASD who struggled with staying employed long-term. The researchers identified common employment-based skill deficits through literature searches and surveying employers, and contrived opportunities to observe the presence or the absence of these skills. Some examples of the skills targeted included asking for help, on-task behaviour, and requesting missing materials. Following this assessment, the researchers developed individualized intervention plans for each participant to address the skill deficits recorded during the assessment. These assessment procedures were replicated in a later study and similarly led to individualized interventions being implemented to target workplace-relevant social skills (Grob et al., 2019).

Lerman et al. (2017) note that one necessary avenue for future investigations into observation-based assessment procedures is the social validity of the skills being evaluated. Historically, the field of behaviour analysis has not placed great emphasis on evaluating the social validity of its procedures (Carr, Austin, Britton, Kellum, & Bailey, 1999; Wolf, 1978). However, an integral aspect of applied behaviour analysis is that all endeavours in research and practice must be applied in nature, in that the procedures and the outcomes of these activities

must be viewed as socially important to those affected by the behaviour change (Baer, Wolf, & Risley, 1968; Cooper et al., 2007). Therefore, in consideration of the above reviewed research, investigations into the development of a socially valid and systematically constructed assessment tool would positively contribute to this area of research.

Purpose of Current Research

The purpose of the current study was to develop a pre-requisite skills assessment tool for workplace readiness for adults with disabilities. Previous attempts to define workplace-related behavioural constructs have found that some assessments may not accurately reflect the skills needed to succeed in a workplace or may not properly discriminate between the abilities of different individuals (Rudrud, Williams, Bouska, & Osborne, 1989). As highlighted in the previously reviewed literature, available assessment tools are limited by focusing on setting-specific or task-specific skills (Hillier et al., 2007; Müller & VanGilder, 2014; Partington & Mueller, 2012; McGreevy, Fry, & Cornwall, 2012). This approach not only does not address the generalized skill set required to function in a workplace independently, but also restricts the inclusion of individuals who cannot access certain workplaces or complete certain tasks due to cognitive limitations (Cannella-Malone & Schaefer, 2017; Walsh et al., 2016; Walsh et al., 2014). Therefore, the development of this tool may contribute to this area of research by attempting to address how to define and measure a widely applicable workplace readiness construct. This study may further contribute to this literature through the description and implementation of systematic and objective procedures used to develop a workplace readiness tool, with an emphasis on addressing the content, construct, and social validity of the assessment.

Chapter 2: Method

General Procedure

The development and distribution of this assessment tool was comprised of several phases. An extensive literature review was conducted to compile a master list of typical skills that have been identified in the literature for assessment, for supported employment, or for behavioural intervention. Interviews were conducted with a sample of participants working with individuals with disabilities to collect information about their experiences training/employing individuals in this population in various workplace settings (see Appendix B for interview questions).

Following the completion of the interviews, participants were invited to complete a ranking of vocational skills using a Q-sort procedure. The Q-sort method is a method of data collection and analysis requiring respondents to rank items in relation to each other in terms of their importance (Brown, 1996). Research studies using Q-methodology are classified as collecting opinions from a select sample of individuals pertaining to a particular topic of interest (Webler, Danielson, & Tuler, 2009). For the current study, the topic of study was generalizable vocational skills and the group of people asked to complete the Q-sort were clinicians working with individuals with disabilities to train vocational skills and employers who have hired individuals with disabilities.

In Q-sort methodology, the pool of items used to represent the statements or items to be ranked is called the concourse of text (Webler et al., 2009) and may be drawn from previous literature or research for the specific topic of interest (Shinebourne, 2009). For this research, a master list of vocational skills was compiled from the previously reviewed vocational literature (detailed procedure listed below). Respondents are then asked to sort statements related to the

topic of study based on how much they agree or disagree with the statement (Shinebourne, 2009). For this research, participants were required to sort a collection of vocational skills within the framework of a normal distribution (see Appendix C for an example) based on the degree to which they thought the skill was important or relevant to vocational readiness. Specifically, participants were asked to rate items against an operational definition of vocational readiness. Following the completion of these individual rankings, the results of this procedure were used to develop the pre-requisite skills assessment tool. The tool was distributed to participants to collect acceptability data on the usefulness and clarity of the tool following development based on the Q-sort results.

Phase 1: Literature Review and Participant Interviews

Literature review. The Google Scholar search engine was used to search for articles related to research on vocational skills in adolescents or adults with varying disabilities. Examples of workplace related search terms used to locate relevant articles included *vocational skills, vocational readiness, workplace skills, workplace readiness, employment skills, employment training, supported employment, pre-requisite workplace skills,* and *pre-requisite vocational skills.* In order to narrow this search to articles pertaining to individuals with cognitive disabilities, qualifiers such as *autism, autism spectrum disorder, ASD, disabilities* and *developmental disabilities* were added to these search terms.

Articles were reviewed and selected for inclusion for the literature review on this topic if they were published after 2000; articles published after 2010 were given priority review. Four categories of articles were searched and reviewed for inclusion in this review: empirical investigations training or teaching any workplace skills, reliability or validity testing of pre-

existing assessment tools, descriptions of supported employment models or perspective data from employers, and reviews of specific topics within this area.

Skills identified in the articles were either a dependent variable in empirical studies, skills listed in descriptions of supported employment procedures, or grouped as commonly reviewed skills in published literature reviews. Any research article in the reviewed literature that described an observable and measurable behaviour that was assessed and/or targeted for intervention was included in the compilation of this master list. Items that were not observable or measurable and could not be assessed or targeted for intervention using a behaviour analytic approach, such as beliefs about the importance of certain qualities or career identity labels, were eliminated from the list. If two or more articles identified the same or similar target behaviours, the skill was only listed once. For example, *on-task* and *remaining on task* and *seeking help, asking for help* and *seeking help when needed* were collectively included on the master list as *remaining on task* and *asking for help,* respectively.

All skills, regardless of being task-specific or generalized social skills, were included. The purpose of including all possible skills regardless of category was to eliminate response bias in the ranking system to acquire a true ranking of importance across the breadth of skills typically addressed in this area of research.

Participant recruitment. The objective for participant recruitment was to recruit an equal number of clinicians who work in a vocational context with individuals with varying disabilities and employers who have ever hired individuals with disabilities. Invitation emails were sent to various individuals in the community via contacts in the field or through independent research for possible participants that fit the inclusion criteria (see below). If individuals replied expressing their interest in participation, informed-consent forms and letters

of information were sent to participants for each component of the research (informed consent for interviews and letters of information for the Q-sort and social validity questionnaire). The following inclusion criteria for participants were used during recruitment.

The clinicians that were contacted for participation in this research were defined as an individual working in a behaviour-change supervisory role. These individuals were required to possess a professional designation or license certifying their competency in their given roles, such as a Board Certified Behaviour Analyst (BCBA). Participants were required to have at least one year of experience working with adult (i.e., over 18 years old) clients teaching vocational skills or supervising the teaching of vocational skills. Participants could also be employed as outside consultants to a specific workplace setting or by a specific organization involved in liaising with employers to create vocational placements.

The employers that were contacted for participation in this research were defined as any individual who either had hiring power at an organization and hired an individual with an identified disability, or an individual who had served as the primary point of contact in an employment setting for an employee with an identified disability. Participants were required to have had had a working relationship with the employee for a minimum of three months.

General interview structure. A semi-structured interview was conducted with participants over the phone or in person (depending on participant and researcher availability). Participants were asked a set of questions to collect initial information about their experiences with individuals with disabilities in a vocational context. All participant interviews and answers were recorded in Microsoft Word and password protected on the researcher's computer.

Clinicians were asked for initial information about their agencies, the clients they typically served, and their roles in training or supervising the training of vocational skills.

Clinicians were also asked about any previously used assessment methods for measuring vocational skills, the usefulness of those methods in directing intervention efforts, and the most commonly encountered barriers for individuals with disabilities entering a workplace.

Employers were asked for initial information about their businesses, their roles, and the context in which individuals with disabilities had been employed at their facilities. Employers were also asked about the supports used to assist with supporting an individual with a disability in the workplace, and the most common barriers they have typically faced when hiring an individual with a disability.

Data collection and analysis. These interviews were used to gather preliminary information about the current state of assessment and intervention in vocational contexts from two different perspectives involved in the process of employing adults with disabilities. This information was used to highlight the need for continued research in this area, in addition to being used for the Q-sort development and tool modification procedures described below.

This information was also used as a method of comparison for the data collected during the latter phases of this research. Specifically, the information from these interviews was compared against the results of the ranking procedures described below to evaluate whether the identified barriers discussed during the interviews corresponded with the data collected on important items of measurement for the pre-requisite vocational skills assessment.

Phase 2: Q-Sort Procedure and Tool Development

Study framework materials. An online platform for developing and running Q-sort studies was used to construct and distribute the Q-sort activity used in this research (https://www.qmethodsoftware.com). Following the creation of an account with the Q-method software, numerous organizational materials were developed for use in this study using this

platform. A brief description of the study was created for participants to read and review upon following the link to complete the Q-sort. An invitation email was drafted to be sent to the participants, and a reminder email was drafted to be sent to participants a week after the initial invitation was sent. Consent text was developed to ensure that participants read the letter of information for the Q-sort procedure and continued to consent to completing the procedure. Detailed instructions were written to be displayed on the participant's screens before the sorting activities.

The Q-method software also required the creation of Q-structure labels and stimulus materials prior to sending participation links to participants. Q-structure labels were the scales displayed along the bottom of the Q-structure to serve as a guide for where to place skills during the ranking procedure. The labels created for this study were *least important/relevant to vocational readiness, somewhat important/relevant to vocational readiness,* and *most important/relevant to vocational readiness.* The stimulus given to participants to use as a guide for their ranking procedures was a definition of vocational readiness. *Vocational readiness* was defined as an individual having the ability to accurately and independently fulfill the duties of a designated employer role within a workplace. In this definition, duties are considered to be completed accurately if each component of the work task has been completed according to the directions provided. Duties are considered to be completed independently if each component of the work task has been completed by the individual alone without direct assistance from another person.

