

**A Comprehensive Review of Evidence-Based Employment  
Practices for Youth and Adults with Intellectual and  
Other Developmental Disabilities**

**Final Report**

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## **Research Team**

This research synthesis is a collaborative report developed by researchers from the Centre for Disability Studies, affiliated with the University of Sydney (Vivienne Riches, Renell Rodrigues, and David Taylor), the Rehabilitation Research and Training Center at Virginia Commonwealth University in Richmond, Virginia (Paul Wehman, Josh Taylor, Lauren Avellone, and John Kregel). The analyses and conclusions presented in the report are solely those of the authors.

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## Summary

Australia has a long history of recognizing the importance of open employment (OE) for individuals with an intellectual disability (ID) (including people with an intellectual disability and co-occurring autism). Beginning with demonstration projects in the 1980s, and continuing through the current Disability Employment Services (DES) program for adults with disabilities, the nation has committed to providing high quality, effective services to individuals with ID to enable them to achieve their employment and self-sufficiency goals. The success of these programs over time has raised expectations regarding the capabilities and competence of persons with significant disabilities and has led to a paradigm shift with OE now the preferred outcome for individuals with ID.

The current DES program focuses on the use of employment placement and retention measures to determine the effectiveness and efficiency of employment services and supports provided to individuals with ID. People with intellectual disability, advocates and family members have questioned whether the program has served a sufficient number of beneficiaries, identified an adequate supply of provider organizations capable of meeting the unique needs of persons with intellectual abilities, and ensured that provider agencies are using state of the art, evidence-based practices to provide high quality services to individuals and employers.

To aid in future policy and program development, researchers from the Centre for Disability Studies, affiliated with the University of Sydney and the Rehabilitation Research and Training Center at Virginia Commonwealth University conducted a comprehensive review of international research on employment programs and practices that purport to promote successful employment outcomes for individuals with ID. Using a rigorous, structured approach for research reviews, we examined the scientific validity and strength of evidence for research-based practices to support the employment of people with ID (Armstrong, Hall, Doyle, & Waters, 2011).

We developed three research questions to guide the study and identify current evidence-based employment services and supports that have been proven to lead to meaningful employment outcomes for individuals with ID.

1. What evidenced-based employment practices lead to successful outcomes on key performance indicators of OE for individuals with ID?
2. What particular components of intervention packages emerge as specific predictors of high quality employment outcomes?
3. To what extent are the evidenced-based practices identified in the review supported by methodologically rigorous research?

We began the review by identifying over 600 individual studies or research reports. After reviewing the studies for relevance, we identified 92 articles that examine employment interventions for individuals with ID. We rated each study based on its methodological rigor in order to bolster the validity and usefulness of the report findings. In addition to published literature, we also reviewed a large quantity of government documents, evaluation studies and reports published outside of traditional academic databases, often conducted by governments for their own purposes.

This summary is deliberately limited to evidence-based practices for people with ID. Much of the literature reports findings for mixed populations that contain some people with ID. Reports that analyze practices used with a mixed population without an outcome measure confirming the effectiveness of these practices for people with ID are noted in the report.

### Major Findings

This section summarizes the key findings of the review. First, we describe the evidence-based practices in the area of employment services for individuals with ID, similar to the types of services delivered through the DES program and the NDIS School Leaver Employment Supports (SLES). Second, we identify several common practices often found in employment service programs that lack a sound empirical research base that would justify their large scale application.

While the primary purpose of this review was to identify the strength of evidence documenting the effectiveness of various employment practices related to promoting high quality employment outcomes for individuals with ID, we also were able to identify current practices that lack limited supporting evidence in the empirical literature. Where frequently used practices were notably absent from the research literature, we identified those practices within the report.

### Summary of Findings: Evidence-Based Practices

Major practices discussed in this section include open employment, staff training and technical assistance for provider agencies, and work experience for transition aged youth.

**There is an abundance of evidence indicating that the OE model is an effective, evidence-based practice that leads to measurably greater employment outcomes when compared to alternative service approaches.** The open employment service model is characterized by four major components: (1) Personalized client assessment; (2) Individualized job development and placement; (3) Intensive job site training and support; and (4) Ongoing support throughout the course of the individual's employment. Each component is briefly described below.

**Personalized client assessment** – Assessment is individualized and is based on individuals' employment goals, skills, strengths, and support needs. Most assessment activities occur in local job sites and other community settings. The assessment process helps individuals to become confident in their ability to succeed in employment, refine their employment preferences, and identify the training and support necessary for success.

**Job Development and Placement** – An employment specialist implements an individualized job search plan on behalf of a single client. Job search strategies are based on effective marketing strategies. Job placements reflect a match between an individual's preferences and choices and a customized job rather than readily available jobs in the local market.

**Intensive Job Site Training** – Job site instruction is based on the principles of learning theory and applied behavior analysis. The employment specialist provides training and support to ensure that all work tasks are completed to the satisfaction of the employer.

**Ongoing Support** – Open employment services are not time-limited. Ongoing support services are provided to both the individual and the employer throughout the employment process. Specific services are based on each individual’s needs and requests, and fluctuate over time in frequency and intensity, while continuing as long as the individual remains employed.

Findings from the systematic review clearly indicate that the effectiveness of open employment is not the product of a single strategy, but rather a comprehensive evidence-based process in which the four components are implemented as a comprehensive service package. When the four components are applied in combination to serve individuals with ID, the open employment model results in client employment rates, earnings, and employment retention far superior to Australian Disability Enterprises programs, group employment options in which groups of individuals with ID work in a supervised setting in the community, often earning less than award wages, or traditional job placement programs in which persons with ID are placed into employment with little follow-up training or support.

**Experimental evidence documents a direct relationship between the delivery of training and technical assistance provided to staff in open employment programs and improved client outcomes for persons with ID in OE.** The quality of employment services provided to individuals with ID is in large part dependent on the level of training received by staff implementing those services. Findings from our review indicate that staff training programs on the key components of the open employment model and the provision of ongoing technical assistance to providers resulted in significantly improved placement rates, higher wages, and more hours worked per week for clients. Staff providing employment services should be fluent in the overall process for implementing the multiple stages of OE, along with knowledge of instructional training techniques that are supported by empirical research, such as individualized assessment and training strategies based on learning theory principles.

**Work Experience for Transition-Age Students.** There are numerous studies that report participation in work experience correlates with subsequent open employment. However, few of these studies focus exclusively on individuals with ID and don’t provide data demonstrating that work experience alone, in the absence of other services, leads to people with ID achieving open employment.

Jobsupport, a specialist service for people with ID, recently reported that the number of school leavers willing to attempt open employment more than doubled after it introduced extended work experiences (Tuckerman, 2015). Similarly, a recent five-year national demonstration funded by four U.S. federal agencies found that transition age youth who participated in community-based work experience were significantly more likely to subsequently apply for vocational rehabilitation services, including OE services (Mamun, et al., 2019).

It is not enough to simply supply work experience opportunities to transition-age students with ID. To be effective, the work experience must be combined with the evidence based practices outlined above, including personalized assessment, job development and placement, intensive job site training, and ongoing support services to assist individuals with ID to obtain and maintain employment.

### **Summary of Findings: Current Practices Lacking Empirical Evidence**

The review identified several commonly used practices that were notably absent from the empirical literature. There is extremely limited evidence (or in some cases, no evidence) within the scientific research bases that justifies the use of these programs or policies over the clearly established, evidenced-based methods reviewed.

**Participation in Segregated, Facility-Based Supported Employment does not lead to Open Employment** - We found clear evidence that placement of individuals with ID into segregated employment settings, such as Australian Disability Enterprises (ADEs), rarely leads to subsequent community integrated employment. A major study by Siperstein, Heyman, and Stokes (2014) found that in a large nationwide sample in the U.S. only 10% of the sample ever moved from segregated employment facilities to competitive employment. They further found that very few individuals in OE had ever been in segregated employment settings for any length of time. Similarly, the Australian Department of Social Services (2015) reported that 20,000 people were in supported employment (ADEs) in 2014 and that 159 (1%) moved to open employment. Consequently, Australian Disability Enterprises should not be viewed as a “stepping stone” service leading to OE.

**No evidence was uncovered to document that starting transition services for transition age youth at a younger age was itself an evidence-based practice for youth with ID.** While we were able to document evidence-based practices and predictors for youth transitioning to adulthood (i.e., community-based work experience), we did not find that early intervention itself in the absence of other evidenced based techniques directly leads to improved employment outcomes.

**No evidence supported the effectiveness of classroom-based pre-vocational training and vocational education in leading to high quality employment outcomes for individuals with ID.** We found clear evidence that community-based work experiences for youth in school-to-work transition programs is a proven evidence-based practice for ID. While pre-vocational training and vocational education in classroom settings may be effective for other populations, the overall lack of evidence behind pre-employment and classroom-based training and education for youth with ID in terms of measurable employment outcomes should serve as a caution to policymakers and practitioners against making these practices required prerequisites to proven community-based work experience and open employment services.

## Implications

The results of the review have multiple implications for the design and operation of employment services for individuals with ID. We briefly describe three important implications below.

**Use of Evidence-Based Practices within DES services** - The finding that the open employment model is an evidence-based practice that generally leads to high quality employment outcomes offers the opportunity to refine the current DES open employment program. Client employment outcomes (placement rate and 26 week retention) are less than what might be expected if the provider agencies were implementing all the major program components with a high degree of treatment fidelity. While many factors may affect the outcomes generated by a single program over a specific time period, policymakers and practitioners should examine whether: (1) the provider agencies are actually implementing evidence-based practices; and (2) whether individuals with ID are receiving the high quality employment services and supports that will enable them to achieve their employment goals.

The Australian government has the tools to undertake this type of review. It publishes employment outcomes achieved by individuals with ID (and other types of disabilities) for every DES service in Australia. Random sample audits are conducted on every service to verify the reported outcomes, specifically the proportion of all funded participants who are placed into OE, and the proportion of placements still employed after 12 months. These data provide a unique basis for empirically identifying the highest outcome services for people with ID in Australia. The peak Australian body representing people with an intellectual disability, Inclusion Australia (2018), recently calculated an indicative 12 month employment outcome rate. The best performing DES service in Australia Jobsupport had a 12 month employment outcome rate for people with ID nearly twice the next best service (67.2%, next best 37.6%). Similarly, the Australian Department of Employment and Workplace Relations 2010-2013 evaluation of DES services confirmed that Jobsupport had the highest employment outcome rates and that the achievement of these outcomes is based on utilizing the four evidence based practice components listed above.

Jobsupport has a long record of delivering OE services with rigorous fidelity to the evidence-based components of the model. Client assessment is individualized, based on an assessment plan, and conducted primarily in the community. Job development activities are based on sound marketing principles and are personalized to each client's employment goals and work preferences. Job site customization and training is based on the proven principles of learning theory and delivered by staff who have received extensive training. Ongoing support services are delivered proactively and designed to meet the needs of both the client and the employer. It can be reasonably hypothesized that if other DES provider services were to rigorously adopt and implement the same evidence-based program components as Jobsupport, the results would be better quality program outcomes for individuals with ID, greater employer satisfaction and willingness to hire individuals with disabilities, and significant financial savings to the government.

**Staff Training and Technical Assistance** - Second, the finding that staff training and technical assistance leads to improved OE service delivery (i.e. greater use of evidence-based practices)

has direct implications for the future structure and funding of the DES open employment system. The current system relies on a performance framework that consists of a managed, performance oriented, data driven approach to the governance of disability employment practice by Commonwealth open employment provider agencies. Based on the results of this study, future program management approaches should ensure that clients with ID receive services based on effective, evidence-based employment services delivered by highly trained open employment staff members.

**Effectiveness of Classroom-Based Services** - Third, the finding that we did not identify any research evidence supporting the effectiveness of classroom-based pre-vocational and vocational education in leading to high quality employment outcomes for individuals with ID should be examined in relation to the services provided to youth with ID in transition to work programs. While these services may be effective for individuals with other types of disabilities, their use with youth with ID should be carefully considered and evaluated. We found that a strong reliance on classroom based services, at the expense of work experience programs and other community-based activities may not be of sufficient scope and intensity to lead to desired outcomes for youth with ID in the NDIS SLES programs.

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## Introduction

In order to promote improved employment outcomes for individuals with intellectual and developmental disabilities (IDD), a better understanding of what research has shown to be effective practice and policy is necessary. This paper examines the strength of evidence for research-based practices to support the employment of people with IDD internationally. To aid in future policy and program development, researchers from the Centre for Disability Studies, an affiliate of the University of Sydney, Australia, and the Rehabilitation Research and Training Center at Virginia Commonwealth University conducted a comprehensive review of international research on employment programs and practices that promote successful employment outcomes for individuals with IDD. We examined the scientific validity and strength of evidence for research-based practices that support the employment of people with IDD through a scoping review of internationally-published research articles and grey literature, as well as a parallel targeted review of Australian research and practice in this area.

The purpose of a scoping review is to synthesize available research on a given topic in order to better understand the breadth, type and quality of empirical research that exists within the current literature base (Armstrong, Hall, Doyle, & Waters, 2011). For this review, we examined pertinent research databases containing peer-reviewed journals and also grey literature sources, which include unpublished data and reports produced by government entities, advocacy groups, research centers, and academic organizations with the potential to inform findings. We analyzed study components and methodological rigor to determine their strength of evidence, and summarized the findings in the following narrative.

## Background

Over the past 40 years, legislative, policy, and program changes have led to the inclusion of individuals with IDD into the competitive workforce and have enabled thousands of persons worldwide to lead more productive and independent lives. Beginning in the late 1970s, the experiences of adults with IDD changed dramatically as individuals exited institutions and moved into communities. For many of those individuals with IDD, however, work-related integration into communities was limited to participation in segregated employment (e.g., sheltered workshops, facility-based, and center-based employment) where work responsibilities consisted of menial tasks for meager wages (Brown et al., 1984; Gold, 1973). Although the employment options for adults with IDD were largely restricted to highly segregated employment, there was significant progress made in research and practice showing increasing efficacy for structured, behavioral approaches to employment services for individuals with the most significant disabilities (Brown et al., 1983; Gold, 1978)

Wehman (1981) initially articulated the philosophical and programmatic basis of what came to be known as the supported employment (SE)<sup>1</sup> model of employment services for individuals with IDD. The model emerged in the U.S. in the 1970s and '80s as an alternative to segregated work (Rusch, 1985; Vogelsburg, 1986, Wehman & Hill, 1985) and led to the development of

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<sup>1</sup> Supported Employment (SE) was first defined in US Public Law 99-506 as “*competitive work in an integrated work setting for individuals who, because of their handicaps, need ongoing support services to perform that work*” (Federal Register, 1987, p.30546).

service delivery models widely used by employment support organizations today. SE, referred to in Australia as open employment (OE)<sup>2</sup>, relied on the use of on-site employment specialists who provide training, support, and advocacy for individuals with significant disabilities while employed (Wehman & Kregel, 1985). SE/OE program components include individualized assessment and job development activities, intensive on-site systematic training based on the principles of applied behavior analysis (ABA), and ongoing support services throughout the course of an individual's employment.