Items for Q-sort procedure. The concourse of text for the current study was typically researched or assessed vocational skills. The two sources used to compile a master list of skills were the completed literature review described above and the information about targeted skills

and barriers drawn from participant interviews. Following the completion of the literature review, the skills gathered from this procedure were compared against the skills reported by participants during interviews.

During clinician interviews, participants were asked to report common vocational skills that were taught in their practices or organizations. Clinicians were also asked to describe typical barriers they experienced in assisting clients to access work placements and opportunities. During employer interviews, participants were asked to describe the roles that individuals with disabilities held in their respective workplaces and to describe common barriers that were typically encountered with employing any individual with a disability. Across all interviews, responses that described observable and measurable behaviours were included on the master list of skills. Responses that described systemic barriers such as access to support workers or financial limitations were not included in the Q-sort. Following the creation of this master list, skills were selected for inclusion on the Q-sort if they appeared at least twice from the two sources used for the compilation of this concourse of test (reviewed articles and participant interviews).

Q-sort procedure. Participants were sent an invitation email with the link to the Q-sort website to complete this phase of the research. Participants were given unique participation codes as confidential identifiers for the completion of the ranking activity. Upon entering the participation code, participants were asked to indicate that they had received the letter of information about the Q-sort and consented to continuing with the activity. Participants were given the option to consent by selecting buttons reading *I agree* or *I do not agree.* If participants selected *I do not agree,* the screen changed back to the participation code screen. If participants selected *I agree,* they were presented with detailed instructions on how to complete the sorting

activity. The participants were also provided with the vocational readiness operational definition on this page and on the following page before the first sorting step.

Following the instruction page, participants were presented with the first step of the sorting activity. The vocational skills that comprised the master list described above were displayed on 31 itemized cards. Each card listed one of the vocational skills, an image of a thumbs up, an image of a thumbs down, and an image of a question mark. The instructions stipulated that participants were to click on the icon that best represented their opinion regarding whether the skill listed was relevant to the vocational readiness operational definition. Clicking on the thumbs up icon resulted in the card being sorted into the *agree* pile. Clicking on the thumbs down icon resulted in the card being sorted into the *disagree* pile. Clicking on the question mark icon resulted in the card being sorted into the *unsure* pile.

Once participants were finished with the initial sort, they were presented with the final sort structure on their screens with the three initial sorting groups presented at the top of the screen. The Q-structure for this research was comprised of 31 squares (for each item card) resembling a columned pyramid. Along the bottom of the pyramid, nine numbers were listed underneath the nine bottom squares; from left to right, the numbers were -4, -3, -2, -1, 0, +1, +2, +3, and +4. The label *least important/relevant to vocational readiness* was present on the left-hand side of the column under the squares denoted by negative numbers. The label *most important/relevant to vocational readiness* was present on the right-hand side of the column under the squares denoted by positive numbers.

As explained on the instruction screen, cards were to be dragged and dropped into the squares on the pyramid until all 31 cards were placed into squares on the pyramid. In the instructions, participants were advised to begin with the furthest right or left columns to sort the

cards they considered most strongly to be most important or least important to vocational readiness. Participants were able to drag the cards between squares on the pyramid if they wished to change their sorting and were not given a time limit for the sorting activity. When the sorting was completed, participants were required to select a green submission button to submit their final ranking.

Tool construction. Based on the results of the Q-sort, commonly ranked items were identified to be included on the assessment tool. Any item that was listed in the two *most agreed upon* columns a minimum of four times, across at least one employer and one clinician, was included on the tool. The assessment tool was constructed to include a respondent component and a direct observation component. Previous vocational skills assessment research has achieved positive outcome validity with the inclusion of direct observation (Lerman et al., 2017, Grob et al., 2019). The respondent component of the tool was developed as a forced choice yes/no response to whether or not the individual being assessed has the skills outlined in this tool. Operational definitions for each skill were developed to provide assistance with how to answer these respondent questions. Following the respondent portion of this assessment tool, direct observation instructions were developed to assist with making the observation component of the assessment as standardized as possible, while still allowing for variation between different tasks and workplace-specific skills. Following these descriptions, a data sheet with space to provide information about the materials used and situations contrived for direct assessment was created to be included in the assessment (see Appendix D for developed tool).

Additional analyses. In addition to the tool modification procedure, descriptive analyses were conducted to summarize and identify patterns in the data collected across individual Q-sorts. Specifically, agreements between clinicians and employers were calculated by analyzing

the distribution of responses across both sides of the Q-sort structure for shared rankings. Within each participant group, the range of responses for highest rated skills and lowest rated skills was also calculated to describe patterns within individual participant groups.

Phase 3: Social Validity Rating

Questionnaire development. A brief questionnaire was developed for distribution to participants to collect social validity data on whether the assessment tool reflected an adequate breadth of skills that clinicians and employers deemed important for entry into a workplace (see Appendix E for social validity questionnaire). The social validity questionnaire consisted of three closed-ended questions and four open-ended questions. The three closed-ended questions asked participants to rate the comprehensiveness, clarity, and potential usefulness of the revised assessment tool using the labels strongly disagree, disagree, neutral, agree, and strongly agree. The four open-ended questions asked participants to comment on any skills they would add or remove from the tool, whether the participants would use the tool in their practice or employment setting, and whether the participants had any additional feedback regarding the usability of the tool. This questionnaire was formatted for participant completion using Google Forms. A multiple-choice format with the labels from strongly disagree to strongly agree was used for the first three questions, and a short-answer format was used for the last four questions.

Distribution procedure. Participants were sent an email with an invitation via email to review the revised tool. A PDF version of the assessment tool was attached to participant emails, along with a link to Google Forms to complete the social validity questionnaire. Clicking on the link led participants to the questionnaire. Multiple choice questions could be answered by clicking the applicable answer and open-ended questions had a space for participants to type

responses. Participant responses were automatically recorded and could be viewed by the researcher individually or as a whole sample.

Data collection and analysis. Participant responses from the social validity questionnaire were pooled and calculated in terms of percentages of ratings (e.g., how many participants strongly agreed or strongly disagreed that the tool was clear enough to use in its current state). Average ratings were calculated by later assigning numbers to the options for the closed-ended questions (see Table 5). Free-form responses to open-ended questions were also coded in terms of the feedback provided and used for evaluation of the overall acceptability of the tool.

Chapter 3: Results

Recruitment Results

During recruitment for this research, 27 potential participants were contacted, including individual clinicians working for various community agencies, individual employers who were known to hire individuals with disabilities, and employment agencies that were advertised as employment services for individuals with disabilities. Participants were contacted using an invitation email, including a brief introduction to the researcher's project focus and a description of participant roles. Fifteen participants (eight clinicians and seven employers) followed up with the researcher and were recruited for participation in this study. Seven clinicians and seven employers participated in the first phase of this research (interviewing) and all 15 participants completed Q-sorts and social validity questionnaires for the latter phases of this research.

Interview Results

Clinician characteristics and reported barriers. The clinicians selected to participate in this research worked as supervising therapists, clinical supervisors, behaviour facilitators, or clinical directors of various community agencies and programs delivering behavioural services to adults with disabilities. All clinician participants held a Board Certified Behaviour Analyst (BCBA) designation. The clients being served by these clinicians were between the ages of 15-65 years old; most clinicians reported primarily working with individuals diagnosed with autism spectrum disorder or a general developmental delay. All clinicians interviewed for this research worked under a supported employment model.

Two clinicians reported using published assessment tools such as the VB-MAPP, ABLLS, AFLS, and EFLS. One clinician reported that different pieces of these assessment were sometimes useful but not particularly focused for vocational skill assessment; the other clinician

reported that these measures did not provide an appropriate breadth of vocational skill evaluation. Other clinicians reported not using specific measures to assess vocational skills or using a specifically designed checklist for a government-funded employment project. Many clinicians reported relying on simple observation and addressing noted deficits in work environments to direct intervention efforts.

A number of barriers were reported by clinicians for individuals with disabilities entering a workplace. The most common barriers reported by this group of participants included the presence of challenging behaviour (three clinicians), employer buy-in (five clinicians), and time/monetary resources for both supporting individuals on the job and supervising direct support staff (four clinicians). Additional barriers that were reported included problems coping with changes in the workplace, difficulties with finding placements of interest to clients, communication deficits, and social skills deficits (see Table 1 for a summary of these results).

Employer characteristics and reported barriers. The employers selected to participate in this research worked in a variety of workplaces, including human resources departments, a restaurant kitchen, the athletic and recreation department for a local university, a bank warehouse, a food delivery service, and a community library. The duties that employees with disabilities were responsible for under the supervision of these employers included computer data entry, food portioning, gym equipment cleaning, warehouse shredding, food delivery, and library shelving organization. The individuals employed by this group of participants were typically between the ages of 15-40 years old.

Most employees were diagnosed with autism spectrum disorder, a general developmental delay, or Down's syndrome. Most individuals working under these participants were working in a volunteer or work placement capacity, with some paid positions. All employer participants

reported that their employees with disabilities typically worked in some capacity with a direct therapist or job coach to help complete the requirements of the job as independently as possible. The majority of employers reported that a lack of resources were primary contributing barriers to hiring or supporting individuals with disabilities in their workplaces. These resources included time for training the individual, time for training workplace staff, time to modify the workplace setting or materials to best support the completion of duties, or money to support outside assistance in the form of job coaches or consultants (see Table 1 for interview summaries).