The SE/OE model challenged the effectiveness and necessity of segregated, facility-based, or center-based service programs for individuals with ID. These programs traditionally followed a “train then place” model of service delivery in which individuals received training in a segregated environment and after acquiring a set of skills were gradually moved through a continuum of settings until reaching the goal of competitive employment in a real job in the community. Proponents of this approach argued that individuals with ID had “skill deficits” in areas such as the independent living, communication, and employment domains that must be addressed before an individual was exposed to a more integrated community employment setting. In reality, the “train then place” approach rarely worked. Few individuals ever obtained competitive employment and obtained CIE. The overwhelming majority remained in segregated settings that did not provide opportunities to work side by side with other members of their communities, paid negligible wages, and prevented individuals from achieving their employment and economic self-sufficiency goals.

In contrast, SE/OE espoused a “place then train” philosophy that enabled individuals with ID to quickly move into a CIE setting. Training and support was delivered in these “real world” environments that allowed them to rapidly acquire the necessary skills; develop relationships and interact with employers, coworkers and community members; and earn significant wages that enabled them to contribute to their economic self-sufficiency (Wehman & Kregel, 1989).

The large-scale adoption of the “place then train” SE/OE model in the 1980s was highly controversial. Criticisms focused on concerns that those individuals with ID placed into integrated community settings would quickly fail, employers would not hire them, they would be mistreated or taken advantage of by coworkers or community members, or they would not be safe in community environments. In short, low expectations for the employment potential of individuals with moderate or severe ID led to their exclusion from work opportunities and limited their access to community supports.

Research in SE/OE expanded over the next two decades from smaller case studies and single subject designs (SSD) to larger scale group comparisons and efficacy studies (Wehman, Revell, & Kregel, 1998). As results from these studies disseminated, SE/OE began to shift policy and practice first in the United States, followed by Canada and Australia, and then in other countries around the world (Corbière, Bond, Goldner, & Ptasinski, 2005; Parmenter, 1999).

These changes in policy and practice raised expectations about the capabilities and competence of persons with significant disabilities and led to a paradigm shift from segregated employment

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<sup>2</sup> Australia uses the term Open Employment (OE) as supported employment occurs in Australian Disability Enterprises (ADEs), which are segregated settings.

to competitive integrated employment (CIE)<sup>3</sup> as the preferred outcome for all individuals. The SE approach has subsequently been used with several different populations, including people with intellectual disability (ID) (Wehman, Chan, Ditchman, & Kang, 2014a), psychiatric disability (Bond, Drake, & Becker, 2008), traumatic brain injury (Dillahunt-Aspillaga et al., 2018), spinal cord injury (Ottomanelli, et al., 2012) and autism spectrum disorder ([ASD]; Wehman et al., 2016).

Internationally, CIE has also been adopted as a preferred outcome for all people with disabilities. The International Labor Office (ILO) of the United Nations first passed Convention No. 159 in 1983 to ensure that member states provide vocational services to individuals with disabilities to support their employment opportunities in the open labour market. The guidelines from Convention No. 159, along with recommendations outlined in ILO Convention No. 168, formed provisions for states to adopt in establishing vocational support for adults with IDD (United Nations, 2006). These outlined specific targets in such areas as the work setting (i.e., integrated where possible and segregated where necessary), wages (i.e., conforming to standards of general workers), and the training and expertise of vocational staff. In 2008, the United Nations General Assembly passed the Convention on the Rights of Persons with Disabilities, which has been ratified by 177 member states. While its scope covers many areas of the inclusion of people with disabilities into society, employment provisions include a commitment to equal access to employment opportunities on the open labour market with support from trained and competent staff and vocational training programmes.

International policy has shifted more toward CIE following the legislative actions of the United Nations and several national governments. For example, in the United States, the Partnerships in Employment state projects emerged as a systems change policy approach that enhanced the ability of states and organizations to build greater opportunities for CIE for individuals with disabilities. Funded by the US Federal Administration on Community Living in the Department of Health and Human Services, this initiative proliferated systems change efforts designed to provide long-term impact on employment opportunities for individuals with disabilities across states and communities, including coordinated state agency policies, training for service providers, and enhanced internship/work experience programs (Butterworth et al., 2017). Similar international systems change models promoting CIE globally through national and regionally-sponsored SE systems change efforts have reported similarly positive outcomes (e.g., Owen et al., 2015; Suibhne & Finnerty, 2014).

Australia has a long history of recognizing the importance of CIE for individuals with IDD. Beginning with demonstrations and pilot projects in the 1970s and 1980s, and continuing through the current Disability Employment Services (DES) program for adults with disabilities, the nation has committed to providing high quality, effective services to individuals with IDD to enable them to achieve their employment and self-sufficiency goals (Baume & Kay, 1995; Grimes, 1985; McClure, 2000). The success of these programs over time has raised expectations regarding the capabilities and competence of persons with significant disabilities (Inclusion

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<sup>3</sup> Competitive Integrated Employment (CIE) was defined as “*Real work for real pay with commensurate benefits. The job is aligned to the person’s employment goals as well as the labour market needs and involves working 20 hours or more per week (US)*” (Allison, Hyatt, Owens, Clark, & Test, 2017) or eight hours or more (Australia).

Australia, 2015; NSW Department of Family and Community Services, 2009; Parmenter, 1993, 2002).

Nevertheless, despite decades of advocacy, research, and policy directed at addressing the issue of employing adults with IDD in their communities, more work is required (Wehman et al., 2018). For example, policy changes associated with the Australian Welfare to Work reform introduced from 2006 moved the Disability Employment Service (DES) program away from a values-base towards a more economic aspirational rationale focused on a single objective – employment outcomes (Cocks & Harvey, 2008, p.187), with a performance framework of efficiency and effectiveness reflected in a managed, performance oriented, data-based approach to the governance of disability employment practice by the Commonwealth. The focus on outcomes is commendable. However, insufficient emphasis has been put on understanding the practices and processes that contribute to successful outcomes. The result is highly variable job placement and retention outcomes being achieved among Specialist Disability Employment Services (DES-ESS) that provide assistance to job seekers with IDD who need regular, ongoing support in the workplace to find and keep a job (Department of Social Services, 2014a; Inclusion Australia, 2015).

In order to more precisely delineate the evidence in support of various employment practices, we conducted three parallel reviews: a) a scoping review of the empirical international research (i.e., peer reviewed journals published in academic databases), b) a review of international grey literature (i.e., policy documents, white papers, and government reports published outside of traditional academic databases), and c) a targeted review specific to Australia inclusive of both peer-reviewed and grey literature information. A summary of each is presented consecutively in this paper. The purpose of this review is to document evidence that supports various practices, as well as identify others that are not currently supported by research findings. In the following sections, we describe the methodology used for the scoping review, a summary of findings organized by strength of research evidence, a discussion of the grey literature findings and a review of transition predictors. Finally, we synthesize common findings across all three reviews to inform service provision.

## **Scoping Review on International CIE Evidenced-Based Practices for IDD**

A scoping review was conducted to map the existing literature on evidence-based employment practices related to CIE outcomes for individuals with IDD. For the purpose of this review, we identified studies using a sample of participants with IDD or IDD subgroups, such as ASD, ID, developmental disability (DD), cognitive disability, and IDD with comorbid disorders. The term “mental retardation” (MR) was also included in searches to capture relevant research prior to the replacement of the term MR with ID. A targeted Australian literature review was also conducted that used similar search terms.

The protocol we used for this review followed recommended procedures for conducting a scoping review; identifying research questions, locating relevant studies, charting findings, and summarizing results (Arksey & O’Malley, 2005; Armstrong et al., 2011). Three databases—PubMed, Education Research Complete, and Web of Science—were used in this review in order to ensure a wide review of intervention literature in vocational rehabilitation, education,

medicine, and related social science fields. A description of each stage in the review protocol is presented below.

### Research Questions

When conducting a scoping review, research questions are intentionally left broad with the explicit purpose of allowing the bigger picture of a topic to emerge via findings (Armstrong et al., 2011). The following research questions were used to guide study selection:

- What evidence-based employment practices lead to successful outcomes on key performance indicators of CIE for individuals with IDD?
- What particular components of intervention packages emerge as specific predictors of high quality employment outcomes?
- To what extent are the evidenced-based practices identified in the review supported by methodologically rigorous research?

### Location of Relevant Studies

Two reviewers searched empirical databases to locate international articles (excluding Australia) pertinent to the aforementioned research questions. Reviewers assessed articles yielded by search terms against stringent inclusion criteria. Studies included in the final sample were analyzed by study design, methodological rigor, participant and intervention characteristics, country, and employment outcomes. Both researchers had educational and applied experience in research methodology and disciplines related to the intersection of disability and employment. An inter-rater agreement of 95% regarding inclusion/exclusion criteria was achieved prior to abstract review. Table 1 depicts criteria used for study selection.

Table 1

#### *Search Criteria for Study Selection*

<b>Criteria</b>	<b>Description</b>
<i>Databases</i>	PubMed, Education Research Complete, Web of Science
<i>Years</i>	To keep literature contemporary, only articles from the 21 <sup>st</sup> century were included; 2000-2019
<i>Key Search Term Parameters</i>	Concept terms related to the main topic, organization of terms using Boolean operations (AND/OR/NOT), and truncation symbols by population x intervention; <u>Population</u> : autism* OR intellectual disab* OR developmental disab* OR mental retardation <u>Intervention</u> : employment practices OR supported employment OR customized employment OR transition to employment OR competitive integrated employment OR employment internships OR evidence-based employment practice OR vocational rehabilitation
<i>Inclusion Criteria</i>	Target population diagnosis, English or English-translated, published on or after 2000, peer reviewed or white paper, U.S. or abroad (excluding Australia),

Criteria	Description
	examining interventions for target population resulting in employment outcomes.
<i>Exclusion Criteria</i>	Non-English/translated, published before 2000, conducted in Australia, pertaining to non-target diagnoses, examining dependent variables other than employment outcomes, focused primarily on post-secondary education programs and experiences, and individual-level characteristic factors. A supplementary paper summarizing the relevant literature outside Australia for the period 1970 to 1999 has also been produced.

### Screening Findings

A detailed account of the source of all records and decisions made during the screening process was documented. The number of total articles included and excluded at each stage of the review are identified below.

- Initially 624 records were identified through database searching, an additional 23 records were found through other sources;
- A total of 647 records were initially reviewed – 136 duplicate records were identified and removed;
- 511 Abstracts were screened using initial screening criteria, 303 were excluded due to failure to meet specified inclusion criteria;
- The remaining 208 full text articles were reviewed against the selection criteria, a total of 145 of the articles were eliminated for failure to meet inclusion criteria; and
- The final 62 articles were included in the synthesis.

The Australian review used Ovid, Medline and Scopus databases. Grey literature also included published and unpublished reports by Federal and State Government departments, research centres, academic organisations, advocacy groups and peak bodies representing the voice of people with intellectual disability but included articles and reports dating back to 1978. Sources using keyword combinations included the Australian Institute for Health Welfare (AIHW), National Centre for Vocational Education Research (NCVER), Database of Abstracts and Reviews of Effects (DARE), Citation and related article searching on key articles using Google Scholar and Grey literature searching. This resulted in a total of 106 articles and reports that were reviewed.

### Results of the Scoping Review

Assessing the quality of research methodology is a key feature of scoping reviews (Armstrong et al, 2011). Therefore, we included an indication of methodological rigor for each research study to bolster support for findings in our synthesis. We ranked research rigor using the basic evidence guidelines published by Johns Hopkins Hospital in terms of a hierarchy from most (I) to least (V) strength of evidence (Newhouse, Dearholt, Poe, Pugh, & White, 2005). Table 2 shows the coding system used to define research rigor.

Table 2

*Research Methodology Rigor Coding System*

Category	Rank	Description	Examples
<i>Experimental</i>	I	<ul style="list-style-type: none"> <li>• Random assignment to groups</li> <li>• IV Manipulation</li> <li>• Optimal control of confounding variables</li> </ul>	Randomized control designs, classic experimental designs that include randomization
<i>Quasi-Experimental</i>	II	<ul style="list-style-type: none"> <li>• Tested for causality</li> <li>• NO random assignment (but similar to experimental in all other ways)                             <ul style="list-style-type: none"> <li>○ IV Manipulation</li> <li>○ Suboptimal control of confounding variables</li> </ul> </li> </ul>	Classic experimental designs that do <i>not</i> include randomization, pre-posttest designs, post-test only designs, interrupted time series designs
<i>Secondary Data Analysis</i>	III	<ul style="list-style-type: none"> <li>• Tested for causality</li> <li>• No random assignment</li> <li>• No control of extraneous variables</li> <li>• Examined relationship between variables</li> </ul>	Correlational studies, predictive designs, model testing designs, regression analyses
<i>Single Subject Design</i>	IV	<ul style="list-style-type: none"> <li>• Limited <i>n</i></li> <li>• Single subject/group serves as own control</li> </ul>	AB design, multiple baseline, reversal designs
<i>Qualitative Design/ Mixed Methods/ Case Study</i>	V	<ul style="list-style-type: none"> <li>• Experimental manipulation</li> <li>• Control of extraneous variables</li> <li>• Use of coding techniques for themes</li> <li>• Description of case example</li> <li>• Combination of qualitative and quantitative methods</li> </ul>	Case study using interview, documents, or reports, demonstration projects, pilot projects

To organize interventions, employment practices were sorted into six intervention code categories. We developed these categories based largely on the chronological phases of support needed during the open employment process, including creating a job seeker profile, job development, job site training, and long term support (Schall et al., 2015). We added two additional coding categories to encompass service provider strategies and any additional pertinent practices (i.e., “other” category). A description of each category (IV #) with associated services is presented in Table 3.

In total, we identified 62 articles reporting on employment interventions for individuals with IDD diagnoses, though some studies included a mixed sample with other disabilities or comorbid diagnoses. For each sample that was not comprised entirely of the target population (i.e., IDD), the total amount of individuals with IDD diagnoses is specified in the appendix. Studies were conducted mainly in the United States ( $n = 55$ ; 88.7%) but also the United Kingdom ( $n = 2$ ; 3.2%), Spain ( $n = 2$ ; 3.2%), Brazil ( $n = 1$ ; 1.6%), China ( $n = 1$ ; 1.6%), and Canada ( $n = 1$ ; 1.6%).

Table 3

## Evidence-Based Employment Practices for Persons with IDD

### *Intervention Component Coding System*

<b>Employment Practice Category</b>	<b>IV Code #</b>	<b>Description</b>	<b>Examples</b>
<i>Creating a Job Seeker Profile</i>	1	Pre-employment activities aimed at determining a job seeker's personal strengths, vocational interests, concerns related to employment and desired employment outcome.	Assessments, person-centered career planning, resume/portfolio development, attention to job choice, structured work experience (paid or unpaid), seamless transition from school to work, family involvement, classroom instruction (secondary or postsecondary), life skills (e.g., travel training or assistance, social skills), self-determination training, etc.
<i>Job Development</i>	2	Activities related to securing a proper job match, which include networking with businesses and evaluating potential businesses for fit.	Individualized job search strategies, rapid job search, job analysis, job matching, disability disclosure, job customization, informational interviews, networking, and business partnership strategies, etc.
<i>On-the-Job Training</i>	3	Activities related to teaching direct job skills, identifying workplace supports, or making environmental arrangements for success in the workplace.	Place and train model, job coach supports, job support plan, workplace modifications, individualized supports, peer mentoring, internships, and communication between stakeholders, etc.
<i>Long-term Support</i>	4	Activities related to the identification and installation of extended supports necessary for vocational success	Follow-along services, continued communication among stakeholders, family involvement, monitoring, etc.
<i>Service Provider Practices</i>	5	Activities related to improved service provider training or practices	Training initiatives, referral information, knowledge translation, interagency collaboration, etc.
<i>Other</i>	6	All other services	Diagnostic or medical evaluation, collaboration with medical staff or other service providers, etc.

Concerning methodology, the vast majority of articles met level III on the established coding system ( $n = 29$ ), followed by level V ( $n = 15$ ), levels I and II ( $n = 5$  each), and level IV ( $n = 8$ ). Many of the Australian specific articles and reports comprised mixed samples but only studies where the majority were people with IDD were included. Following application of stringent

inclusion criteria, 9 Australian peer reviewed articles were included in the scoping review, with some at level V ( $n = 4$ ) followed by level II ( $n=3$ ) and level III ( $n=2$ ). Additionally, findings from grey literature are also reported.

### **Themes at Levels I and II.**

Levels I and II, which targeted randomized control trial (RCT) and quasi-experimental methods represent the strongest level of evidence produced by research designs (Newhouse, Dearholt, Poe, Pugh, & White, 2005). A total of 10 international studies were identified across these 2 levels (i.e.,  $n = 5$  at Level I and  $n = 5$  at Level II). The following findings emerged from a review of these studies: (1) A high degree of support for the Project SEARCH Plus Autism Spectrum Disorder (PS+ASD) Supports model exists at the strongest level of methodological testing; and (2) an RCT demonstrated the importance of staff training in producing better employment outcomes for clients. We will review each of these findings in more detail.

**PS+ASD Supports Model.** The traditional Project SEARCH model is a transition-to-work internship program designed to help high school students ages 18 to 22 build vocational skills by participating in a series of individualized unpaid internships in applied business settings using an SE approach (Daston, Riehle, & Rutkowski, 2012). The traditional model was developed at the Cincinnati Children's Hospital Medical Center in 1996 and includes total immersion in a workplace, a business-led approach, customized internships based on student's interests, strengths and needs, highly trained staff and collaboration with supported employment service provider agencies that placed graduates not employed by the intern host employer and provided follow-along services to both the individuals employed by the host employer and those placed elsewhere (Daston, Riehle, & Rutkowski, 2012).

Wehman and colleagues (2014b) extended the traditional Project SEARCH model by including diagnosis specific supports for ASD to address the vocational, social communication and learning needs of a sample of individuals with ASD and co-occurring ID. Examples of ASD specific supports used in the PS+ASD model include visual cues, behavior support training, social and communication skills training, and self-regulation strategies (Wehman et al., 2019). Research on the PS+ASD model included in this review were conducted at the Level I rigor using RCT designs and yielded highly successful CIE outcomes ranging from 73.4% to 90% for graduating interns (Wehman et al., 2014b; Wehman et al., 2017; Wehman et al., 2019). Five key components of the PS +ASD supports model were identified as contributing to such a high CIE success rate (Wehman et al., 2019).

- *Internships:* Students participate in three internship rotations, each approximately 10 to 12 weeks long accruing a high dosage of over 700 hours of internship hours during the school year (Schall et al., 2015). Internships are individually designed for each student accounting for personalized long-term career goals and built-in opportunities to develop and refine social communication and employment skills in an applied work setting. During the course of the internship rotations, staff identify each student's strengths, preferences, interests and support needs, and use this information to modify training in order to prepare the student to be career ready by the completion of the third, and final, internship.

- *Instructional strategies during internships:* Instruction during internship rotations centers on repeated practice opportunities in naturalistic environments to build vocational and social skills. Staff use Applied Behavior Analysis (ABA) to instruct students in the acquisition, fluency and maintenance of employment relevant skills.
- *Personalized vocational assessment and training:* By design, the program is totally immersed within a work setting which enables personalized internships to serve as both assessment and training opportunities.
- *Seamless transition to adult services:* PS+ASD students receive vocational support during the intervention from job coaches and a Vocational Rehabilitation (VR) counselor. Upon graduating from the PS+ASD program, students immediately begin the job search process with the job coaches and VR counselor already familiar with their strengths, needs, interests and career goals rather than delaying the employment process by entering a wait list at an adult service agency and ultimately working with service providers who are unfamiliar with their work abilities and preferences.
- *Focus on meeting business needs:* In addition to providing personalized vocational training for students, internships are also customized to meet the needs of a business. PS+ASD staff do not expect the business to create internships where open positions are not conducive to the business or a customization of job tasks for a new position does not also benefit the business as well as the intern. Therefore, interns are fulfilling a real need within the business and so the business holds high expectations regarding work performance. This sets a high standard for the quality of work students in the PS+ASD program are required to learn.

**Staff Training.** Research indicates that service provider training can substantially affect CIE outcomes. Using an RCT design, Butterworth and colleagues (2012) assigned employment consultants across 25 SE programs in two U.S. states to a specific training curriculum compared to a control condition (i.e., training as usual). The intervention group, which received 24 seminar hours of instruction in SE and customized employment (CE) demonstrated three times more placements within the next 12 months along with higher wages and more hours worked per week for clients. These findings reinforce an important point that employment services are only as effective as the staff trained to provide them.

To summarize, there are several common themes to be gleaned from Levels I and II studies. These include an emphasis on specific transition-to-employment techniques, such as intensive, integrated work experience for youth and young adults before leaving school or immediately post school<sup>4</sup>. Further, these intervention services must be highly individualized, accounting for distinct differences in vocational strengths, preferences, interests and needs. The PS+ASD Supports model installed specific supports for individuals with ASD, including highly structured learning experiences, reliance on evidence-based ABA techniques for teaching and addressing challenging behavior, and a focus on developing social communication skills pertinent to a work setting (Wehman et al., 2014b; Wehman et al., 2017; Wehman et al., 2019).

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<sup>4</sup> In the U.S., students with moderate or severe ID often attend school to the age of 22. In Australia, school typically finishes at age 18 and Student Leaver Employment Supports is offered immediately post school.

The importance of including specialized supports for students with ASD should be emphasized as CIE success rates for PS+ASD supports at the Level I rigor were as high as 73.4% to 90%.

**Traditional Project SEARCH.** Comparatively, studies identified in this review adhering to the traditional Project SEARCH model without diagnosis specific supports were conducted at the Level II rigor and reported a slightly lower range (51.5%- 83%) of successful CIE outcomes for students (Christensen & Richardson, 2017; Christensen, Hetherington, Daston, & Riehle, 2015). These studies did not focus specifically on individuals with IDD. It should be noted that the results of an independent evaluation of the traditional Project SEARCH model is presented later in the grey literature section of this document.

When examining the effectiveness of the traditional Project SEARCH models, we must consider the limitations in current study designs. First, most studies of Project SEARCH do not focus specifically on individuals with ID. For example, in the Christensen et al. (2015) study, individuals with ID comprised only 37.9% of the study sample. Without the ability to specifically examine the experiences of participants with ID, the ability of the Project SEARCH model to meet the needs of these individuals is not fully confirmed.

Second, the study designs employed in most traditional Project SEARCH evaluations make it difficult to assess the effectiveness of the internship component of the model. The Christensen et al. (2015) article reported an extremely high 83% employment outcome rate. However, well over half (58%) of all positive employment outcomes occurred when individuals were placed in jobs outside the host company. Without a control or comparison group study design, it is not clear whether or not the participants with ID actually require the intensive work experience activities provided in Project SEARCH, or if the same employment outcomes could be achieved through the basic SE/OE service model of assessment, job development, job site training, and ongoing support.

**Australian Place and Train Models.** The three level II Australian studies related to a work preparation/vocational training model for youth with mild ID and learning difficulties ( $IQ \geq 65$ ) that was the forerunner of the current DES system (Black, 1984; Hauritz, Riches, Parmenter & Ward, 1980). Systematic data driven assessment and vocational instruction (using task analyses, goal setting and reinforcement strategies etc.) were provided in an industrial setting. Additional instruction was provided in functional work related life skills, and individualized assistance was provided by vocational counsellors for job search and job interviews. The service provider was responsible for job analysis and job matching and short term on the job support post placement. Graduates of this model consistently obtained full time CIE placement rates of 60% at a time of high youth unemployment, in addition to 4% undertaking apprenticeships, as well as intermittent employment rates at approximately 11% (Black, 1984). The work preparation/vocational training model evolved into a place and train model when this approach was found to be more effective.

Lastly, all interventions identified at Levels I and II shared a common focal point of ultimately achieving competitive employment outcomes within the community for pay rather than volunteer or other non-paid work. Supplementary Tables 1 and 2 in the appendix show the IV components of studies identified at levels I and II.

### Themes at Level III

While Levels I and II studies were primarily multi-element interventions, those included in Level III examined more specific intervention components. These studies employed mainly correlational, as opposed to causal, research approaches and included disability populations with diagnoses other than just IDD. Results are depicted in Supplementary Table 3 in the appendix.

Level III research predominately focused on receipt of eligibility-based VR services from agencies in the United States, which exist to help individuals with disabilities achieve positive employment outcomes. These agencies offer a wide range of services based on each individual's need. Findings indicated that some specific services emerged as particularly impactful on CIE outcomes across multiple studies. Most notably, job placement services, which refer to assistance with actions related to securing an interview with an employer (Chen, Sung & Pi, 2015) were reported as a positive predictor of employment outcomes across multiple studies. Also, on-the-job support and job training all emerged as important services associated with positive employment outcomes across three or more studies. To organize findings, a summary of studies supporting or opposing use of identified intervention components at level III methodological rigor is presented in Table 4.

Two key findings emerged from the review. First, multiple studies reported that receiving *more VR services was associated with better employment outcomes* (Alverson & Yamamoto, 2017; Alverson & Yamamoto, 2018). Ditchman, Miller, and Easton (2018) reported that having a greater amount of six specific services resulted in better CIE outcomes, though findings indicate it is not the quantity but the combination of services that led to successful outcomes; assessment, counseling, job placement, on-the-job training, job search support, and transportation services. Second, *individualized job support placements, using supported employment techniques* yield better pay outcomes. Boeltzig, Timmons, and Butterworth (2008) reported higher wages for those in individualized support jobs compared to those in group support settings within matched job sectors (e.g., sales, administration, food service, etc.).

Tuckerman, Smith & Borland (1999) analysed 10 years of data from Jobsupport, an Australian DES-ESS provider that only caters for people with moderate ID (average IQ=51.2), is data driven but also documents its practices. Practices comprised a functional/situational assessment which culminates in an agreed plan signed by both the provider and the client; a formal job-client matching process; a detailed job analysis including job redesign, task analysis, and agreed rate, quality and supervision requirements (average time per client 108 hours); one-to-one onsite training until the client reaches the agreed standards and is integrated into the workplace with daily supervision transferred to the supervisor/co-worker (average time per client 72 hours or 6.9 weeks for onsite training); and ongoing follow-up support for the client and employer (average of 9.6 hours per month follow-up after the first twelve months of employment). Using customized employment, 50% jobs were created by JobSupport. Over the 10 year period analysed, these combined practices resulted in 81% job placements in workplaces with over 20 employees, an average annual job retention rate of 82%; and good to high client and employer satisfaction levels at comparatively less cost and better open employment outcomes than a state funded Post school options program. The contribution and significance of individual practices was unknown.

An evaluation of the moderate ID loading (defined as an IQ≤60) found Jobsupport was responsible for 72% of all 26-week 15+ hours per week employment outcomes across Australia for people with a moderate intellectual disability (59% of all 26-week employment outcomes for MID). The report noted that Jobsupports results were two to three times the national average. A summary of Jobsupports approach was included in the report (Department of Education, Employment and Workplace Relations (DEEWR) (2013).

Furthermore, DES Outcomes by type of disability data for every service in Australia is subject to sample audit checks by government and government data are readily available and provide a unique opportunity to identify, investigate and disseminate what works for people with ID or other populations. The late Paul Cain<sup>5</sup> produced a user-friendly spreadsheet version of these data while the original government data are still available at <http://lmip.gov.au/default.aspx?LMIP/Downloads/DisabilityEmploymentServicesData/DESOutcomeRatesbyDisabilityType>

Table 4

*Support by Number Study for All Identified Evidenced-based Practices*

<b>Service</b>	<b>General Description</b>	<b>Supports vs Opposes</b>	<b># Studies indicating Support</b>	<b>References</b>
<i>Job Placement</i>	Activities leading to a referral to a specific job resulting in an interview	Supports	9	Bolton; Bellini & Brookings, 2000; Chen, Sung & Pi, 2015; Ditchman, Miller, & Easton, 2018; Kaya, 2018; Kaya et al., 2018; Migliore, Timmons, Butterworth, & Lugas, 2012; Moore, Harley, & Gamble, 2004; Nord, 2016, Tuckerman, Smith & Borland, 1999
<i>Job Training</i>	Training of the particular tasks and duties related to an individual’s employment position	Supports	4	Ditchman, Miller, & Easton, 2018; Kaya, 2018; Kaya et al., 2018, Tuckerman, Smith & Borland, 1999
<i>Long Term Support/Maintenance</i>	Installation of supports for on-going success	Supports	6	Brooke et al., 2018; Kaya, 2018; Kaya et al., 2018; Lawer, Brusilovskiy, Salzer, & Mandell,

<sup>5</sup> Vale Paul Cain - CEO Inclusion Australia, and advocate for the rights of people with disability, particularly in the areas of inclusive education and employment

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Service	General Description	Supports vs Opposes	# Studies indicating Support	References
				2009, Tuckerman, Smith & Borland, 1999; Tuckerman, et al., 2012
<i>Counseling/ Job Guidance</i>	Direction provided to help individual obtain employment, including addressing vocational needs or determining vocational interests	Supports	3	Chen, Sung & Pi, 2015; Chiang, Ditchman, Miller, & Easton, 2018; Moore, Harley, & Gamble, 2004
<i>On-the-job Support</i>	Support provided after an individual obtains a job (e.g., job coach for teaching and monitoring)	Supports	6	Chen, Sung & Pi, 2015; Kaya, 2018; Kaya et al., 2018; Lawer, Brusilovskiy, Salzer, & Mandell, 2009; Nord, 2016, Tuckerman, Smith & Borland, 1999
<i>Diagnosis/ Evaluation</i>	Assistance getting a diagnosis and subsequent supports or medical treatment to manage symptoms	Supports	2	Kaya, 2018; Kaya et al., 2018
<i>Job Search Support</i>	Help with finding a job; design resume, practice interviews, look for employment opportunities	Supports	3	Ditchman, Miller, & Easton, 2018; Nord, 2016, Tuckerman, Smith & Borland, 1999
<i>Transportation</i>	Assistance with learning, securing or funding transportation services for work purposes	Supports	2	Ditchman, Miller, & Easton, 2018, Tuckerman, Smith & Borland, 1999

Overall, an analysis of Level III data corroborate findings from Levels I and II which indicate that increasing the use of higher quality SE services (Alverson & Yamamoto, 2017; Alverson & Yamamoto, 2018), such as those found in intervention packages that comprehensively cover all parts of the employment process (i.e., support with creating a profile, job development, on-the-job training, and follow-along) lead to better CIE outcomes (Tuckerman, Smith & Borland, 1999; Wehman et al., 2014b; Wehman et al., 2017; Wehman et al., 2019).