Q-Sort Results

Items for inclusion on assessment tool. Following the completion of all participant Q-sorts, items that were ranked under columns +4 and +3 (most important/relevant to vocational readiness) were considered for inclusion on the modified version of the pre-requisite behaviours for workplace readiness assessment tool. Skills were required to be ranked in one of these two columns a minimum of four times, by at least one employer and one clinician, to be included on the tool. Of the 31 skills ranked in the Q-sort procedure across 15 participants, eight skills fell under this inclusion criteria. The eight skills included in the developed tool were: *absence of challenging behaviour, having motivation to work, understanding instructions, independently initiating a task, problem solves/corrects own mistakes, following instructions from multiple people, remaining on task,* and *asking questions* (see Table 2 for a summary of these results).

Agreements between clinicians and employers. Agreements between clinicians and employers for individual Q-sort results were calculated based on the number of shared rankings across skills. Specifically, clusters of skills rated under the *most important/relevant to vocational readiness* label (columns +1 to +4) and clusters of skills rated under the *least important/relevant to vocational readiness* label (columns -1 to -4) were analyzed for combined agreements and

disagreements. Across all 15 participants, 14 out of 31 skills were rated in the +4 column (see Table 1 for specific skills). The skill most frequently placed in the +4 column was *having motivation to work* across six different participants. Conversely, 10 out of 31 skills were rated in the -4 column (see Table 1 for specific skills). The skill most frequently placed in the -4 column was *independent travel to/from work* across eight different participants.

A significant discrepancy in rankings between clinicians and employers was defined as skills being ranked in both the +4 column and the -4 column. The two skills that were ranked in either of these two columns between clinicians and employers were *good hygiene* and *initiating a task.*

Agreements within clinician participants. The highest ranked skills (in the +4 column) across three clinicians were *having motivation to work* and *absence of challenging behaviour.* Three skills that did not receive any rankings below 0 in this group included *asking for help, requesting reasonable accommodations,* and *returning to work following a break.* The lowest ranked skill (in the -4 column) across six clinicians was *independent travel to/from work*. Three additional skills that did not receive rankings above -1 in this participant group were *lifting, general office skills, and initiating conversations.*

Across all ranked skills, the majority of clinicians that ranked skills under the same column was between 0-3 participants. Therefore, significant agreements were defined as a minimum of four participants assigning the same ranking to a particular skill. Six agreements across the Q-sort columns occurred within the clinician group, including *returning to work after a break* (+2 column), *requesting reasonable accommodations* (0 column), *speaking so others can understand* (-1 column), *initiating conversations* (-2 column), *general office skills* (-3

column) and *independent travel to/from work* (-4 column) (see Table 3 for a summary of these results).

Agreements within employer participants. The highest ranked skill (in the +4 column) across three employers was *having motivation to work*. Five skills that did not receive any rankings below 0 in this group included *asking for help, making confirming statements, flexibility with change, absence of challenging behaviour,* and *following schedules*. The lowest rated skill (in the -4 column) across four employers was *general office skills*. Three additional skills that did not receive rankings above -1 in this participant group were *lifting, job acquisition skills* and *independent travel to/from work*.

Significant agreements for employers were also defined as a minimum of four participants assigning the same ranking to a particular skill. Four agreements occurred within the employer group, including *asking questions* (+3 column), *remaining on task* (+2 column), *matching skills* (-2 column), and *general office skills* (-4 column) (see Table 4 for a summary of these results).

Q-Sort and Interview Response Comparisons

Comparisons between clinician interviews and Q-sort responses. Seven clinicians were interviewed during phase one of this research project. During these interviews, participants were asked to describe skills frequently taught for vocational settings and behaviours typically serving as barriers for individuals with disabilities to enter workplace settings. The answers to these questions were compared against Q-sort results to assess whether reported information from participants corresponded with Q-sort rankings.

Six out of seven clinicians consistently ranked skills in their Q-sorts in accordance with what they reported during interviews. In particular, three clinicians who cited challenging

behaviours as a common barrier for individuals with disabilities entering a workplace setting rated the absence of challenging behaviour as important/relevant to vocational readiness (based on a ranking of +1, +2, +3, or +4). Additional behavioural barriers reported in interviews that corresponded with high importance rankings on individual Q-sorts included understanding and following instructions, being flexible with changes in tasks or routines, engaging in on-task behaviour, having motivation to work, engaging in proper hygiene at work, and asking for help.

Five out of seven clinicians had discrepancies between reported common skills/barriers during interviews and Q-sort rankings. Reported barriers to employment that were not ranked as important or relevant to vocational readiness across clinicians included job acquisition skills and independent travel to/from work. Additionally, skills that were reported as being frequently targeted within a vocational context that were subsequently not ranked as important or relevant to vocational readiness included initiating conversations, sorting skills, general office skills, and following multi-step instructions.

Comparisons between employer interviews and Q-sort responses. Seven employers were interviewed during phase one and were asked to describe typical barriers to employment for individuals with disabilities in their workplace settings. Five out of seven employers ranked skills in their Q-sorts in accordance with what was reported during interviews. Specifically, common duties that employers reported individuals with disabilities completing in their workplaces corresponded with skills ranked as highly important/relevant to workplace readiness. For example, one employer working in a kitchen setting ranked hygiene as important to workplace readiness. Similarly, one employer supervising employees in a food delivery service reported independent problem solving as an important skill, and subsequently ranked problem solving or correcting one's own mistakes as highly important/relevant for workplace readiness.

Moreover, three employers reported having sufficient motivation to work and the ability to stay on-task as common barriers to employment; these employers correspondingly ranked having motivation to work and staying on-task as highly important/relevant to workplace readiness.

Four out of seven employers had discrepancies between rankings on Q-sorts and skills reported as being commonly taught or used in their workplaces. Specifically, skills such as general cleaning, general office, and sorting were ranked low on being important/relevant to workplace readiness, despite being reported as common and important skills in these employer's individual workplaces.

Social Validity Questionnaire Results

Combined rating results. Participants were asked to rate the comprehensiveness, clarity, and usefulness of the assessment tool by selecting one of five options of varying agreement/disagreement with provided statements (strongly agree, agree, neutral, disagree, or strongly disagree). Across the 15 participants who completed the social validity questionnaire, all participants rated the assessment tool as adequately covering the breadth of skills defining the vocational readiness construct (53.3% strongly agreed and 46.7% agreed). Ten participants (66.7%) strongly agreed that the instructions and the items on the assessment tool were described in sufficient detail to complete the assessment, while three participants (20%) agreed and two participants (13.3%) disagreed. Eleven participants (73.3%) strongly agreed that using this assessment tool would be helpful in informing intervention or training decisions; three participants (20%) agreed and one participant (6.7%) rated this statement as neutral (see Table 5 for average ratings and ranges of responses for closed-ended social validity questions).

Reported skills to add to tool. Question four on the social validity questionnaire asked participants if there were any skills that needed to be added to the assessment tool. Eleven

participants responded to this question and four participants did not respond. Four participants reported that they would not add any additional skills, and three participants suggested adding an addendum with workplace-specific skills to be measured across different workplace settings. Two participants reported that answering questions should be included. One participant reported that while the absence of challenging behaviour is important, getting along with people in the workplace is equally important. One participant responded that additional examples for some items on the tool should be added (see Table 6 for a summary of these responses).

Reported skills to remove from tool. Question five on the social validity questionnaire asked participants if there were any skills that should be removed from the assessment tool. Eleven participants responded to this question and four participants did not respond. Ten participants reported that there were no skills they would remove. One participant reported that they would remove *having motivation to work* due to the changing state of motivation across multiple variables related to workplace duties and settings (see Table 6).

Reported potential use of tool in clinical practice/employment setting. Question six on the social validity questionnaire asked participants whether they would use this assessment tool in their clinical practice (clinicians) or in their employment settings (employers). Thirteen participants responded to this question and two participants did not respond. Twelve participants reported that they would use this assessment tool to help inform an individual's preparedness for vocational placement. One participant reported that they would not use the assessment tool, because the observation section of the tool did not provide sufficient detail for examples of tasks to test the skills (see Table 6).

Reported additional feedback. Question seven on the social validity questionnaire asked participants to record any additional feedback to improve the usefulness of this tool. Ten

participants responded to this question and four participants did not record additional feedback. Five participants reported not having any specific corrective feedback; for example, one employer reported that the tool was practical, user friendly, and did not use an excessive amount of jargon.

Additional feedback for this tool was comprised of suggestions for modifications outside of adding or removing specific skills to measure; four clinicians and one employer had specific suggestions for additional modifications. One clinician reported that some of the terms used in the tool could be isolating to individuals not well versed in behaviour analysis. One clinician suggested adding a coding system for challenging behaviours based on the severity of the behaviours in accordance with the acceptability of certain behaviours in different workplace settings, such as inappropriate language in an office setting compared to a construction site. Another clinician recommended changing *having motivation to work* to be incorporated into *on-task behaviour*. Another clinician's recommendation was to add a reinforcement schedule element to determine whether individuals being assessed could work on a thinned schedule of reinforcement, in addition to adding a reinforcer preference component. An employer participant commented that the tool may be overwhelming for employers to use and interpret, and that sample activities for completing the direct observation section would be helpful in completing the assessments. This participant also recommended adding how long the assessment may take and adding a concrete measurement for how many skills should be looked for when considering hiring an individual (see Table 6).

Chapter 4: Discussion

The purpose of this research was to develop a vocational pre-requisite assessment tool for individuals with disabilities using a Q-sort ranking procedure for content validity, with preliminary social validity testing following tool development. A group of participants consisting of employers and clinicians were recruited and interviewed about their experiences hiring and training individuals with disabilities in vocational settings. Interviews were followed by the completion of a Q-sort procedure, where participants ranked a bank of vocational skills in accordance with a provided definition of vocational readiness. Following this ranking procedure, a standardized distribution of the relative importance of each item was created, quantifying the typically subjective process of collecting importance rating data from participants. This data was used to develop this assessment tool, which was subsequently distributed to participants for preliminary social validity testing. Participants reviewed the tool and provided suggestions for further modifications through filling out a social validity questionnaire.