### **Themes at Levels IV**

While Level IV is placed comparatively lower on the methodical hierarchy, it should be stated that all of these studies identified in the matrix incorporated single subject design (SSD). Although SSD does not use large sample sizes, it does serve an applied purpose by allowing for an analysis of individually-designed interventions while exercising experimental manipulation and control, and using highly-structured interpretation methods of collected data (Kazdin, 2011). As is typical for SSD research, results for this search returned primarily granular intervention-based techniques. In this case, the collection of articles offers support for specific instructional strategies related to successful employment in local businesses. These include the positive effect of video modeling job tasks (Burke et al., 2013), video feedback by viewing work performance and discussing with a coach (Mackey & Nelson, 2015), audio prompts provided discreetly during job training (Bennett, Ramasamy & Honsberger, 2013a; 2013b), a simultaneous prompting procedure in a work setting (Collin, Terrell, & Test, 2017), and a vocational self-management strategy utilizing a wearable watch alarm (DiPipi-Hoy, Jitendra, & Kern, 2009).

Together, these findings illuminate contemporary themes surrounding the usefulness of technology in both teaching job tasks and fading job support to increase independence on-the-job and maximize job support resources. A full inclusion of instructional strategies at the SSD level was likely not captured given the narrow search parameters used while analyzing the empirical databases used in this review. Included Level IV studies were identified specifically due to their applied vocational focus. However, a greater need for incorporating technology within employment support services is recognized. Chen, Sung and Pi (2015), who reviewed case files for 5,681 individuals with ASD receiving VR services expressed concern over a continued lack of funding for, and availability of, rehabilitation technology (e.g., iPad, JobTips, etc.) through VR agencies when so much empirical evidence exists supporting the use of these approaches to promote employment performance for individuals with IDD. Supplementary Table 4 in the appendix presents results of studies with Level IV methodological designs.

### **Themes at Level V**

Articles meeting a Level V methodological rigor varied greatly in terms of design and scope. A range of qualitative, mixed-methods, and case study data were reviewed, which are summarized in Supplementary Table 5 in the appendix. Mainly, level V research substantiated the findings from the aforementioned more rigorous studies. Most studies effectively yielded employment outcomes by following an SE or CE approach (Baker-Ericzén et al., 2018; Banks, Jahoda, Dagnan, Kemp, & Williams 2010; Becerra, Montanero, & Lucero; 2018; Coleman & Adams, 2018; dos Santos Rodrigues, Luecking, Glat, & Daquer, 2013; Ham et al., 2014; Lindstrom., Hirano, McCarthy, & Alverson, 2014; McLaren et al., 2017; Wehman, Schall, McDonough, et al., 2012b). While not explicitly stating the use of SE or CE, several additional studies reported

success using techniques commonly incorporated into SE and CE approaches including job coach assistance and job modification (Mautz, Storey, & Certo, 2001), job matching (McCabe & Suxing, 2009), job customization and job development strategies (Smith McVilly, Rhodes & Pavlidis, 2018), and on the job training (Vilà, Pallisera, & Fullana, 2007).

Additional findings included studies that documented the effective use of visual supports (Mautz, Storey, & Certo, 2001) and positive behavior support (Ham et al., 2014) to increase independence and fade job coach support. Lastly, the importance of job retention services emerged in the Level IV data. For individuals who are already employed, job retention is a major concern. One case study identified reasons for job loss or separation while receiving SE services, which included lack of acclimation to workplace changes, behavioral problems in the workplace, inability to manage job stress, and job dissatisfaction (Banks, Jahoda, Dagnan, Kemp & Williams, 2010). These issues could all arguably be prevented with proper proactive follow-along services, and highlight the need for productive communication between rehabilitation and vocational service providers, the employees with IDD, and the business.

### **Summary**

In summary, the overall results of this scoping review support the efficacy of the “place, then train” model that enables an individual to learn work skills while immersed in real work environments (Christensen & Richardson, 2017; Christensen, Hetherington, Daston, & Riehle, 2015; Kaehne, 2016; Wehman et al., 2014a Wehman et al., 2017). Supports should be provided based on individual need during the entire employment process, beginning with job searching and continuing with proper follow-along services (Banks et al., 2010). Failure to install supports at any point can ultimately lead to job loss. All teaching strategies should be evidenced-based, individualized (Schall et al., 2015), and implemented by highly trained staff (Butterworth, Migliore, Nord, & Gelb, 2012). On a broader note, findings from this scoping review also elucidate a need for the research community to initiate greater efforts to use the highest levels of methodological rigor when investigating employment interventions for individuals with IDD. Currently, very few studies met the most stringent methodological criteria.

### **Limitations**

Although efforts were made to collect a representative international sample of studies, most that met inclusion criteria came from the United States, and therefore findings may not account for societal factors impacting work outcomes in other parts of the world. Many studies, particularly those at the Level III rigor, did not limit samples to exclusively IDD, thus some included studies comprising a mixed sample with individuals with IDD along with other diagnoses. With this in mind, the total percent of individuals with IDD were identified in each table in the appendix to provide transparency and help the reader make accurate interpretations regarding generalization of results. In general, most studies did not target a specific intervention component (e.g., situational assessments, job matching tools, etc.) as part of their design. Rather, most studies investigated the effect of a combination of intervention techniques, making it difficult to isolate specific strategies and evaluate their solitary worth. However, this may reflect the overall notion that services are best delivered as a combination of effective practices (Ditchman, Miller, & Easton, 2018). Further, many studies explained intervention components in vague terms, reporting processes like “on-the-job training” rather than specific methods like “discrete trial training” or “systematic instruction” with the exception of Level IV studies. As a result, the

combined effect of multiple interventions, as opposed to specific practices, directed the analyses of results. The findings of this scoping review of peer reviewed literature can be combined with the following review of the grey literature to guide evidenced-based practices.

### **Review of the Grey Literature**

A review of the grey literature was also conducted as part of this scoping review. This analysis of non-peer-reviewed policy literature revealed various US federally-funded, and Australian federally and state funded, private, and non-profit grant-based programs aimed at improving employment outcomes for individuals with IDD. Documentation in this area ranged from extensive program evaluation reports and white papers (e.g., Centre for International Economics, 2017, Department of Social Services, 2014a; Fraker, Mamum, Honeycutt, Thompkins, & Valentine, 2014), to more informal articles disseminated through mainstream magazines and online publications (e.g., Wasmer Andrews, 2005). The vast majority of grey literature reviewed consisted of descriptive policy and program recommendations that highlighted potential employment models through specific funding sources (Thompson, Schalock, & Tassé, 2018), results of private foundation employment grants (Kessler Foundation, 2018), social enterprises (Kanady & Missimer, 2018), and demand-side strategies to promote the business case for hiring people with disabilities (Australian Chamber of Commerce and Industry, 2014;). Several government policy documents were also analyzed in this review. These reports emphasized the importance of funding programs to address the needs of both potential employers and employees (Australian Institute of Health and Welfare, 2017; Great Britain Department for Work and Pensions, 2017; Scottish Government Fair Work Employability, and Skills Directorate, 2018). While these documents outlined broad policy commitments of national governments to engage in improving domestic employment outcomes for individuals with disabilities, they omitted more granular descriptions and evaluation of specific practices.

In reviewing the grey literature, there are several rigorous, systematic evaluations of employment programmes that provide useful evidence of effective practices.

**Importance of Training and Technical Assistance.** Hall, Butterworth, Gilmore, and Metzel (2003) analyzed data across all U.S. states to identify those that had the highest rates of integrated employment of people with IDD. The authors then interviewed key informants from 13 of these high-performing states to identify best practices for promoting employment of individuals with IDD. Their findings include the following themes: (1) strong agency leadership and interagency collaboration; (2) ongoing training and technical assistance; (3) local control of service delivery, and (4) data collection and program evaluation (Hall, Butterworth, Gilmore, & Metzel, 2003). Many of the states included in this sample overcame systemic barriers to CIE by identifying statewide goals and key indicators to incentivize service providers. Several other states reported engaging leadership within the state and across organizations to promote collaboration on target initiatives. While state-wide commitment to driving innovation through shared leadership was a consistent theme, so too was local community autonomy over funding decisions. Finally, one of the most important factors identified was the strong need for ongoing training and technical assistance to all stakeholders involved in the employment of people with disabilities (Hall, Butterworth, Gilmore, & Metzel, 2003).

**Youth Transition Demonstration.** The Youth Transition Demonstration (YTD) was a national RCT demonstration undertaken by the U.S. Social Security Administration to maximize the economic self-sufficiency of youth transitioning into adulthood by identifying and testing best practices for service delivery and work incentive funding (Fraker, Mamun, Honeycutt, Thompkins, & Valentine, 2014). Six project sites across the U.S. were counted in the evaluation sample with approximately 800-900 youth at each site. The YTD program incorporated individualized work experiences, supports for youth and family, interagency service support, and incentives and benefits counseling to overcome widely-diagnosed barriers to CIE (Fraker et al., 2014). While the programming specifics as well as the goals and outcomes of each project site varied within the general focus of transition-age youth with disabilities, several key findings emerged from the evaluation. Five of the six project sites reported statistically significant positive impacts on increased earnings, reduction in pension benefits, or both (Fraker et al., 2014). Of particular note is the fact that technical assistance was provided to these projects, which led to significantly positive results in the following year of this intervention (Fraker et al., 2014).

**Social Security Promise Demonstration.** The PROMISE programme (U.S. Department of Education, 2014) was a national, multi-site RCT demonstration project aimed at validating employment services and supports that lead to successful employment outcomes for adolescents with disabilities who receive Supplemental Security Income (SSI) from the U.S. Social Security Administration. The demonstration operated from 2013-2018 in six sites and enrolled over 12,000 adolescents into the study sample (Hartman, Schlegelmilch, Roskowski, Anderson, & Tansey, 2019). (Golden, Karpur, & Podolec, 2019). Participants in the experimental group were provided a core set of services, including training in self-determination, benefits counseling, work experience placements, family training, and employment supports (job development and job site training). Individuals with ID comprised approximately 30% of the study sample, which limited the generalizability of the study results.

A recent preliminary impact analysis (Mamun, et al., 2019) described the initial service and employment outcomes across the six Promise demonstration sites. The projects' impact on employment was generally limited to short term work experiences as opposed to permanent paid employment, although the report indicated that greater impacts may be shown if services are improved and delivered for a longer period of time.

A potentially important finding was that in four of the projects the receipt of transition services led to a considerable increase in the likelihood that participants would subsequently apply for vocational rehabilitation services. The finding that receipt of work experience opportunities and other transition services might ultimately lead participants to apply for formal adult vocational rehabilitation services (open employment, job placement, etc.) would have significant implications for future service delivery, particularly for individuals with ID.

**Federal Supported Employment Study.** Chan and Kregel (2019), reviewed a propensity-score matched analysis of 108,000 individuals with ID served by state vocational rehabilitation agencies in the U.S. The results of the study documented the effectiveness of SE as an effective intervention for individuals with intellectual disabilities served by the state-federal vocational rehabilitation program. Individuals receiving SE were significantly more likely to become

employed after receiving services. Notably, the effect was strongest for individuals with intellectual disabilities, transition age youth (mean age 19), and persons receiving federal disability benefits, three groups that traditionally have been unemployed or underemployed.

**Additional Project SEARCH Evaluation.** Finally, in addition to studies evaluating the efficacy of Project SEARCH in the peer-reviewed literature, Kaehne (2014) produced an independent evaluation of Project SEARCH across 17 sites in the UK. Sites included in the evaluation adhered to the *traditional* Project SEARCH model rather than specialized components integrated into the PS+ASD Supports model used in studies included in the Level I evidence section (e.g., Wehman et al., 2019). Similar findings were also later published in the peer-reviewed literature (Kaehne, 2016), which was included in our analysis under Level II evidence. Despite significant methodological limitations to generalizing evaluation results based on a significant amount of inconsistent data, Kaehne's (2014) findings are largely in keeping with the peer reviewed literature reporting positive employment outcomes with both the host employer and post graduation from the *traditional* Project SEARCH model, though with a smaller effect size than those reported in PS+ASD Supports studies (e.g., Wehman et al., 2019).

### **Raised employability expectations**

In the Australian context, several studies concluded the presumption of employability among parents, educators and employment services was integral to the success of employment for young people with ID, and was associated with increased job confidence and job retention (ARTD Consultants, 2016; Black, 1984; Riches & MacDonald, 2016; Tuckerman, 2015). A comparative data analysis by Jobsupport found the introduction of the TTW service increased the number of school leavers willing to attempt employment by 120%. Over half of the school leavers who entered Jobsupport's TTW/SLES<sup>6</sup> were unable to use public transport at the end of school, had low self-fulfilling expectations regarding employment and would not attempt employment without a bridging TTW/SLES service. Customised work experience and systematic training allowed participants to experience success and gain confidence (Tuckerman, 2015).

Several reports identified that successful DES providers concentrate on developing profile data regarding the strengths, interests, preferences and abilities of jobseekers with ID, use functional work assessment data and identify employment goals to assist in job placement (Department of Social Services, 2017; Riches & MacDonald, 2016; Tuckerman, Smith & Borland, 1999).

### **Marketing**

Job search and targeted marketing strategies were identified as effective practices associated with improved job placements for people with IDD (Department of Social Services, 2014b; Marsh, Tuckerman, Cain & Kregel, 2012). Jobsupport uses an evidence-based job search process based on a comprehensive market survey to achieve consistently high placement rates (Centre for International Economics, 2017; Tuckerman, 2015). Nova Employment, another successful DES-ESS provider has a strong marketing approach involving staff training in marketing for all employment consultants, regular marketing to local employers, use of a repeat business strategy and a range of promotion activities (Department of Social Services, 2017; Riches & MacDonald,

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<sup>6</sup> Transition to Work (TTW) services are now called School Leaver Employment Supports (SLES) in Australia.

2016). The Autism and Agriculture Pilot Program, a CRC Autism collaborator has replaced the normal recruitment interview process with online applications, use of photographs and a practical demonstration of skills to enable candidates with ID/ASD to successfully show their skills and strengths and gain employment (van Barneveld, 2017).