The rankings stemming from the Q-sort procedure across the sample of participants resulted in eight top-ranked skills pertaining to vocational readiness. It is important to note that these skills did not include workplace-specific behaviours, but rather represented a group of skills that would provide individuals with a generalized repertoire of behaviours. Skills such as following multi-step instructions, initiating tasks, asking questions, and remaining on-task represent essential skills across numerous environments, people, and tasks. The results of these skills being ranked as most important and relevant to vocational readiness aligns with previously reviewed research stipulating the need for targeting generalizable behaviours in relation to vocational training (Dotto-Fojut et al., 2011; Gladh & Sjolund, 2014; Grob et al., 2019; Hedley et al., 2017; Ju et al., 2012; Walsh et al., 2014).

In their handbook of applied behaviour analysis, Cooper, Heron, and Heward (2007) discussed a number of variables pertaining to analyzing whether target behaviours selected for intervention should be considered socially significant. One stipulation they made in particular is whether behaviours targeted for assessment or intervention serve as behavioural cusps. Behavioural cusps are defined as behaviours with widespread effects following an isolated behaviour change, including providing the individual with access to new contingencies and environments (Rosales-Ruiz & Baer, 1997). The ability to understand instructions, problem solve, and refrain from engagement in challenging behaviours may be argued to represent behavioural cusps, in that the potential for positive behaviour change beyond the initial mastery of these skills is vast.

As such, one strength of this project was a focus on an applied and under-represented area of research. The stipulation that research and practice endeavours in applied behavior analysis be applied in nature (Baer et al., 1968) was addressed in this research with its focus on a socially important problem (a lack of resources for properly assessing workplace skills) and subject (improving a population's access to independent employment). Research regarding the assessment of vocational skills was previously discussed as being scarce, with limited or poor methodological strength (Bennet & Dukes, 2013; Cannella-Malone & Schaefer, 2017; Gilson et al., 2017; Nicholas et al., 2015; Zwaigenbaum & Clarke, 2015). Additionally, during the phase one interviews of this research, clinician participants reported not having a consistent way to assess vocational skills being targeted for intervention. When the assessment tool was developed and presented to participants, many clinicians reported that the tool would be useful in their settings to help direct intervention efforts. This preliminary data indicates that this research addresses an important gap that some clinicians working in this area of practice are experiencing.

Further extensions of validity testing are necessary to continue to refine the preliminary development of this assessment tool. While the results of this study through interviews and Q-sort procedures provided preliminary evidence for content validity, additional testing is required to determine whether this tool encompasses necessary forms of validity for assessment measures overall.

Pilot testing of this tool could assist with establishing whether the skills included on the assessment are reliably being assessed as they appear in the natural environment across numerous respondents, observers, and contrived observation situations. Discriminant validity testing would be necessary to determine whether the assessment tool could properly discriminate between different individuals. For instance, conducting the assessment between individuals who are already employed and people who have failed to retain employment would usefully provide information regarding whether the assessment is accurately scored differentially across individuals with varying abilities and employment statuses. Additionally, the convergent and divergent validity of this assessment should be established by comparing results of the completed tool with results on commercialized assessments, such as the AFLS or EFLS. Although these assessments have noted limitations, in order for this tool to become recognized as an efficient alternative for specifically measuring pre-requisite skills to inform interventions, it must stand up against other, more established assessment measures.

Finally, and relatedly, the utility of this assessment must also be established regarding outcome validity. One area of interest with this research was to inquire whether participants thought that using this assessment tool would be beneficial for directing intervention plans. Many of the participants in this research reported that it would be, but for concrete analysis of this, actual testing will be required.

In addition to feedback from clinicians, this project sampled employers who have hired or supervised individuals with disabilities. The analysis of individual data from each participant was useful in pinpointing patterns across these two groups of participants. For instance, skills such as sorting, matching, following multi-step instructions, and flexibility with changes in routines were rated as important and relevant to vocational readiness by clinicians; however, none of these skills were rated highly by employers. Conversely, asking questions, making confirming statements, and following schedules were rated by employers as important to vocational readiness more frequently.

These results may reflect differences in history and experiences in the roles that clinicians and employers fill in the development of vocational skills for individuals with disabilities. For example, clinicians may have prior knowledge and experience that sorting and matching skills are required in a variety of tasks across workplaces and may place more emphasis on these skills in consideration of a generalized skill repertoire. Clinicians working with individuals with disabilities may also be more aware of some of the ways that certain diagnoses impact behaviours such as following multi-step instructions and exhibiting flexibility with change. The presence of a diagnosis may impact the ease with which these skills are acquired, making them important to assess in order to enter a workplace and learn job-specific skills. Employers, on the other hand, may have a longer reinforcement history with strong employees possessing skills that were rated highly on Q-sorts.

The importance in analyzing these differences relates to how the improvement of a vocational pre-requisite skills assessment tool will be relevant for training individuals with disabilities to work independently. In phase one of this research, employers frequently reported limited time and money as a common barrier to integrating more people with disabilities into the

workforce. Similarly, clinicians frequently reported that employer buy-in regarding dedication training and resource management were commonly experienced barriers to employment for individuals with disabilities. These results are further supported in the literature on this topic (Hagner & Cooney, 2005; Kaye et al., 2011; Lemaire & Mallik, 2008; Lindsay et al., 2015; McDonough & Revell, 2010; Nesbitt, 2000; Scott et al., 2015). As such, an argument may be made that instead of training employees to be integrated into workplaces, employers can be trained to better support individuals with disabilities in the workplace.

The problem with this conclusion is that the contingencies that control employer behaviour may not support this solution. While some individual employees may accept training from outside consultants to be better prepared to support individuals with disabilities in the workplace, on a larger scale, the execution of this proposal may not work. However, if continued research and testing is able to demonstrate that an efficient and effective method of assessment can provide objective data regarding which skills are necessary to train for workplace readiness, more employers may be more willing to allocate necessary resources at the beginning of a partnership or volunteer placement in order to achieve the long-term consequences of employing a productive individual in the future.

Previously noted limitations of assessment methods for vocational skills included poorly defined skills (Murray et al., 2016) and an over-emphasis on more complex cognitive skills (Cannella-Malone & Schaefer, 2017; Gilson et al., 2017; Hillier et al., 2007; Nicholas et al., 2015; Walsh et al., 2014; Walsh et al., 2016). More recent research has demonstrated that directly observing individuals in contrived situations and applying that information to interventions has been useful in training vocational skills for individuals with disabilities (Grob et al., 2019; Lerman et al., 2017). Information from the literature, then, dictate that vocational

assessment tools should include a direct observation component, provide an appropriate breadth of skills, and provide adequately defined procedures for identifying and assessing skills.

As such, future uses of the currently researched tool should incorporate both respondent and direct observation components. The assessment provided suggestions for how to construct opportunities to observe the presence or absence of the skills measured using this assessment. This section of the assessment tool was left purposefully open to accommodate for the various workplace settings that an individual with disabilities may work in; providing strict examples of tasks used to test these skills might limit the ability to test these skills in a wide range of situations.

Additional strengths of this research were the methodology used to collect participant data and the inclusion of social validity measures. The use of the Q-sort procedure added some necessary objectivity to the typically subjective activity of collecting information on participant perspectives (Brown, 2019). Additionally, the specification of inclusion criteria for the final modified tool were easily defined and clearly implemented based on ranking positions in the Q-sort structures. Following the completion of the Q-sort procedures and modifying the tool with the results of these procedures, participants were provided with a social validity questionnaire to evaluate the acceptability and potential usefulness of this tool. Overall, the results of this questionnaire were positive with multiple reports that this tool provided an appropriate breadth of skills, was clear, and would be useful across clinical and employment settings.

Despite these strengths, a number of limitations and avenues for future directions should be noted while interpreting the results of this study. First, an online tool for data collection comes with a number of benefits, such as feasibility for completing participation activities more efficiently and having an automatically recorded electronic copy of data. However, the limitation

with this study that may have impacted the results was the absence of the researcher while the participants were completing the Q-sort and social validity activities. Although the participants were informed of the ability to contact the researcher at any time with questions during the completion of these activities, it cannot be directly evaluated whether all participants completed the activities with complete accuracy.

Relatedly, in order to collect more accurate results pertaining to skill ranking and social validity, a larger number of participants would be required. Conclusions drawn from this sample of participants were tentative based on the small sample size. A future extension of this research could be to recruit a larger number of participants from more diverse backgrounds. A larger sample of participants providing information about common barriers and ranking vocational skills may provide more nuanced responses or add more weight to the already promising results of the current investigation. Similarly, the results of the social validity questionnaire may have been biased due to previous experience with completing the Q-sort and completing interviews with the researcher. Therefore, instead of distributing the tool and the questionnaire to the same participants completing the Q-sorts, additional participants should be recruited in the future to evaluate the acceptability of the tool.

In order to maintain the methodological integrity of this study, inclusion criteria for skills included on the Q-sort and for skills included on the modified tool were specified and used without modification. However, some resulting items in the Q-sort bank and on the modified tool did not reflect concretely observable and measurable behaviours. For instance, while motivation cannot be directly observed or adequately measured across one setting, this element of vocational readiness was frequently reported in the literature, across participant interviews, and ranked highly in the Q-sort procedure. Similar discrepancies were also noted when analyzing the

differences between interviews and Q-sorts for both groups of participants. Given that the reporting procedures for interviews and Q-sorts were different, it was expected that some discrepancies would occur. For instance, while motivation and employer buy-in are important conceptual considerations for individuals with disabilities entering the workplace, they cannot be easily incorporated into direct skill assessments. Rather, and perhaps as an extension of the currently described research, motivation might be a useful measure to evaluate separately as a placement guide for individuals seeking preferred workplace settings. Subsequently, the specific use of the currently described assessment tool could be implemented in a specific setting already established as motivating and/or preferred to the individual being assessed for workplace readiness.