### **On the job versus Classroom-based instruction**

While pre-vocational training and vocational education in classroom settings may be effective for other populations, there is a lack of evidence for such pre-employment and classroom-based training and education for youth with ID. Cavallaro, Foley, Bowman (2005) reported that within the equity groups, people with a disability had the lowest educational achievement and employment outcomes from VET, and that for many students with disability their reasons for study were non vocational. Ticket to Work programs in Australia as yet lack empirical evaluation, but Wakeford & Waugh, (2014) reported that students with autism and ID can struggle with the Ticket to Work program that includes classroom based instruction, as they do not easily transfer generic skills development from classroom training into the workplace. Instead, students with ID learn better through practical, hands-on experience, and require customisation, adaptation, task breakdown, and the provision of ongoing disability support. In another VET study, Fossey, Chaffey, Venville et al., (2015) also recognised learners with ID struggle with classroom learning and identified best practice supports required involve strengthening teacher knowledge about the ways in which to adapt tasks and spaces to support individual students; recognising and respecting differences in student needs; and establishing inclusive curriculum design and practice across the educational institution. These conclusions are supported by course entry, course completion rates and employment outcomes that are collected for all Nationally Accredited Vocational Education and Training (VET) courses from Certificate level 1 through to University Diploma by the Commonwealth of Australia. VET data from 2014-2017 revealed course completion rates for people with ID were extremely low, ranging from 5.7% to 9.1%. The employment outcome rates for these graduate cohorts with ID 2015-2018 ranged from 20.5% to 55.8% (NCVER, 2019).

In contrast, skills based vocational instruction and work experience occurring in real work environments has consistently been associated with better employment outcomes post school (ARTD Consultants, 2016; Department of Family and Community Services, 2009; Riches & MacDonald, 2016; Riches, Parmenter, Fegent & Bailey, 1993; Riches, Parmenter & Robertson, 1996; Watters, Riches & Parmenter, 1993; Wirth, 1979).

**Staff training and technical assistance** has the potential to enhance performance of individual agencies and improve outcomes for clients with IDD, but the issue can be complex. Marsh, Tuckerman, Cain & Kregel, (2012) found successful organisational change requires four necessary and sufficient elements - recognition of need for change among management, direct commitment to change from top management, a plan of action, and follow through training and reporting systems; and evidence was that offering offering technical assistance to services that were not ready to change was unlikely to be successful.

## Transition Predictors of Employment

Although the main purpose of this scoping review focused on interventions directly impacting employment outcomes for adults with IDD, it is also important to consider additional evidence examining the experiences of transition-age youth prior to exiting school. Fortunately, recent systematic review and meta-analyses research in this area have revealed several key transition predictors and practices linked to post-secondary success for students with disabilities (Haber et al., 2016; Mazzotti et al., 2016). Many of the studies in these reviews include, but are not specific to, individuals with IDD, so conclusions should be interpreted with caution for individuals with IDD. Mazzotti et al. (2016) synthesized the results of studies using data from the US National Longitudinal Transition Study – 2 (NLTS2) that examined predictive factors leading to positive postsecondary outcomes for transition-age students with disabilities. Their study expanded findings from a previous literature review conducted by Test et al. (2009) that established a framework for organizing evidence-based in-school predictors of postsecondary outcomes by levels of strength of evidence (i.e., none, potential, emerging evidence, and moderate) in the areas of employment as well as postsecondary education and independent living. Haber et al. (2016) conducted a meta-analysis of studies included in Test et al. (2009), further refining contexts and populations where transition predictors and practices are effective at promoting positive postsecondary outcomes. Findings from these studies form the foundation for training efforts through NTACT (National Technical Assistance Center on Transition, 2019) to prepare transition practitioners with effective practices for improving post school outcomes for students. This section summarizes general findings from these correlational transition studies that include students with IDD, organizing them by levels of evidence and using predictor terms used in the systematic review by Mazzotti et al. (2016).

### Transition Predictors of Employment with Moderate Evidence for Youth with IDD

It should be noted that limitations of correlational designs used predominately in research on predictors of transition-age students mean that no factors carry more than moderate levels of evidence for promoting employment for youth with IDD (Test et al., 2009). Among those with moderate evidence (i.e., with at least two *a priori* studies, per Test et al., 2009), *work experience* is one of the most well-documented factors identified in the research literature (Carter, Austin, Trainor, 2012; McDonnall & O’Mally, 2012; Wagner et al., 2014). Other moderately predictive school factors include participation in *vocational education* (Baer et al., 2003; Chiang et al., 2013; Harvey, 2002). However, it should also be noted that while vocational education was generally found to predict better work outcomes, context likely is a significant moderator in intervention efficacy. For example, Baer, Daviso, Flexer, McMahan Queen, and Meindl (2011) found that students who received three or more semesters of career and technical education classes in non-community-based high school settings were not significantly more likely to achieve post-school employment.

### Transition Predictors of Employment with Potential Evidence for Youth with IDD

A potential level of evidence means that predictors have at least one *a priori* study and two or more exploratory studies (Test et al., 2009). Additionally, several aspects of student programming were identified as potential predictors, including *transition programming* (Benz, Lindstrom, & Yovanoff, 2000) and *community experiences* (White & Weiner, 2004). Several malleable student characteristic factors also emerged in this level of evidence including *self-determination* (Wehmeyer & Schwartz, 1997), and *youth autonomy/decision making* (Doren et al., 2012;), Chiang, Cheung, Hickson, Xiang, & Tsai, 2012). Finally, *parental expectations* were associated in several studies with moderate to large effect sizes in predicting employment (Doren et al., 2012; Papay & Bambara, 2014).

### **Transition Predictors of Employment with Emerging Evidence for Youth with IDD**

Factors that did not meet criteria for potential predictors, but presented some positive exploratory findings were classified as having emerging evidence. Two predictors were incorporated into Mazzotti et al.'s (2016) review under this level of evidence. Carter et al. (2012) found that both *goal setting* and *travel skills* led to improved employment outcomes for youth in their study. Both of these areas may also have been considered under other areas as *travel skills* are often included as a component of *self-care* and *independent living*, and *goal setting* as a component of *self-determination*. However, Mazzotti et al. (2016) found emerging evidence for these as standalone factors.

### **Transition Predictors of Employment without Evidence for Youth with IDD**

There were two predictors included in reviews to support the evidence base for students with disabilities as a whole, but no studies involving individuals with IDD were included in the sample, and so—based on these systematic reviews—these factors do not have evidence for youth with IDD. These factors include *interagency collaboration* and *parental involvement* (not to be confused with *parental expectations*). The sole study supporting *interagency collaboration* as a predictor of employment outcomes was focused on deaf students (Bullis et al., 1995). Likewise, only one study was identified to support *parental involvement* as a predictor of employment, but the sample was limited to students with learning disabilities (Fourqurean, Meisgeier, Swank, & Williams, 1991).

### **Negative Correlational Findings**

Finally, several studies included in these reviews reported negative correlational findings, or practices that contradicted evidence for various predictors (Mazzotti et al., 2016). Among these findings, Chiang et al. (2013) reported that schools contacting vocational training programs and potential employers decreased likelihood of employment. Papay and Bambara (2014) also found that family involvement during high school was negatively correlated with employment. Though, this finding should be interpreted with caution as this predictor was defined by parent reports of whether teachers contacted them to develop post-school goals.

### **Practices with Limited Empirical Evidence**

While the primary purpose of this review is to identify the breadth of evidence supporting various employment practices related to promoting CIE for individuals with IDD, it is also important to highlight those practices with limited evidence in the empirical literature. Several common practices were notably absent from the research literature. First, while previous sections have identified several evidence-based practices and predictors for youth transitioning to adulthood (i.e., community-based work experience), it should be clarified that early intervention itself did not emerge as a salient factor in this review. Instead, the combination of *early intervention* and *quality services* is an important determinant. Accordingly, Cimera, Burgess, and Bedesem (2014) reported that earlier service delivery improved outcomes when using evidence-based practices. No studies were identified that found that beginning engagement at an earlier age led to better outcomes in the absence of evidenced-based techniques.

Additionally, no studies were found that supported the generalization of skills from specifically classroom-based vocational education and training to improved CIE in adulthood for individuals with IDD. This paucity of research may be partially explained by previous research demonstrating that over-specificity of repetitive learning opportunities leads to decreased ability to generalize skills for individuals with ASD (Harris et al., 2015). While the strength of evidence behind several community-based work experiences for youth offer encouraging signs of potential future research in this area, the overall lack of evidence behind early intervention and classroom-based approaches to improving employment outcomes should serve as a caution to policymakers against less nuanced approaches to transition intervention.

A number of Australian studies and reports identified effective transition practices correlated with successful employment outcomes for students with ID. Effective school-based transition practices involved individualised, person-centered transition plans with student chosen goals, and goals to guide curriculum planning that were strength-based and collaborative (Department of Family and Community Services, 2009; Riches, Parmenter & Robertson, 1996); and a substantial amount of vocational training/work experience in community-based or real worksites and job coaching using employment related technologies in the later school years (Department of Family and Community Services, 2009; Ling, Morris, & Riches, 1993; Riches, 1997; Riches, Parmenter, Fegent and Bailey, 1993; Riches, Parmenter & Robertson, 1996).

Effective post school transition programs were conceptually strong in their vocational orientation, flexible around clients' needs and aspirations, and provided substantial work experience in community and real work sites, tailored to participants' interests and strengths (ARTD, 2005; Department of Family and Community Services, 2009; Marsh, Tuckerman, Cain & Kregel, 2012; NCID, 2009; Riches, Knox & O'Brien, 2014; Wakeford & Waugh, 2014). Transition programs can raise expectations regarding CIE, as Tuckerman (2018) reported the number of school leavers entering Jobsupport (Transition or DES program) increased by 120% after the establishment of a transition program. Nevertheless, involvement in the transition program did not appear to have any impact on reducing onsite training time once placed in a job (Tuckerman, 2018).

Successful post school transition programs resulting in employment outcomes were also strong in building and sustaining relationships with employers when employed staff were skilled in job

placement, and had expertise with instructional technology and behavior management strategies, along with experience providing disability support and inclusion in the workplace (Riches & Parmenter, 1990; Riches & Parmenter, 1993; Riches et al, 1993; Watters, Riches & Parmenter, 1993).

### **Policies and Practices That Are Ineffective**

Building off of several decades' worth of research, advocacy, and policy evaluation, a great deal is now known about the service delivery practices that increase CIE outcomes for people with IDD. While it is important to understand those practices that do lead to better outcomes, it is also important to isolate those that do not.

The NSW TTW and DES outcome data demonstrate a large tail of services that lack knowledge of evidence-based practices and competence in achieving employment outcomes for people with an intellectual disability. The MIDL<sup>7</sup> review stated “*peak organisations recognise that few DES providers have the specialist skill sets and competencies required to support MIDL participants*” (Department of Education, Employment and Workplace Relations (DEEWR), 2013 p. 24).

In the U.S., a significant portion of individuals with IDD continue to be ‘employed’ in segregated employment settings (Siperstein, Parker, & Drascher, 2013). These persistently high rates of segregated employment settings continue despite policies like the Workforce Innovation and Opportunity Act of 2014 (PL 113–128) in the U.S. and the Convention on the Rights of Persons with Disabilities (United Nations, 2006) internationally that emphasize the commitment to CIE as the priority outcomes for all individuals. Siperstein, Heyman, and Stokes (2014) found that those who entered segregated employment settings rarely became competitively employed later (only 10% of the sample). Australian figures are even lower, the Australian Department of Social Services (2015) reported that 20,000 people were in supported employment in 2014 and that 159 (1%) moved to open employment. Furthermore, individuals engaged in segregated work were almost half as likely to have had previous work experience or job training and were almost four times less likely to ever be competitively employed. Other analyses of segregated and competitive employment found that segregated work settings were a significantly less efficient use of public funding (Cimera, 2007), while inclusive employment delivers better quality of life outcomes for young people with Down syndrome and their families than either segregated employment or day programs (Foley, Girdler, S., Downs, et al., 2014.) These studies overwhelmingly show that segregated employment settings do not work as a means for improving CIE.

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<sup>7</sup> MIDL Moderate Intellectual Disability Loading – a funding loading For DES providers on job placement and outcome fees where an eligible participant with moderate ID achieves employment for at least 15 hours per week

## Summary and Conclusion

The objective of this review was to identify evidenced-based employment practices and document the associated strength of research for each identified practice related to CIE for individuals with IDD. The information presented below is a synthesis of all three review initiatives; a) a scoping review of the international peer reviewed literature base, b) a review of international empirical grey literature, and c) a concentrated review of both the peer-reviewed literature and grey literature pertaining specifically to Australia. Several major themes were consistent across all three reviews. In the following sections, we summarize the common findings that emerged as evidenced-based employment practices. Further, we discuss several current practices for which little evidence materialized during the course of our review. Findings have implications for informing policy and practice initiatives that promote competitive employment for individuals with IDD.

## Summary of Recommended Evidenced-Based Employment Practices

The major findings from these three review efforts point to the following as evidenced-based practices for achieving competitive employment outcomes for individuals with IDD within community settings.

- ***Combined Stages of the Supported Employment Model.*** Findings from the systematic and grey literature reviews highlight the following point: successful employment outcomes are not typically the product of a single service, but rather the product of a comprehensive evidenced-based process implemented at multiple chronological stages consistent with the SE model. To reiterate, the SE model includes 1) personalized assessments to build a job seeker profile, 2) individualized job development, 3) on-the-job training provided by qualified staff, and 4) on-going support that is needs-based rather than time-based. These combined services lead to measurably greater outcomes than traditional employment services. There is a plethora of evidence demonstrating the efficacy of the combined 4-stage model of SE on multiple measurable outcomes, including a *significantly higher likelihood of becoming employed* (Alverson & Yamamoto, 2017; Alverson & Yamamoto, 2018; Cimera, 2017; Christensen & Richardson, 2017; Christensen, Hetherington, Daston, & Riehle, 2015; Kaehne, 2016; Kaya, 2018; Kaya et al., 2018; Wehman, Chan, Ditchman, & Kang, 2014a; Wehman, Lau, et al., 2012b; Wehman, Schall, McDonough, et al., 2017; Wehman, Schall, McDonough, et al., 2014b; Wehman et al., 2019), *greater hourly earnings at or above minimum wage* (Cimera, 2017; Schall et al., 2015; Wehman, Schall, McDonough, et al., 2017; Wehman et al., 2019; Wehman, Lau, et al., 2012b) and *greater job retention over time* (Brooke et al., 2018; Schall et al., 2015) as compared to traditional employment service alternatives.
- ***Place, then Train Approach.*** While not in and of itself a step, the overarching philosophy of SE is a “place, then train” approach to employment. Importantly, this

method eliminates wasted time in pre-vocational preparatory activities that delay transition to employment. Individuals should be placed in a job using information about their strengths, interests, preferences and needs, followed by the installation of personalized supports that will ultimately foster independence. The efficacy of “place, then train” is clearly demonstrated by the successful CIE outcomes reported by SE/OE programs that have already utilized this model.

Successful examples include multiple VR service success cases that point to on-the-job training and support as a predictor of CIE (Chen, Sung & Pi, 2015; Kaya, 2018; Kaya et al., 2018; Lawer, Brusilovskiy, Salzer, & Mandell, 2009; Nord, 2016), the results of a recent large scale study including 108,819 individuals with ASD and 182,719 individuals with ID indicating a positive effect of the SE intervention on CIE outcomes (Chan & Kregel, 2019), and numerous studies and reports on Jobsupport regarding individuals who have achieved successful placement and retention outcomes using the place and train model (Tuckerman, 1993; Tuckerman, Smith & Borland, 1999; Department of Education, Employment and Workplace Relations, 2013).