The process through which this assessment tool was developed demonstrates a necessary scientific approach towards assessment tool conceptualization and development. Use of the Q-sort procedure provided an objective method of item selection and ranking, to counteract the typically subjective process of assigning importance to items based on perspective or experience. More importantly, however, is the development of a tool that can impact the precision and utility of activities used to assist a capable population of individuals acquire work in their respective communities. A tool that measures foundational skills validated by employers and clinicians can add generality to this area of research and practice by having the capacity to target a wider population of individuals across functioning levels.

It is anticipated that this tool, following further testing and development, has the capacity to provide important information to better guide intervention efforts in the vocational sector, with an emphasis on the independent execution of workplace-relevant skills. An important consideration for this area of research and practice is to inquire whether, contingent on learning

the setting-specific task, the individual can exhibit generalized autonomous workplace behaviours in order to complete said tasks across a variety of settings independently. If the results of this assessment tool indicate that they cannot, the utility of this tool can importantly provide clinicians with a way to set a benchmark for what skills need to be targeted for intensive intervention to become successfully and independently employed.

References

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1,* 91-97. doi:10.1901/jaba.1968.1-91

Bennett, K. D., & Dukes, C. (2013). Employment instruction for secondary students with autism spectrum disorder: A systematic review of the literature. *Education and Training in Autism and Developmental Disabilities, 48,* 67-75.

Bond, G. R., Becker, D. R., Drake, R. E., Rapp, C. A., Meisler, N., Lehman, A. F., … Blyler, C. R. (2001). Implementing supported employment as evidence-based practice. *Psychiatric Services, 52,* 312-322. doi:10.1176/appi.ps.52.3.313

Brown, S. R. (2019). Subjectivity in the human sciences. *The Psychological Record, 69,* 565 579. doi:10.1007/s40732-019-00354-5

Brown, S. R. (1996). Q methodology and qualitative research. *Qualitative Health Research, 6,* 561-567. doi:10.1177/104973239600600408

Cannella-Malone, H. I., & Schaefer, J. M. (2017). A review of research on teaching people with significant disabilities vocational skills. *Career Development and Transition for Exceptional Individuals, 40,* 67-78. doi:10.1177/2165143415583498

Carr, J. E., Austin, J. L., Britton, L. N., Kellum, K. K., & Bailey, J. S. (1999). An assessment of social validity trends in applied behavior analysis. *Behavioral Interventions, 14,* 223-231. doi:10.1002/(SICI)1099-078X(199910/12)14:4<223::AID-BIN37>3.0.CO;2-Y

Cimera, R. E., & Cowan, R. J. (2009). The costs of services and employment outcomes achieved by adults with autism in the US. *Autism, 13,* 285-302. doi:10.1177/1362361309103791

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, New Jersey: Pearson Education, Inc.

Dotto-Fojut, K. M., Reeve, K. F., Townsend, D. B., & Progar, P. R. (2011). Teaching adolescents with autism to describe a problem and request assistance during simulated vocational tasks. *Research in Autism Spectrum Disorders, 5,* 826-833. doi:10.1016/j.rasd.2010.09.012

Gal, E., Landes, E., & Katz, N. (2015). Work performance skills in adults with and without high functioning autism spectrum disorders (HFASD). *Research in Autism Spectrum Disorders, 10,* 71-77. doi:10.1016/j.rasd.2014.10.011

Gal, E., Meir, A. B., & Katz, N. (2013). Development and reliability of the autism work skills questionnaire. *The American Journal of Occupational Therapy, 67,* e1-5. doi:10.5014/ajot.2013.005066.

Ganz, M. L. (2007). The lifetime distribution of the incremental societal costs of autism. *Archives of Pediatrics and Adolescent Medicine, 16,* 343-349. doi:10.1001/archpedi.161.4.343

Gerhardt, P. F. & Lainer, I. (2011). Addressing the needs of adolescents and adults with autism: A crisis on the horizon. *Journal of Contemporary Psychotherapy, 41,* 37-45. doi:10.1007/s10879-010-9160-2

Gilson, C. B., Carter, E. W., & Biggs, E. E. (2017). Systematic review of instructional methods to teach employment skills to secondary students with intellectual and developmental disabilities. *Research and Practice for Persons with Severe Disabilities, 42,* 89-107. doi:107.171/1775/4105470976996197176699888831

Grob, C. M., Lerman, D. C., Langlinais, C. A., & Villante, N. K. (2019). Assessing and teaching job-related social skills to adults with autism spectrum disorder. *Journal of Applied Behavior Analysis, 52,* 150-172. doi:10.1002/jaba.503

Hagner, D., & Cooney, B. F. (2005). “I do that for everybody”: Supervising employees with autism. *Focus on Autism and Other Developmental Disabilities, 20,* 91-97. doi:10.1177/10883576050200020501

Hedley, D., Cai, R., Uljarević, M., Wilmot, M., Spoor, J. R., Richdale, A., & Dissanayake, A. (2018). Transition to work: Perspectives from the autism spectrum. *Autism,* 528-541. doi:10.1177/1362361316687697

Hedley, D., Uljarević, M., Cameron, L., Halder, S., Richdale, A., & Dissanayake, C. (2017). Employment programmes and interventions targeting adults with autism spectrum disorder: A systematic review of the literature. *Autism, 2,* 929-941. doi:10.1177/1362361316661855

Henninger, N. A., & Taylor, J. L. (2012). Outcomes in adults with autism spectrum disorders: A historical perspective. *Autism, 17,* 103-116. doi:10.1177/1362361312441266

Hillier, A., Campbell, H., Mastriani, K., Izzo, M. V., Kool-Tucker, A. K., Cherry, L., & Beversdorf, D. Q. (2007). Two-year evaluation of a vocational support program for adults on the autism spectrum. *Career Development and Transition for Exceptional Individuals, 30,* 35-47. doi:10.1177/08857288070300010501

Howlin, P., Alcock, J., & Burkin, C. (2005). An 8-year follow-up of a specialist supported employment service for high-ability adults with autism or Asperger syndrome. *Autism, 9,* 533-549. doi:10.1177/1362361305057871

Jauss, J. M., Wacker, D. P., Berg, W. K., Flynn, T. H., & Hurd, R. (1994). An evaluation of long-term maintenance in supported employment placements using a hypothesis testing approach. *Journal of Rehabilitation, 60,* 52-58.

Katz, N., Dejak, I., & Gal, E. (2015). Work performance evaluation and QoL of adults with high functioning autism spectrum disorders (HFASD). *Work, 51,* 887-892. doi:10.3233/WOR-152001

Kaya, C., Chan, F., Rumrill, P., Hartman, E., Wehman, P., Iwanaga, K., … Avellone, L. (2016). Vocational rehabilitation services and competitive employment for transition-age youth with autism spectrum disorders. *Journal of Vocational Rehabilitation, 45,* 73-83. doi:10.3233/JVR-160812

Kaye, H. S., Jans, L. H., & Jones, E. C. (2011). Why don't employers hire and retain workers with disabilities? *Journal of Occupational Rehabilitation, 21,* 526-536. doi:10.1007/s10926-011-9302-8

Keel, J. H., Mesibov, G. B., & Woods, A. V. (1997). TEACCH-supported employment program. *Journal of Autism and Developmental Disorders, 27,* 3-9. doi:10.1023/A:1025813020229

Lemaire, G. S., & Mallik, K. (2008). Barriers to supported employment for persons with developmental disabilities. *Archives of Psychiatric Nursing, 22,* 147-155. doi:10.1016/j.apnu.2007.06.014

Lerman, D. C., White, B., Grob, C., & Laudont, C. (2017). A clinic-based assessment for evaluating job-related social skills in adolescents and adults with autism. *Behavior Analysis in Practice, 10,* 323-336. doi:10.1007/s40617-017-0177-9

Lindsay, S., McDougall, C., Menna-Dack, D., Sanford, R., & Adams, T. L. (2015). An ecological approach to understanding barriers to employment for youth with disabilities compared to their typically developing peers: Views of youth, employers, and job counselors. *Disability and Rehabilitation, 37,* 701-711. doi:10.3109/09638288.2014.939775

Matson, J. L., Hattier, M. A., & Belva, B. (2012). Treating adaptive living skills of persons with autism using applied behavior analysis: A review. *Research in Autism Spectrum Disorders, 6,* 271-276. doi:10.1016/j.rasd.2011.05.008

Mavranezouli, I., Megnin-Viggars, O., Cheema, N., Howlin, P., Baron-Cohen, S., & Pilling, S. (2014). The cost-effectiveness of supported employment for adults with autism in the United Kingdom. *Autism, 18,* 975-984. doi:10.1177/1362361313505720

Mawhood, L., & Howlin, P. (1999). The outcome of a supported employment scheme for high functioning adults with autism or Asperger syndrome. *Autism, 3,* 229-254. doi:10.1177/1362361399003003003

McCuller, G. L., Salzberg, C. L., & Lignugaris, B. K. (1987). Producing generalized job initiative in severely mentally retarded sheltered workers. *Journal of Applied Behavior Analysis, 20,* 413-420. doi:10.1901/jaba.1987.20-413

McClannahan, L. E., MacDuff, G. S., & Krantz, P. J. (2002). Behavior analysis and intervention for adults with autism. *Behavior Modification, 26,* 9-26. doi:10.1177/0145445502026001002

McDonough, J. T., & Revell, G. (2010). Accessing employment supports in the adult system for transitioning youth with autism spectrum disorders. *Journal of Vocational Rehabilitation, 32,* 89-100. doi:10.3233/JVR-2010-0498

McGreevy, P., Fry, T., & Cornwall, C. (2012). *Essential for living.* Orlando, FL: Patrick McGreevy Publishing

Mesibov, G. B., & Shea, V. (2010). The TEACCH program in the era of evidence-based practice. *Journal of Autism and Developmental Disorders, 40,* 570-579. doi:10.1007/s10803-009-0901-6

Müller, E., & VanGilder, R. (2014). The relationship between participation in project SEARCH and job readiness and employment for young adults with disabilities. *Journal of Vocational Rehabilitation, 40,* 15-26. doi:10.3233/JVR-130660

Murray, N., Hatfield, M., Falkmer, M., & Falkmer, T. (2016). Evaluation of career planning tools for use with individuals with autism spectrum disorder: A systematic review. *Research in Autism Spectrum Disorders, 23,* 188-202. doi:10.1016/j.rasd.2015.12.007

Nesbitt, S. (2000). Why and why not? Factors influencing employment for individuals with Asperger syndrome. *Autism, 4,* 357-369. doi:10.1177/1362361300004004002

Nicholas, D. B., Attridge, M., Zwaigenbaum, L., & Clarke, M. (2015). Vocational support approaches in autism spectrum disorder: A synthesis review of the literature. *Autism, 19,* 235-245. doi:10.1177/1362361313516548

Partington, J. W., & Mueller, M. M. (2012). *The assessment of functional living skills (The AFLS).* Walnut Creek, CA: Behavior Analysts, Inc.

Rosales-Ruiz, J., & Baer, D. M. (1997). Behavioral cusps: A developmental and pragmatic concept for behavior analysis. *Journal of Applied Behavior Analysis, 30,* 533-544. doi:10.1901/jaba.1997.30-533

Roth, M. E., Gillis, J. M., & Reed, F. D. D. (2013). A meta-analysis of behavioral interventions for adolescents and adults with autism spectrum disorders. *Journal of Behavioural Education, 23,* 258-286. doi:10.1007/s10864-013-9189-x

Rudrud, E., Williams, S., Carole, B., & Osborne, K. (1989). Assessment of social skills: A comparison with supervisory ratings. *Vocational Evaluation and Work Adjustment Bulletin, 22,* 71-77.

Rutkowski, S., Daston, M., Van Kuiken, D., & Riehle, E. (2006). Project SEARCH: A demand side model of high school transition. *Journal of Vocational Rehabilitation, 25,* 85-96.

Schall, C. M., Wehman, P., Brooke, V., Graham, C., McDonough, J., Brooke, A., … Allen, J. (2015). Employment interventions for individuals with ASD: The relative efficacy of supported employment with or without prior project SEARCH training. *Journal of Autism and Developmental Disorders, 45,* 3990-4001. doi:10.1007/s10803-015-2426-5

Schall, C., Wehman, P., & McDonough, J. L. (2012). Transition from school to work for students with autism spectrum disorders: Understanding the process and achieving better outcomes. *Pediatric Clinics of North America, 59,* 189-202. doi:10.1016/j.pcl.2011.10.009

Schaller, J., & Yang, N. K. (2005). Competitive employment for people with autism: Correlates of successful closure in competitive and supported employment. *Rehabilitation Counseling Bulletin, 49,* 4-16. doi:10.1177/00343552050490010201

Scott, M., Falkmer, M., Girdler, S., & Falkmer, T. (2015). Viewpoints on factors for successful employment for adults with autism spectrum disorder. *PLoS One, 10,* e0139281. doi:10.1371/journal.pone.0139281

Seaman, R. L., & Cannella-Malone, H. I. (2016). Vocational skills interventions for adults with autism spectrum disorder: A review of the literature. *Journal of Developmental and Physical Disabilities, 28,* 479-494. doi:10.1007/s10882-016-9479-z

Shinebourne, P. Using Q method in qualitative research. *International Journal of Qualitative Methods, 8,* 93-97. doi:10.1177/160940690900800109

Sung, C., Connor, A., Chen, J., Chien-Chun, L., Kuo, H., & Chun, J. (2019). Development, feasibility, and preliminary efficacy of an employment-related social skills intervention for young adults with high-functioning autism. *Autism, 23,* 1542-1553. doi:10.1177/1362361318801345

Test, D. W., Fowler, C. H., Richter, S. M., White, J., Mazzotti, V., Walker, A. R., … Kortering, L. (2009). Evidence-based practices in secondary transition. *Career Development for Exceptional Individuals, 32,* 115-128. doi:10.1177/0885728809336859

Walsh, E., Holloway, J., McCoy, A., & Lydon, H. (2016). Technology-aided interventions for employment skills in adults with autism spectrum disorder: A systematic review. *Journal of Autism and Developmental Disorders, 4,* 12-25. doi:10.1007/s40489-016-0093-x

Walsh, L., Lydon, S., & Healy, O. (2014). Employment and vocational skills among individuals with autism spectrum disorder: Predictors, impact, and interventions. *Review Journal of Autism and Developmental Disorders, 1,* 266-275. doi:10.1007/s40489-014-0024-7

Webler, T., Danielson, S., & Tuler, S. (2009). *Using Q method to reveal social perspectives in environmental research.* Greenfield MA: Social and Environmental Research Institute. Retrieved from https://www.researchgate.net/publication/273697977_Using_Q_Method_to_Reveal_Social_Perspectives_in_Environmental_Research

Wehman, P., Lau, S., Molinelli, A., Brooke, V., Thompson, K., Moore, C., & West, M. (2012a). Supported employment for young adults with autism spectrum disorder: Preliminary data. *Research & Practice for Persons with Severe Disabilities, 37,* 160-169. doi:10.2511/027494812804153606

Wehman, P., Schall, C., McDonough, J., Molinelli, A. M., Riehle, E., Ham, W., & Thiss, W. R. (2012b). Project SEARCH for youth with autism spectrum disorders: Increasing competitive employment on transition from high school. *Journal of Positive Behavior Interventions, 15,* 144-155. doi:10.1177/1098300712459760

Wehman, P., Schall, C., Carr, S., Targett, P., West, M., & Cifu, G. (2014). Transition from school to adulthood for youth with autism spectrum disorder: What we know and what we need to know. *Journal of Disability Policy Studies, 25,* 30-40. doi:10.1177/1044207313518071

Wehman, P., Schall, C. M., McDonough, J., Graham, C., Brooke, V., Riehle, J. E., … Avellone, L. (2017). Effects of an employer-based intervention on employment outcomes for youth with significant support needs due to autism. *Autism, 21,* 276-290. doi:10.11777/1362361316635826

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11,* 203-214. doi:10.1901/jaba.1978.11-203

Appendix A: Tables and Figures

Table 1

Common Interview Results across Clinicians and Employers

Interview information	Clinicians	Employers
Sample size	7	7
Typical diagnoses of clients/employees		
Primarily ASD	4	3
Varied developmental delays	3	4
Commonly taught skills/job tasks		
Hygiene	2	1
Conversation/social skills	4	1
Remaining on-task	2	0
General office tasks	1	1
General cleaning tasks	2	3
Common barriers		
Challenging behaviour	3	1
Employer buy-in	4	1
Insufficient staff resources	4	4
Financial constraints	1	2
Social/communicative deficits	4	3

Note. Table 1 provides summaries of participant interviews when similar responses were recorded at least twice (either between or within participant groups). Responses that were not common across at least two participants were not summarized for inclusion in this table.

Table 2

Number of Q-Sort Rankings (+4 or +3) for Tool Inclusion

Q-Sort Items	Clinicians	Employers
Included		
Absence of challenging behaviour (physical/verbal)	3	4
Having motivation to work	5	5
Understanding instructions	4	1
Independently initiating a task	3	3
Problem solving/correcting mistakes	3	2
Following multi-step instructions	2	1
Remaining on-task	2	2
Asking questions	1	4
Not included		
Lifting	0	0
General office skills (photocopying, filing, scanning)	0	0
Requesting missing items to complete task	0	1
Asking for help	1	1
Punctuality	3	1
Follows instructions from multiple people	2	0
Requesting reasonable accommodations (chair, quiet space)	0	0
Alerting someone when task is complete	0	0
Speaking so others can understand	0	2
Matching skills	1	0
Sorting skills	2	0
Engaging in good hygiene at work	1	1
General computer skills	0	0
Making confirming statements/task clarification	1	2
Job acquisition skills (resume, interview)	0	0
Responding to corrective feedback	0	2
General cleaning skills	0	0
Returning to work after break	1	0
Initiating conversations with others	0	0
Independent travel to/from work	0	0
Flexibility with changes in schedule/task	2	0
Waiting	1	1
Following schedules	2	1

Note. Items with a minimum of four rankings in the +4 or +3 column of the Q-structure, by at least one clinician and on employer, were selected for inclusion on the assessment tool. Table 2 outlines the number of rankings that each skill received in either of these two columns.

Table 3

Summary of Clinician Ranking Distributions for High/Low Rated Skills

High/Low Rated Skills	Most important					Least important			
	+4	+3	+2	+1	0	-1	-2	-3	-4
Highest rated skills									
Having motivation to work	3	2	0	2	0	0	1	0	0
Absence of challenging behaviour	3	0	3	1	0	0	0	1	0
Asking for help	0	1	2	2	3	0	0	0	0
Requesting accommodations	0	0	0	2	**6**	0	0	0	0
Returning to work after break	0	1	**5**	0	2	0	0	0	0
Lowest rated skills									
Independent travel to/from work	0	0	0	0	0	1	0	1	**6**
Lifting	0	0	0	0	0	1	2	2	3
General office skills	0	0	0	0	0	3	1	**4**	0
Initiating conversations	0	0	0	0	0	3	**4**	0	1
Additional agreements									
Speaking so others understand	0	0	0	1	1	**4**	1	1	0

Note. This table displays the number of times each of the listed skills was sorted under each column in the Q-structure for clinician participants (labelled as *most important* or *least important* to vocational readiness). Agreements (defined as more than three of the same rankings) are highlighted in this table with boldface.