- ***Effect of Dosage.*** Receiving a higher number of quality services for a substantial amount of time is associated with better employment outcomes. To illustrate, findings from this review indicated that individuals with IDD were five times more likely to become employed with each additional VR service received (Alverson & Yamamoto, 2017) and those who were competitively employed used twice as many VR services as those who were not competitively employed (Alverson & Yamamoto, 2018). Similarly, Ditchman, Miller, and Easton (2018) found that a greater combination of the following specific services was associated with greater CIE outcomes; assessments, counseling, job placement, on-the-job training, job search support, and transportation services. Top performing Australian DES-ESS providers Jobsupport and Nova Employment also use a similar combination of services and achieve high job placement and retention rates (Department of Social Services, 2017; Riches & MacDonald, 2016; Tuckerman, 2015; Tuckerman, Smith & Borland, 1999). In addition to the number and combination of different services provided within the multicomponent PS+ASD Supports model, the Project SEARCH internship program also utilizes markedly high doses of time spent receiving individual services, with over 700 hours of internship experiences accrued during a single 9-month program per intern (Schall et al., 2015). It is important for service providers to determine an appropriate combination and amount of time for services depending upon the needs and strengths of each individual client.
- ***Quality of Staff Training/Services.*** The quality of employment services provided to individuals with IDD is in large part dependent on the level of training received by staff implementing those services. Therefore, properly trained staff are paramount to successful employment outcomes. Findings from our review indicate that staff who are properly trained on how to effectively implement the stages of SE secure more CIE outcomes for clients, secure clients higher paying work per hour, and negotiate more hours of work weekly than staff who do not receive targeted training in this area (Butterworth, Migliore, Nord, & Gelb, 2012; Marsh, Tuckerman, Cain & Kregel, 2012). Staff providing employment services should be fluent in the overall process for implementing the chronological stages of SE along with knowledge of instructional

training techniques that are supported by empirical research, such as ABA strategies used for the on-the-job training (Wehman, Schall, McDonough, et al., 2017; Wehman, Schall, McDonough, et al., 2014b; Wehman et al., 2019).

- ***Work Experience for Transition-age Students.*** Participation in work experience before graduating high school or shortly thereafter is a known predictor of later community employment. Numerous studies establish clear links between early work experience and later employment (Lindstrom, Hirano, McCarthy, & Alverson, 2014; Carter, Austin, & Trainor, 2012; Mamun, Carter, Fraker, & Timmins, 2018; Riches, Knox & O'Brien, 2014; Riches, Parmenter, Fegent & Bailey, 1993; Riches, Parmenter & Robinson, 1996; Wehman, Schall, McDonough, et al., 2017; Wehman et al., 2019).

However, it is not enough to simply provide work opportunities to transition-age students. For individuals with moderate or severe ID, it cannot be assumed that work experience alone will necessarily lead to CIE in the absence of additional OE services. These individuals traditionally have had limited exposure to integrated community environments and may have received much of their education in segregated classrooms or other settings. They and their families may have been told repeatedly that competitive employment was not a realistic option for them. For individuals with moderate or severe ID, the benefit of work experience may be to raise the employment expectations of youth and their families. For individuals with mild ID, work experience across several industries often results in more realistic employment goals and better job matches (Riches & MacDonald, 2017).

- ***Need for Further Research.*** Further research is needed to confirm Jobsupports report (Tuckerman 2015) and the U.S. PROMISES data (Mamun, et al., 2019) that a primary benefit of work experience for people with ID is to overcome low expectations and result in more people willing to attempt open employment.
- ***Personalized Rather than Universal Assessment and Training.*** Individuals with IDD vary in terms of strengths, interests, preferences, and needs. Employment support services that emphasize personalization of supports at every phase of the employment process are significantly more likely to assist individuals in securing and retaining a job. For example, DES providers that focused on developing profile data on clients to guide the open employment process had better job placement outcomes. A 70% placement rate for individuals with moderate ID between 2012 and 2017 by the DES-ESS Jobsupport was achieved using detailed assessments to determine strengths and weaknesses that informed good job matches (Department of Social Services, 2017). Personalized assessment-based processes used by NOVA contributed to an 80% job placement rate between 2012 and 2017 (Department of Social Services, 2017). Tapping into individual needs rather than applying a generalized template of service allows service providers to really understand the individual with IDD, develop an appropriate job match within a preferred context and subsequently anticipate challenges that that might thwart successful employment outcomes.

### **Summary of Current Practices with Limited Empirical Evidence**

Finally, our team identified several commonly used practices that were notably absent from the empirical literature. There is extremely limited evidence (or in some cases, no evidence) within the scientific body of literature that justify selection of these techniques over the clearly established, evidenced-based methods already reviewed.

- **Segregated Employment.** Participation in segregated employment was not cited as a predictor of CIE outcomes in any study reviewed. Rather, many studies indicated that segregated employment hindered individuals with IDD's ability to later obtain community integrated jobs. For example, Siperstein, Heyman, and Stokes (2014) found that only 10% of a large, nationally representative U.S. sample was able to successfully move from segregated employment to CIE. Christensen and Richardson (2017) found that no participants who had been in a segregated workshop setting for longer than five years were able to transition to a community job. Individuals in segregated employment also earn significantly less than those in community-based employment (Cimera, 2017). In summary, there is no contemporary evidence that segregated employment leads to community employment. Correspondingly, the Australian Department of Social Services (2015) reported that 20,000 people were in supported employment in 2014 and that 159 (1%) moved to open employment.
- **Classroom-based Pre-vocational Training.** While pre-employment training in the form of applied internships and other work experience in real work settings emerged as a significant predictor of CIE for individuals with IDD (Carter, Austin, & Trainor, 2012; Wehman, Schall, McDonough, et al., 2017; Wehman, Schall, McDonough, et al., 2014b; Wehman et al., 2019), preparatory activities conducted in a classroom or simulated setting (as opposed to a real work environment) did *not* yield empirical support as an evidenced-based practice. Such preparatory activities range in scope but include pre-employment training programs and classroom-based vocational coursework where the student does not have access to natural opportunities to develop and refine employment skills. While several studies have described classroom-based techniques with aims at better generalization to real world settings, such as the Ticket to Work program (Wakeford & Waugh, 2014, p.18-19) and the Vocational Education and Training (VET) study (Fossey, Chaffey, Venville et al., 2015; NCVER, 2019), none provide outcome data to support efficacy. Therefore, at present, classroom-based pre-vocational training simply cannot be identified as an evidenced-practice linked to real CIE outcomes.
- **Transition Services in the Absence of Evidenced-Based Practices.** Lastly, there is no evidence to suggest that the provision of earlier transition services is in and of itself an evidenced-based practice. Earlier transition services, provided at age 14 rather than 16, were found to be effective in promoting CIE outcomes for youth with IDD (Cimera, Burgess, and Bedesem, 2014) but *only* when combined with the implementation of other evidenced-based practices. Simply providing transition services at earlier ages in the absence of other empirically backed techniques does not lead to improved employment outcomes for youth and young adults with IDD.

In summary, clear themes separating evidence-based employment practices for individuals with IDD from those lacking empirical evidence emerged across our three reviews. Employment service agencies have a responsibility to provide services that hold scientific merit in order to maximize each client's likelihood of achieving a job within their community, in an employment field of their interest, and with the supports needed to succeed. Use of non-evidenced based teaching strategies or allowing poorly trained staff to provide services runs several risks including jeopardizing employment, damaging relationships with businesses, and causing undue stress and frustration to the individual with IDD. Supports must comprehensively address needs at all stages of the employment process, beginning with job search activities and continuing through follow-along. Greater use of these evidence-based practices can be achieved through staff training, technical assistance, and policy change. Collaborative efforts from government entities, agencies, employers, individuals with IDD and their families can substantially improve CIE opportunities for individuals with IDD.

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## Appendix

### Supplementary Table 1

#### *Included Studies with Level I Evidence*

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Butterworth, Migliore, Nord, & Gelb, 2012	RCT	1	n = 84 Employment consultants across 25 programs assisting job seekers with IDD	Training curriculum for employment consultants	<u>IV Code: 5</u> 24- hour face-to -face seminar on supported and customized employment practices over three days	<ul style="list-style-type: none"> <li>Intervention group secured an average of 3.4 more placements within in the next year, approximately \$1 more earnings hourly for clients, and an average of 6.7 more hours per week for clients compared to employment consultants in the control group not receiving the training.</li> </ul>	USA
Ipsen, Kurth, McCormick, Hall, & Chambless, 2019	RCT	1	n = 1,429 SSI Recipients between 12-14 years of age with mental and physical disabilities including ID (8.2%) and ASD (13.9%)	Achieving Success by Prompting Readiness for Education and Employment Program (ASPIRE)	<u>IV Code: 1</u> Case management, self-determination training, transition training, financial literacy, benefits counseling, pre-employment services	<ul style="list-style-type: none"> <li>Intervention participants significantly more likely to become employed compared to control participants.</li> <li>More case meetings and self-determination training early during intervention associated with better employment outcomes.</li> </ul>	USA
Wehman, Schall, McDonough, et al., 2017	RCT	1	n = 49 Youth with ASD ages 18-	Project SEARCH with ASD	<u>IV Codes: 1-5</u> Integrated work internship program	<ul style="list-style-type: none"> <li>90% of participants achieved CIE within 3 months post-graduation,</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
			21	Supports	using an SE approach; job profile, job development, on-the-job training and follow-along activities. Individualized supports tailored to individuals with ASD; social communication training, systematic instruction, visual cues, behavior supports, self-regulation strategies, and staff training, etc.	with 87% still employed 12 months later compared to 6% of control participants employed at 3 months post-graduation and 12% at 12 months. <ul style="list-style-type: none"> <li>All employed SEARCH graduates were earning above U.S. federal minimum wage.</li> </ul>	
Wehman, Schall, McDonough, et al., 2014b	RCT	1	<i>n</i> = 40 Youth with ASD ages 18-21	Project SEARCH with ASD Supports	<u>IV Codes: 1-5</u> Integrated work internship program using an SE approach; job profile, job development, on-the-job training and follow-along activities. Individualized supports tailored to individuals with ASD; social communication training, systematic instruction, visual	<ul style="list-style-type: none"> <li>87.5% of participants achieved CIE compared to only 6.25% of the control group who received typical high school transition services.</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Wehman et al., 2019	RCT	1	<i>n</i> = 156 Individuals with ASD age 18-21	Project SEARCH with ASD Supports	<p>cues, behavior supports, self-regulation strategies, and staff training, etc.</p> <p><u>IV Codes: 1-5</u> Integrated work internship program using an SE approach; job profile, job development, on-the-job training and follow-along activities. Individualized supports tailored to individuals with ASD; social communication training, systematic instruction, visual cues, behavior supports, self-regulation strategies, and staff training, etc.</p>	<ul style="list-style-type: none"> <li>73.4% of the intervention group was competitively employed at a one year follow-up compared to 17% of control participants who received typical high school transition services.</li> <li>Employed SEARCH graduates earned at or above U.S. federal minimum wage and worked an average of 20 hours per week.</li> </ul>	USA

Supplementary Table 2

*Included Studies with Level II Evidence*

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
<b>Black (1984)</b>	Follow up study	2	N= ? youth aged 15-19 years, Mild ID	Work preparation program in industrial setting to employment	<u>IV Codes: 1-3</u> <u>Data based assessment and systematic vocational instruction and life skills training, simulated work setting, individualized job search and placement</u>	<ul style="list-style-type: none"> <li>• 60 % full time open competitive employment,</li> <li>• 4% apprenticeship training,</li> <li>• 15% sheltered employment</li> <li>• 21% unemployed at a time of high youth unememployment</li> </ul>	Australia
Christensen & Richardson, 2017	Quasi-Experimental	2	n =10 Adults (ages 25-51) with ID targeted for community employment after being in a segregated workshop between 2 and 10 years	Project SEARCH - sheltered workshop to community employment model	<u>IV Codes: 1-5</u> Integrated internship program utilizing supported employment (e.g., on-the-job training, job matching for internships, job placement assistance, and follow-along)	<ul style="list-style-type: none"> <li>• 63% of participants in Project SEARCH transitioned to competitive employment from the sheltered workshop.</li> <li>• Participants who had been in the sheltered workshop for more than 5 years did <i>not</i> successfully transition to community employment.</li> </ul>	USA
Christensen, Hetherington, Daston, & Riehle, 2015	Quasi-Experimental	2	n =124 Young adults with IDD who participated in New York Project SEARCH	Project SEARCH	<u>IV Codes: 1-5</u> Integrated internship program utilizing supported employment (e.g., on-the-job training, job matching for	<ul style="list-style-type: none"> <li>• 83% of participants of individuals who completed SEARCH exited into competitive employment.</li> </ul>	USA

Evidence-Based Employment Practices for Persons with IDD

			programs between 2009- 2014		internships, job placement assistance, and follow-along)		
Hauritz, Riches, Parmenter & James, (1980)	Pre-post experimental designs )	2	Youth aged 15-19 years, Mild ID	Work preparation program in industrial setting to employment )	<u>IV Code 3</u> <u>systematic instruction</u> <u>-vocational and life</u> <u>skills (social skills,</u> <u>hygiene and</u> <u>grooming, assertion,</u> <u>conceptual tempo..)</u>	<ul style="list-style-type: none"> <li>• Improved performance job skills and social skills</li> <li>• Linked to other outcome studies e.g. Black, 1984</li> </ul>	Australia
Kaehne, 2016	Quasi Experimental	2	<i>n</i> =315 Youth/young adults with ID	Project SEARCH (17 sites)	<u>IV Codes: 1-5</u> Integrated internship program using SE (e.g., career exploration, applied classroom instruction, on-the- job training, job match for internships, etc).	<ul style="list-style-type: none"> <li>• 51.5% of SEARCH graduates transitioned to competitive employment.</li> <li>• Full-time vs Part-time outcomes varied across sites.</li> </ul>	United Kingdom
Langi, Oberoi, Balcazar, & Awsumb, 2017	Quasi- Experimental (non- randomized control group)	2	<i>n</i> =4,422 Youth with cognitive and physical disabilities ages 14-21 at application for VR services; 24.5% of the intervention and 20.4% of the control sample had ID	START Program	<u>IV Code: 1</u> Concentrated VR services during transition. A VR counselor with START helped develop IEP and IPE for transition youth.	<ul style="list-style-type: none"> <li>• START was more effective in transitioning youth to employment than regular VR transition services. The rehabilitation rate was 61% for START recipients compared to 53% for non-START recipients who received services through normal curriculum or by education trainings coordinated by a VR agency.</li> </ul>	USA