Table 4

Summary of Employer Ranking Distributions for High/Low Rated Skills

High/Low Rated Skills	Most important					Least important			
	+4	+3	+2	+1	0	-1	-2	-3	-4
Highest rated skills									
Having motivation to work	3	2	0	1	0	1	0	0	0
Asking for help	0	1	2	2	2	0	0	0	0
Making confirming statements	0	2	2	2	1	0	0	0	0
Flexibility with changes	0	0	2	2	3	0	0	0	0
Absence of challenging behaviour	2	2	0	1	2	0	0	0	0
Following schedules	1	0	1	3	2	0	0	0	0
Lowest rated skills									
General office skills	0	0	1	0	0	1	0	1	**4**
Lifting	0	0	0	0	0	2	2	2	1
Job acquisition skills	0	0	0	0	1	0	2	2	2
Independent travel to/from work	0	0	0	0	1	2	0	2	2
Additional agreements									
Asking questions	0	**4**	0	0	1	0	1	1	0
Remaining on task	0	2	**4**	0	0	0	1	0	0
Matching skills	0	0	0	1	0	0	**4**	2	0

Note. This table displays the number of times each of the listed skills was sorted under each column in the Q-structure for employer participants (labelled as *most important* or *least important* to vocational readiness). Agreements (defined as more than three of the same rankings) are highlighted in this table with boldface.

Table 5

Closed-Ended Question Results on Social Validity Questionnaire

	All		Clinicians		Employers	
Closed- Ended Questions	Average	Range	Average	Range	Average	Range
Comprehensiveness	4.53	4-5	4.63	4-5	4.42	4-5
Clarity	4.40	2-5	4.87	4-5	3.85	2-5
Potential usefulness	4.66	3-5	4.75	3-5	4.57	4-5

Note. Closed-ended answers on the social validity questionnaire were coded with number assignments for average and range calculations (Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1). The average response and range of responses for each of the three closed-ended questions were calculated across all participants and within each participant group.

Table 6

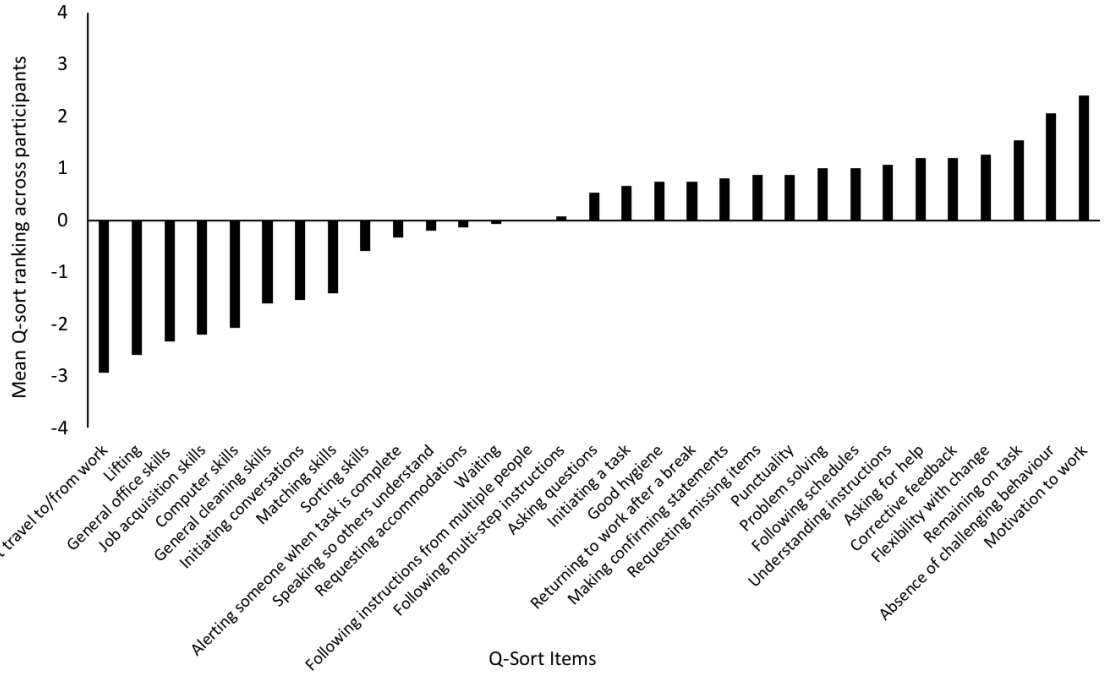
Summary of Responses to Open-Ended Questions on Social Validity Questionnaire

Open-Ended Questions	Total responses	Total response count		
		All	Clinicians	Employers
Are there any additional skills you would add?	11			
Yes (provided suggestions)		7	4	0
No		4	3	4
Are there any items you would remove from this tool?	11			
Yes (provided suggestions)		1	1	0
No		10	6	4
Would you use this tool in your practice/employment setting?	14			
Yes		13	7	6
No		1	0	1
Do you have any additional feedback?	10			
Yes (provided suggestions)		6	4	1
No		4	2	3

Note. This table provides summaries of how many participants provided specific feedback for additional tool modification.

Figure 1

Mean Q-Sort Rankings for Vocational Skills



Note. The mean ranking for each Q-sort item across all participants was calculated and graphed in a hierarchy of lowest to highest average rankings.

Appendix B: Semi-Structured Interview Questions

Clinician Interview Questions

1. What is your role in this agency?

2. How do you work within the vocational sector with adults with disabilities?

3. What is the age range of the clients you serve?

4. What are the most typical diagnoses you see?

5. How do you currently assess the skills that are targeted in your interventions (e.g., curriculum guides, specific tools)?

6. To what degree do these assessment procedures help direct intervention efforts?

7. What are the most common skills you teach?

8. In your experience, what are the most common barriers to entry for entering the workplace?

9. Do you engage in a supported employment model or simply help in a competitive employment context?

Employer Interview Questions

1. What is your role in this business?

2. In what capacity do individuals with disabilities typical work at your facility?

3. What is the age range of the clients that you serve?

4. What are the most typical diagnoses (if you have that information)?

5. Describe the nature of the outside supports that you receive (e.g., if there is a job coach, if the liaison is outside of the facility, if someone occasionally comes in to supervise).

6. How did you come to hire these employees?

7. What are some common barriers you've seen or experienced in regard to hiring or supporting individuals with disabilities?

8. What were the barriers to enter the workplace in the first place?

Appendix C: Sample Q-Sort Layout

Example of Normal Distribution Chart for Q-Sort Procedures

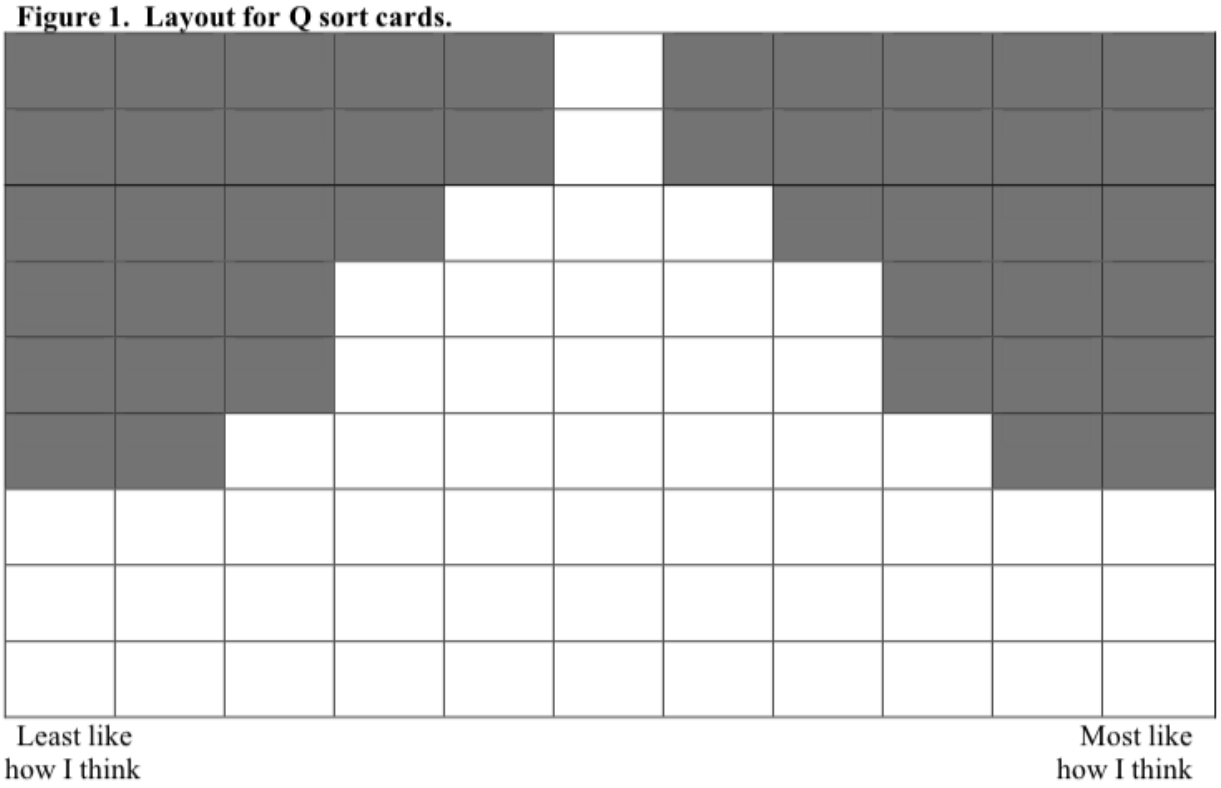


Figure 1. Example of sorting diagram for ranking Q-sort card items. Adapted from *Using Q method to reveal social perspectives in environmental research* (p. 18) by T. Webler, S. Danielson, & S. Tuler, 2009, Greenfield MA: Social and Environmental Research Institute.

Appendix D: Vocational Pre-Requisite Skills Assessment Tool

Pre-Requisite Behaviours for Workplace Readiness: Respondent Questionnaire (instructions and definitions)

Instructions: Read the questions on the data sheet and circle *yes* or *no* to indicate whether the individual being evaluated does or does not have the skill in their repertoire. Definitions for each skill are provided below.

Operational definitions:

- *Absence of challenging behaviour:* The individual does not engage in physical actions that cause injury to another person or themselves, or involves the destruction of task materials, or verbal behaviour that is considered socially inappropriate within a workplace setting.

- *Motivation to work:* The individual does not require excessive contrived reinforcement contingencies to complete a given work task and does not engage in escape/avoidance behaviour when presented with a specific work task. This construct may also be measured by the length of the latency from instruction to task initiation and the individual reporting their preference/dislike of a task before or during completion.

- *Understands instructions:* The individual, upon receiving an instruction to complete a task in an oral or written format, completes the required task as per the instruction given. The completed result of the task corresponds with the instruction provided to the individual.

- *Independently initiating a task:* Upon receiving an instruction, the individual initiates engaging in the behaviours necessary to complete the task independent of an additional prompt from the person delivering the task instruction.

- *Problem solving/correcting own mistakes:* While completing an assigned task, the individual independently resolves problems that arise by altering his/her own behaviour to complete the task with the same expected results.

- *Following multi-step instructions:* The individual, upon receiving an instruction in an oral or written format, completes the required task as per the instruction given by completing each component.

- *Remaining on-task:* The individual orients to the designated task and manipulates task materials in order to satisfy the completion requirements of the task, with deviations from the task lasting no longer than 60 seconds.

- *Asking questions:* The individual independently approaches others in his/her environment to ask questions to obtain varied pieces of information.

Pre-Requisite Behaviours for Workplace Readiness: Respondent Questionnaire (data sheet)

Individual being assessed: _____ Date: _____

Respondent: _____ Interviewer (if applicable): _____

1	Does the individual engage in challenging behaviour (e.g., physical or verbal aggression towards themselves, materials, or others)?	Yes	No
2	Does the individual have sufficient motivation to work?	Yes	No
3	Does the individual understand and respond to a variety of instructions?	Yes	No
4	Can the individual independently initiate a variety of tasks?	Yes	No
5	Can the individual engage in independent problem-solving?	Yes	No
6	Can the individual follow multi-step instructions?	Yes	No
7	Can the individual remain on task for open and closed-ended tasks (up to 10 minutes at a time)?	Yes	No
8	Can the individual independently ask a variety of questions (e.g., for task clarification, for help)?	Yes	No
Preliminary scoring: Tally the number of *yes* responses and the number of *no* responses in the spaces provided. Complete the second portion of this assessment (direct observation) to confirm the skills that are present in the individual's repertoire and/or to determine which skills required training.		/8	/8

Pre-Requisite Behaviours for Workplace Readiness: Direct Observation (instructions)

Instructions: Following the completion of the questionnaire above, complete direct observations of the skills in an evocative situation designed to probe the presence or the absence of the targets being assessed. *If possible, the person who has completed the questionnaire should not also be the person completing the direct observation component of this assessment.* The following descriptions of skills and suggestions for direct observation probes correlate to the questions in the questionnaire above.

Skill	Direct Observation Instructions
Absence of challenging behaviour	During a 60-minute observation period, in which the individual is required to complete a variety of tasks, record whether any challenging behaviour occurs. Challenging behaviour may include: any form of self-injurious behaviour, hitting others, kicking others, pinching others, pulling hair, pulling clothes, throwing objects, using inappropriate or foul language, or any combination of the above behaviours.
Motivation	During a 60-minute observation period, in which the individual is required to complete a number of potential vocational tasks, record whether the instructor can contrive sufficient motivation for the individual to complete given tasks without excessive breaks/use of contrived reinforcers. *Excessive* is defined as more than three breaks from the expected completion of a task within 60 minutes. The excessive use of contrived reinforcers is defined as providing access to tangible items or activities more than three times, for a period extending past 10 minutes, within the 30-minute period. On the data sheet, record which tasks were presented and the number of breaks/contrived reinforcers that were provided to assist in completing the tasks. Record the tasks that were presented and record additional indicators of motivation for individual tasks (e.g., latency from instruction to task initiation, presence or absence of escape/avoidance behaviours during tasks, reporting of preference/dislike during task).
Understanding instructions	Within a contrived observation setting for 30 minutes (either at a potential workplace, in the home, or in the community), provide the individual with multiple and varied receptive instructions. Record on the data sheet whether the individual was capable of following through with the actions dictated in the instructions.

Task completion: initiation (when directed)	Provide an instruction to begin a task and wait for a response. Record on the data sheet whether the individual independently initiated beginning the task upon hearing/reading the instruction.
Task completion: initiation (when expected)	During a routine activity, record on the data sheet whether the individual independently initiates beginning a routine and expected task when the required materials are present in the environment.
Task completion: problem-solving	Provide the individual with a task that includes components that have not been explicitly explained, or that requires additional materials. Probe whether the individual can maintain independence with completing the task.
Multi-step instructions	Deliver an instruction to the individual to complete a task that requires up to three separate steps in the format that he/she understands (verbal or written). Ensure that the task includes materials that the individual is familiar with. Record on the data sheet whether the individual was capable of following through with the actions required in the instructions, and of completing each component without assistance.
On-task behaviour (open-ended task)	Provide the individual with an open-ended task to complete for up to 10 minutes. Record on the data sheet whether the individual was capable of continuously working on the task for up to 10 minutes, with deviations from the task lasting no longer than 30 seconds.
On-task behaviour: (closed-ended task)	Provide the individual with a closed-ended task to start and finish that takes approximately 10 minutes to complete. Record on the data sheet whether the individual was capable of continuously working on and completing the task for up to 10 minutes, with deviations from the task lasting no longer than 30 seconds.
Asking questions	Provide the individual with a task that fills two of the following criteria: • Requires materials for completion that the individual is not familiar with • Requires materials for completion that are missing • Requires clarification for completion Record on the data sheet whether the individual asks a minimum of two questions according to the criteria during the provided task.

Pre-Requisite Behaviours for Workplace Readiness: Direct Observation (data sheet)

Instructions: Complete the direct observation probes as described above. Record the materials used and the tasks assigned in the designated section below, and record *yes* or *no* to indicate whether the skill being assessed was observed to occur.

NOTE: Some of the skills evaluated in this assessment may require interval recording for a more detailed evaluation of the target (e.g., on-task behaviour with open-ended and closed-ended tasks). The purpose of this assessment is to provide a summary of the presence or absence of these skills, with the expectation that the information collected may serve as a foundation for further assessment and intervention for individual skill deficits.

Therapist/data collector: _____ Date: _____

Skill	Description of Materials/Setting/Task(s) Assigned	Skill present?		Notes
Absence of challenging behaviour		Yes	No	
Motivation		Yes	No	
Understanding instructions		Yes	No	
Task completion: initiation (when directed)		Yes	No	
Task completion: initiation (when expected)		Yes	No	

Task completion: problem solving		Yes	No	
Follows multi-step instructions		Yes	No	
On-task behaviour (open-ended task)		Yes	No	
On-task behaviour (closed-ended task)		Yes	No	
Asking questions		Yes	No	

Appendix E: Social Validity Questionnaire

1. Please rate the *comprehensiveness* of the assessment tool. Does the tool adequately cover the breadth of skills that comprise the 'vocational readiness' construct? (check one)

☐	☐	☐	☐	☐
1 Strongly disagree	**2 Disagree**	**3 Neutral**	**4 Agree**	**5 Strongly agree**

2. Please rate the *clarity* of the assessment tool. Are the instructions and the items described in enough detail to understand and complete the assessment? (check one)

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

3. Please rate the *potential usefulness* of the assessment tool. Would the results of this assessment be helpful in informing subsequent training or intervention? (check one)

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

4. Are there any additional skills that you would add? Please explain why below.

5. Are there any items that you would remove from the tool? Please explain why below.

6. Would you use this tool in your practice/employment setting? Why or why not?

7. Do you have any additional feedback for this tool that you feel would increase its usability?

Appendix F: IRB Approval Form

ST. CLOUD STATE UNIVERSITY
EDUCATION FOR LIFE.

Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Marina Jiujias

Email: mjiujias@go.stcloudstate.edu

IRB PROTOCOL DETERMINATION: Exempt Review

Project Title: Investigating the content and social validity of a pre-requisite vocational skills assessment tool for adults with disabilities

Advisor Michele Traub

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).

- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.

-Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.

- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.

- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-4932 or email ResearchNow@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Chair:

Dr. Benjamin Witts
Associate Professor- Applied Behavior Analysis
Department of Community Psychology,Counseling, and Family Therapy

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

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SCSU IRB# 1918 - 2467	**Type:** Exempt Review	**Today's Date:** 9/23/2019
1st Year Approval Date: 9/23/2019	**2nd Year Approval Date:**	**3rd Year Approval Date:**
1st Year Expiration Date:	**2nd Year Expiration Date:**	**3rd Year Expiration Date:**