Ward, Parmenter, Debenham & Miller, (1977)	Comparative study	2	<i>n</i> =131 youth 15-18 yrs Mild ID <i>n</i> = 96 youth no ID, no WP	<i>n</i> =46 Work preparation (WP) model <i>n</i> =91 no WP, <i>n</i> = 96 youth no ID, no WP	<u>IV Codes: 1-3</u> <u>WP model Data based assessment, systematic vocational instruction and life skills training, simulated work setting, individualized job search and placement</u>	<ul style="list-style-type: none"> <li>60.9% WP participants full time employment 12-18 months after leaving school compared to 28% graduates of special schools and 24% special classes with ID but no WP, and 19.8% regular high school graduates no ID</li> </ul>	Australia
Wehman, Lau, et al., 2012b	Quasi-Experimental	2	<i>n</i> =33 Adults with ASD	Individualized combination of SE activities	<u>IV Codes: 1-5</u> Supported employment activities; situational assessments, job discovery, job development, job customization, on-site training, positive behavior supports, and job retention services.	<ul style="list-style-type: none"> <li>27 of 33 participants (82%) gained CIE.</li> <li>Participants were employed on average for 22.5 hours per week with a range of 8 to 40 hours across participants.</li> <li>All participants earned above U.S. federal minimum wage and acquired commensurate benefits to coworkers performing similar work.</li> </ul>	USA

Supplementary Table 3

*Included Studies with Level III Evidence*

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Alverson & Yamamoto, 2018	Secondary Data Analysis RSA-911	3	n =47,312 Youth and adult VR clients with ASD as primary diagnosis	State VR services	<u>IV Codes: 1-6</u> Services vary per client; assessment activities, (1), job placement and job search assistance (2), on-the-job training (3), maintenance services (4), collaboration with interdisciplinary teams (6)	<ul style="list-style-type: none"> <li>Total number of VR services was a significant predictor of VR closure with an employment outcome across all 10 years.</li> <li>“VR clients with ASD increased their odds of becoming employed nearly five-fold with each additional service.”</li> </ul>	USA
Alverson & Yamamoto, 2017	Secondary Data Analysis RSA-911	3	n =49,623 Youth and adult VR clients with ASD as primary diagnosis	State VR services	<u>IV Codes: 1-6</u> Services vary per client; assessment, career counseling, job readiness training, travel assistance (1), job placement and job search assistance (2), on-the-job training (3), maintenance services (4), collaboration with medical teams, diagnostic services (6)	<ul style="list-style-type: none"> <li>Average of 37% of VR recipients with ASD secured CIE (successful case closure) over 10 years; range of 33% to 42% across years.</li> <li>More services associated with better outcomes; VR clients achieving competitive employment utilized twice as many services as those who did not obtain employment.</li> </ul>	USA
Boeltzig,	Secondary	3	n =195 CRPs	Type of work	<u>IV Code: 3</u>	<ul style="list-style-type: none"> <li>Majority (81%) of</li> </ul>	USA

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Timmons, & Butterworth, 2008	Data Analysis  National Survey of CRPs		reported on a 869 adults with DD	support service; individual SE or group supports/ enclave work	Work experience included facility based work, individual employment, or competitive employment	<p>individuals with DD using a CRP obtained individually supported jobs (rather than group support jobs/enclaves).</p> <ul style="list-style-type: none"> <li>• Individual and Group support worked part-time (mean of 23 hours per week for both groups)</li> <li>• Weekly earnings higher for those in individual (\$163) than group (\$103)</li> <li>• Participants with individual supports earned more than those in the group support within the same job sector (e.g., individual support person earned more in sales than group support person in sales).</li> </ul>	
Bolton, Bellini & Brookings, 2000	Secondary Data Analysis  Arkansas Case Files	3	n =4,063 Adults with any disability including MR (10.5%) with closed VR cases	VR services	<u>IV Codes: 1 &amp; 2</u> Vocational training or preparation (1) & Job placement services (2)	<ul style="list-style-type: none"> <li>• Job placement was identified as the most important single variable contributing to the prediction of competitive employment in the overall sample.</li> <li>• Time in rehabilitation negatively predicted employment for individuals with MR.</li> </ul>	USA

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Brooke et al., 2018	Secondary Data Analysis  Employment Support Organization Records	3	n =139 records of adults with ASD referred for CIE services	Extended services	<u>IV Code: 4</u> During long term extended support services (LTESS), individual supports provided such as job customization, lateral and advancement moves within a business	<ul style="list-style-type: none"> <li>• 104 participants became employed.</li> <li>• 74.3% job retention at 18 months.</li> <li>• Most participants with moderate to high levels of support needs were able to move to minimal levels of support needs within 18 months of employment.</li> </ul>	USA
Burgess & Cimera, 2014	Secondary Data Analysis  RSA-911	3	n =34,501 Youth and young adults (under age 22) with ASD and a VR case closure	VR services	<u>IV Codes: 1-6</u> VR services vary per client.	<ul style="list-style-type: none"> <li>• Overall, the number of individuals with ASD seeking VR services increased over time but employment outcomes did <i>not</i> improve over time in the U.S. as a whole.</li> <li>• An average of 36% of transition-aged adults with ASD were successfully employed through VR services.</li> <li>• Transition-age students with ASD were more likely to be employed via VR services than the overall population of individuals using VR services.</li> </ul>	USA
Carter, Austin, & Trainor, 2012	Secondary Data Analysis  NLTS2	3	n =450 Youth and young adults with severe	Type of work experience during high school	<u>IV Code: 3</u> Work experience (divided into 4 categories;	<ul style="list-style-type: none"> <li>• Paid community employment and paid school sponsored work were associated with</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
			disabilities including autism (36%) and ID (26%)		no work experience, unpaid school work/work study, paid school sponsored work, and paid community employment)	competitive employment post-school while unpaid school work and no work experience were not associated with CIE outcomes.	
Chen, Sung, & Pi, 2015	Secondary Data Analysis RSA-911	3	<i>n</i> =5,681 Adult recipients for VR services with ASD	VR services	<u>IV Codes: 1-6</u> Services vary per client; assessments, transportation assistance, job readiness training, career counseling, (1), job placement assistance, job search assistance (2), on-the-job training and support (3), maintenance services (4), collaboration with medical teams, diagnostic and evaluations services (6)	<ul style="list-style-type: none"> <li>Majority of VR recipients with ASD who obtained a job were actually underemployed.</li> <li>Counseling/job guidance, job placement assistance, and on-the-job support had central roles in predicting successful employment across all age groups.</li> <li>Postsecondary education, occupational/vocational training, and on-the-job training positively predicted likelihood of obtaining a job for transition-age young adults.</li> <li>Information and referral services were found to be negatively associated with transition-age students chances of being employed.</li> </ul>	USA
Chiang, Cheung, K., Li, & Tsai,	Secondary Data Analysis	3	<i>n</i> =830 Youth and young adults with	Supports received during high	<u>IV Codes: 1 &amp; 5</u> Services vary per client; career	<ul style="list-style-type: none"> <li>Receiving career counselling during high school associated with</li> </ul>	USA

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
2013	NLTS2		ASD	school related to employment transition	counseling (1) and secondary schools networking with institutions of higher education (5)	higher likelihood of being employed post-school	
Cimera, 2017	Secondary Data Analysis RSA-911	3	n =21,257 Adults with significant cognitive disabilities (55.6%) including ASD, ID and other diagnoses) who selected SE as their vocational goal on their IPE	SE through a VR agency	<u>IV Codes: 1,2,3,&amp; 4</u> Steps of SE; Job profile (1), job development (2), job training (3) and follow-along support (4)	<ul style="list-style-type: none"> <li>SE provided higher wages at all comparison points than sheltered workshops</li> </ul>	USA
Cimera, Burgess, Bedesem, 2014	Secondary Data Analysis RSA-911	3	n =30,017 Youth and young adults with ID from two U.S. states	Age at which IEP transition services are provided	<u>IV Code: 1</u> Transition IEP services provided in some states at age 14 vs other states age 16	<ul style="list-style-type: none"> <li>Earlier transition services linked to better employment outcomes; 58.8% with earlier transition services become employed compared to 45.6% of those from later transition states.</li> </ul>	USA
Ditchman, Miller, & Easton, 2018	Secondary Data Analysis RSA-911	3	n =2,219 Young adults (ages 16-24) with ASD	VR services	<u>IV Codes: 1-6</u> Services vary per client; assessment, counseling and	<ul style="list-style-type: none"> <li>Six core services were identified as predictors; assessments, counseling, job placement, on-the-job</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
			using VR services		guidance, vocational training, transportation services (1), job placement assistance (2), on-the-job supports, rehabilitation technology, personal attendant, technical assistance (3), information and referral services (5), diagnostic services (6)	<p>training, job search support, transportation services.</p> <ul style="list-style-type: none"> <li>Greater number of these 6 that were used the better odds of a positive employment outcome.</li> </ul>	
Joshi, Bouck, & Maeda, 2012	Secondary Data Analysis  NLTS2	3	<i>n</i> =62,513 Youth and young adults with ID	Transition services related to employment	IV Codes: 1,2, &3 Transition services related to employment defined as any “activities that would help the student engage in employment post-school” such as vocational assessment, career counseling, prevocational training, instruction in looking for jobs, job shadowing (1), job placement support (2) and	<ul style="list-style-type: none"> <li>Employment related “transition activities” while in school was related to post-school employment status.</li> <li>“Participation in one additional transition activity represented within the employment activities summation variable resulted in students being 1.2 times more likely to be currently employed post school.”</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Kaya, 2018	Secondary Data Analysis RSA-911	3	<i>n</i> =8,320 Young adults (ages 19-25) with ID	VR services	internship/ apprenticeship (3)  <u>IV Codes: 1-6</u> Services vary per client; assessment, vocational counseling, postsecondary training, literacy training, transportation, job readiness training (1), job placement assistance, job search (2), on-the-job support, rehabilitation technology (3), maintenance services (4), and diagnostic services (6)	<ul style="list-style-type: none"> <li>Of the VR services used, the following were significantly associated with competitive employment outcomes; job placement, on-the-job support, on-the-job training, maintenance, other services, technical assistance, and diagnostic and treatment services.</li> </ul>	USA
Kaya, Hanley, Maxwell, Chan & Tansey, 2018	Secondary Data Analysis RSA-911	3	<i>n</i> =3,243 Young adults (ages 19-25) with ASD	VR services	<u>IV Codes: 1-6</u> Services vary per client; assessment, vocational counseling, postsecondary training, literacy training, transportation, job readiness training (1), job placement	<ul style="list-style-type: none"> <li>The following VR services were associated with competitive employment outcomes; job placement, on- the- job support, on- the- job training, maintenance, information referral, and diagnostic and treatment services</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Lawer, Brusilovskiy, Salzer, & Mandell, 2009	Secondary Data Analysis RSA-911	3	<i>n</i> =382,221 Adults with disabilities including MR ( <i>n</i> =30,278 of sample) and ASD ( <i>n</i> =1,707 of sample) receiving VR services	VR services	assistance, job search (2), on-the-job support, rehabilitation technology (3), maintenance services (4), and diagnostic services (6)  <u>IV Codes: 1-6</u> Services vary per client; assessment, vocational counseling, postsecondary training, literacy training, transportation, job readiness training (1), job placement assistance, job search (2), on-the-job support, rehabilitation technology (3), maintenance services (4), and diagnostic services (6)	<ul style="list-style-type: none"> <li>• For individuals with ASD and MR, on-the-job supports was highly associated with competitive employment.</li> <li>• “On-the-job supports” included job coaching, follow-along, and job retention services.</li> </ul>	USA
Mamun, Carter, Fraker, & Timmins, 2018	Secondary Data Analysis YTD	3	<i>n</i> =1,053 Youth (ages 18-20) with disabilities	Early employment	<u>IV Code: 3</u> Employment experience (e.g., after school job, summer	<ul style="list-style-type: none"> <li>• Participation in early work increased the probability of being employed 2 years later by 17 percentage</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
			including DD (42.6%)		internship, etc.)	points.	
Migliore, Timmons, Butterworth, & Lugas, 2012	Secondary Data Analysis RSA-911	3	<i>n</i> =2,913 Youth and young adults (ages 16-26) with ASD	VR services	<u>IV Codes: 1,2,3,&amp;4</u> Services vary per client; assessment (1), job search and placement support (2), on-the-job support and training (3), and maintenance (4)	<ul style="list-style-type: none"> <li>Receiving job placements services was the strongest predictor of CIE (odds ratio of 4x) although only 48% of participants received this service</li> </ul>	USA
Moore, Harley, & Gamble, 2004	Secondary Data Analysis RSA-911	3	<i>n</i> =28,565 Adults with MR	VR services	<u>IV Codes: 1-6</u> Services vary per client	<ul style="list-style-type: none"> <li>Individuals receiving job placement services, business/vocational training, and counseling were twice as likely to achieve CIE outcomes.</li> </ul>	USA
Morgan McInnes, Demet Ozturk, McDermott, & Mann, 2010	Secondary Data Analysis South Carolina Case Files	3	<i>n</i> =57,979 Adults with MR in South Carolina	SE services	<u>IV Codes: 1,2,3,&amp;4</u> Assessing skills and developing a plan for achieving competitive employment (1), identifying a job suitable for the individual, placement (2), job-site training (3), and follow-up (4)	<ul style="list-style-type: none"> <li>After controlling for other factors, individuals who received job coaching were over three times more likely to be employed.</li> </ul>	USA
Nord, 2016	Secondary Data Analysis	3	<i>n</i> =39,277 Adults with	VR Services	<u>IV Codes: 1-6</u> Services vary per	<ul style="list-style-type: none"> <li>Service types associated with better employment</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
	RSA-911		IDD receiving VR services		client	<p>outcomes; individuals receiving job placement, and on-the-job support experienced outcomes</p> <ul style="list-style-type: none"> <li>Effect sizes grew in magnitude for those receiving two or three job-related services.</li> </ul>	
Nye-Lengerman, 2017	Secondary Data Analysis RSA-911	3	<i>n</i> =15,679 Adults with ASD receiving VR services	VR services	<u>IV Codes: 1-6</u> Services vary per client included; assessment, counseling, transportation services (1), job search, job placement (2), on-the-job support, technology support (3)	<ul style="list-style-type: none"> <li>Individuals who received administrative supports were less likely to be employed at closure than those who received community-based supports</li> </ul>	USA
Papay & Bambara, 2014	Secondary Data Analysis NLTS-2	3	<i>n</i> =490 Youth and young adults with ID	Seamless transition practices	<u>IV Codes: 1 &amp; 5</u> Work experiences, life skills instruction (1), and interagency collaboration (5)	<ul style="list-style-type: none"> <li>Work experience, life skills instruction, and interagency collaboration were significant predictors of employment outcomes</li> </ul>	USA
Schall et al., 2015	Secondary Data Analysis Employment Support Organization	3	<i>n</i> =45 Adults with ASD	SE with or without Project SEARCH plus ASD Supports	<u>IV Codes: 1-6</u> Steps of SE; Job profile (1), job development (2), job training (3) and follow-along support	<ul style="list-style-type: none"> <li>Project SEARCH plus ASD supports group required fewer intervention hours, earned more and had higher job retention rates than those with ASD receiving</li> </ul>	USA

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
	Records				(4) and individualized supports for ASD	SE without ASD specific supports	
Tuckerman, Cain, Long & Klarkowski, (2012)	secondary data analyses 1998-99, 2009-10	3	8,516 service users with ID in May 2012	DES-ESS Moderate ID funding loading to fund long term support	<u>IV Code 4</u> <u>Long-term support post 26 weeks in job placement</u>	<ul style="list-style-type: none"> <li>Number of people with ID in open employment programs stable 2008-2012</li> <li>Drop in proportion of participants receiving and assessed eligible for long term support (27.2% in 2008, 16.3% in 2012)</li> <li>Low 26 week outcome rates (27.8% all disabilities, 30.0% people with ID)</li> </ul>	Australia
Tuckerman Smith & Borland (1999)	secondary data analyses 10 years data, mixed methods	3	n=446 youth and adults moderate ID (IQ= 60 or less)	DES-ESS Jobsupport	<u>IV Codes 1-5</u> <u>functional/situational assessment, agreed support plan, job matching, job analysis /redesign, task analyses, 1:1 onsite training ongoing follow-up support for the client and employer</u>	<ul style="list-style-type: none"> <li>Average job retention rate 82%;</li> <li>81% placements in workplaces over 20 employees; 50% jobs ceated by JobSupport</li> <li>good/ high client and employer satisfaction levels; Comparatvely less costly and better open employment outcomes than state funded Post school options program</li> </ul>	Australia
Wehman, Chan, Ditchman, & Kang, 2014a	Secondary Data Analysis RSA-911	3	n =23,298 Youth with IDD (ages 16-25) aged	VR Services	<u>IV Codes: 1-6</u> Services vary per client	<ul style="list-style-type: none"> <li>SE significantly increased rates of CIE for all subgroups, including SSI beneficiaries</li> </ul>	USA
White &	Secondary	3	n =104 Youth	High school	<u>IV Codes: 1 &amp; 3</u>	<ul style="list-style-type: none"> <li>Time spent in CBT</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Weiner, 2004	Data Analysis  California School Records		and young adults (ages 18-22) with ID	community-based training (CBT)	CBT (1) with on-the-job training (3) and integration with non-disabled peers.	positively correlated with employment outcomes after transitioning out of HS.  • More integrated CBT settings correlated positively with better employment outcomes after transitioning out of HS.	

Supplementary Table 4

*Included Studies with Level IV Evidence*

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Allen, Burke, Howard, Wallace, & Bowen, 2012	Single Subject Design	4	n =3 Adolescents (ages 16-18) with ASD and ID	Video modeling and audio cueing	<u>IV Code: 3</u> Naturalistic and scripted videos of job tasks  Audio cuing involved ear phones and a transreciever with instructions from an attendant	<ul style="list-style-type: none"> <li>• Audio cueing helped individuals exceed job performance criteria.</li> <li>• Video modeling did <i>not</i> increase job task performance.</li> </ul>	USA
Bennett, Ramasamy, & Honsberger, 2013a	Single Subject Design	4	n =3 Youth and young adults (ages 13-22) with ASD	Covert audio coaching	<u>IV Code: 3</u> Two way radio with earbud used to provide performance feedback during a copier task	<ul style="list-style-type: none"> <li>• Lead to increased accuracy on target job tasks.</li> </ul>	USA
Bennett, Ramasamy, & Honsberger, 2013b	Single Subject Design	4	n =3 Youth and young adults (ages 15 and 18) with ASD	Covert audio coaching	<u>IV Code: 3</u> Two way radio with earbud used to provide performance feedback during a copier task	<ul style="list-style-type: none"> <li>• Lead to 100% accuracy of the vocational task of folding t-shirts compared to baseline and maintained at probe points for all three participants.</li> </ul>	USA
Burke, Allen, Howard, Downey, Matz, & Bowen, 2013	Single Subject Design	4	n =4 Adults (ages 19 -28 with ASD or Asperger's	Video modeling with prompting using the software	<u>IV Code: 3</u> 13 minute video showing in individual completed a complex 104-step shipping	<ul style="list-style-type: none"> <li>• All four participants showed increased consistency performing the 104 –step shipping</li> </ul>	USA

Evidence-Based Employment Practices for Persons with IDD

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
				system “Video Tote” on a tablet	task	task after intervention compared to baseline.	
Collins, Terrell, & Test, 2017	Single Subject Design	4	n =4 Youth with ID	Simultaneous prompting procedure	<u>IV Code: 3</u> Controlling prompts during instructional followed by no prompt probe trials	<ul style="list-style-type: none"> <li>All four participants met criterion for employment tasks at a green house.</li> </ul>	USA
DiPipi-Hoy, Jitendra, & Kern, 2009	Single Subject Design	4	n =4 Youth with MR	Time Management using an alarm watch	<u>IV Code: 3</u> Preset watch would sound and pre-determined intervals as a prompt to manage time	<ul style="list-style-type: none"> <li>Increase in time management across all four participants in a work setting along with generalization to a new environment.</li> </ul>	USA
Mackey & Nelson, 2015	Single Subject Design	4	n =2 19-year old twins with ASD	Video Feedback	<u>IV Code: 3</u> Participants watched a video of themselves and discussed with coach for evaluative purposes. In this case, target behaviors were transition, hygiene, responding to others, engagement, and decision-making while at vocational sites (i.e., food bank, warehouse, computer shop)	<ul style="list-style-type: none"> <li>Significant improvements in hygiene, engagement, transition, and responding to others, but <u>not</u> decision-making</li> </ul>	USA
Minarovic &	Single	4	n =3		<u>IV Code: 3</u>	<ul style="list-style-type: none"> <li>Self-initiation of task</li> </ul>	USA

Evidence-Based Employment Practices for Persons with IDD

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Bambara, 2007	subject design		Adults with ID		Participants were taught to recognize sight words that were used on checklists	completion increased in all three participants	

Supplementary Table 5

*Included Studies with Level V Evidence*

Citation	Study Design	Category	Participants & n	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Baker-Ericzén et al., 2018	Pilot Study	5	n =8 Young adults with ASD (without ID)	SUCCESS Intervention; a supported employment, comprehensive cognitive enhancement and social skills intervention package	<u>IV Code: 1</u> Integrated curriculum that focuses on social thinking and cognitive compensatory training used within community supported employment programs	<ul style="list-style-type: none"> <li>Enhancement in vocational outcomes; employment rates doubled post-intervention (22% to 56% of participants employed).</li> <li>Mean hours worked per week increased (from 6 to 20 h a week)</li> <li>Work was for competitive wages (US\$10–US\$18 an hour).</li> </ul>	USA
Banks, Jahoda, Dagnan, Kemp, & Williams, 2010	Qualitative (mixed methods but only qualitative relevant for this matrix)	5	n =49 Youth and young adults with ID already employed via SE services experienced job breakdown	SE services for job retention	<u>IV Code: 4</u> Follow-along services for those already employed.	<ul style="list-style-type: none"> <li>13 of 49 had job break down within 12 months</li> <li>4 of the 13 secured a second job within the 12 months leaving 9 unemployed at the one-year point.</li> <li>Of those who experienced job breakdown; most said they were pleased with the initial support they received on the job from support workers and other employees.</li> </ul>	United Kingdom
Becerra,	Case Study	5	n =5	Natural	<u>IV Code: 3</u>	<ul style="list-style-type: none"> <li>Use of graphic supports</li> </ul>	Spain

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
Montanero, & Lucero, 2018			Adults with ASD	supports within an SE context	Natural Supports vs supports that do not require a job coach; Graphic supports materials, verbal instruction, without help from a job mate	lead to an increase in quality of work compared to support in which the participants received verbal instructions (VIs) from a work mate and compared to receiving no help.	
Block, Athens & Brandenburg, 2002	Case Study	5	<i>n</i> =1 Managed Care Organization Staff serving individuals with DD	Performance based funding systems for SE services	<u>IV Code: 5</u> Monetary incentives provided for reaching certain SE milestones like job placement or job maintenance	<ul style="list-style-type: none"> <li>37% increase in number of community job placements over a 3 year period with incentive system.</li> </ul>	USA
Coleman & Adams, 2018	Survey / Qualitative	5	<i>n</i> =172 Adults with ASD	VR vs all alternatives (sample of individual in Arizona regardless of receiving supports)	<u>IV Code: 6</u> VR services	<ul style="list-style-type: none"> <li>Low levels of feeling that VR was helpful; 9% felt VR services helped them find a job and 11% felt VR services somewhat helped them find a job.</li> </ul>	USA
dos Santos Rodrigues, Luecking, Glat, & Daquer, 2013	Case Study	5	<i>n</i> =1 18 year old with ID	Customized Employment	<u>IV Codes: 1,2,3,&amp;4</u> Discovery, personal profile (1), job/task negotiation (2), on-the-job training (3), and follow-along	<ul style="list-style-type: none"> <li>Individual became independent and stable on-the-job.</li> </ul>	Brazil
Farris & Stancliffe,	Pilot study mixed	5	<i>n</i> = 19 KFC Staff; <i>n</i> = 10	Co-worker training model	<u>IV Code: 3</u> <u>On-the-job training</u>	<ul style="list-style-type: none"> <li>• Co-workers and managers placed</li> </ul>	Australia

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
(2001)	methods design		co-worker training group, M age = 17.34 years; <i>n</i> = 6 place & train model, M age = 18.68 years	for people with ID versus job coach		<p>significantly higher value on persons with ID in the workplace post course.</p> <ul style="list-style-type: none"> <li>• High co-workers satisfaction of the model and higher job satisfaction after becoming a co-worker trainer.</li> <li>• 89% of people with disability employed under the co-worker training model.</li> </ul>	
Ham et al., 2014	Case study	5	<i>n</i> = 2 Young adults with ASD	Provision of Positive Behavior Support in a work setting with in an SE context	<u>IV Code: 3</u> Individualized behavior plan using Applied Behavior Analysis (behavior assessments, self-monitoring plan) to address on-the-job challenging behaviors (3)	<ul style="list-style-type: none"> <li>• Supports were successfully faded. Both participants were independent and stable on the job 24 months after intervention.</li> </ul>	USA
Lindstrom, Hirano, McCarthy, & Alverson, 2014	Multiple Method/Multiple Case Study  (Qualitative)	5	<i>n</i> = 4 Young adults with IDD	SE services	<u>IV Code: 3</u> Work experience	<ul style="list-style-type: none"> <li>• School based work experiences associated with later employment</li> <li>• Job development and work environments associated with employment outcomes</li> </ul>	USA
Mautz, Storey, & Certo, 2001	Case Study	5	<i>n</i> = 1 A 40 year old man with MR	Individualized 4-phase employment	<u>IV Code: 3</u> Job modification, Natural supports	<ul style="list-style-type: none"> <li>• Success on the job was linked to job coach social facilitation training, and</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
McCabe & Suxing, 2009	Qualitative Case study	5	and other disabilities  <i>n</i> =1 A 20-year-old woman with ASD	intervention  Job matching	instruction to co-workers, communication device installation and training, social facilitation by job coach  <u>IV Code: 2</u> Collaboration between parent and local government in job matching	installation of a communication device.  • Individual successfully employed at a community library	China
McLaren et al., 2017	Case study	5	<i>n</i> =5 Youth with ASD and comorbid psychiatric disorders	Multiple-Individual Placement & Support (IPS) Model	<u>IV Code: 1,2,3,4 &amp; 6</u> SE approach; Rapid job search (1), attention to client preferences (2), job training (3), follow-along (4), integration of mental health and employment services (6)	• Each participant secured employment in target career field, maintained employment and increased wages and hours over intervention.	USA
Molina & Demchak, 2016	Case study	5	<i>n</i> =18 Youth and young adults (ages 14-22) with IDD	Customized employment	<u>IV Code: 1, 2</u> Job skills summer camp (1) with job customization (2) to transition-to-work	• Of the 18 participants, 3 gained paid internships and one pursued self-employment.	USA
Owen et al., 2015	Qualitative case study	5	<i>n</i> =17 Adults with DD	Common Ground Co-operative	<u>IV Code: 3</u> One-the-job training (3), & social	• Participants earned only C\$754 per year • Social return on	Canada

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
					enterprise development (6)	investment of program estimated at \$889,274	
Smith, McVilly, Rhodes,& Pavlidis (2018)	Qualitative design-thematic analyses	5	4 service providers, <i>n</i> =12 disability support staff supporting <i>n</i> =29 people with ID/DD	Disability employment workforce training project using The Work First™ curriculum	<u>IV Codes 1,2 Discovery (1) Customised employment &amp; job development strategies (2)</u>	<ul style="list-style-type: none"> <li><i>n</i>= 2 (6.9%) offered employment, <i>n</i>= 5 (17%) active discussion with employers , <i>n</i>= 18 (62%) in job development phase (Total <i>n</i>= 25/29 = 86%) positive outcomes</li> </ul>	Australia
Vilà, Pallisera, & Fullana, 2007	Qualitative	5	<i>n</i> =60 Support professionals in various roles	Vocational Support Services	<u>IV Codes: 3,4 &amp; 5</u> Workplace monitoring (3 & 4), communication between supervisor and service provider, family support, prior and current training (5)	<ul style="list-style-type: none"> <li>Information to families supports their participation</li> <li>Social participation and technical skills valued by employers</li> <li>Coordination between “job trainer” and “natural supervisor” critical to work success</li> </ul>	Spain
Wehman, Schall, McDonough, et al., 2012a	Single subject	5	<i>n</i> =2 Young adults with ASD (ages 19 & 20)	Project SEARCH internship with ASD supports	<u>IV Codes: 1-5</u> Integrated 9-month work internship program with individualized supports. Additional components included behavioral consultation, consistent internship structure, social skills, visual	<ul style="list-style-type: none"> <li>Both participants successfully transitioned into CIE from internships</li> <li>Following intervention, increased job performance and target behavior</li> </ul>	USA

Citation	Study Design	Category	Participants & <i>n</i>	Independent Variable	Intervention Component(s)	DV & Outcomes	Country
					supports, self-monitoring, role playing, intensive instruction and monitoring		

## List of Key Terms

<b>Term</b>	<b>Abbreviation</b>
Applied Behavior Analysis	ABA
Australian Institute for Health Welfare	AIHW
Australian Network on Disability	AND
Autism Spectrum Disorder	ASD
Achieving Success by Prompting Readiness for Education and Employment	ASPIRE
Database of Abstracts and Reviews of Effects	DARE
Department of Social Services	DSS
Disability Employment Australia	DEA
Disability Employment Services	DES
Disability Service Program	DSP
Developmental Disability	DD
Employment and Workplace Relations	DEEWR
Customized Employment	CE
Competitive Integrated Employment	CIE
Community Rehabilitation Providers	CRP
Individualized Education Program	IEP
Individualized Plan for Employment	IPE
Intellectual Disability	ID
Intellectual/Developmental Disabilities	IDD
Independent Variable/Intervention Codes	IV#
National Centre for Vocational Education Research	NCVER
National Disability Insurance Scheme	NDIS
National Longitudinal Transition Study-2	NLTS2
National Technical Assistance Center on Transition	NTACT
Transition to Work	TTW
Promoting Readiness of Minors in Supplemental Security Income Initiative	PROMISE

## Evidence-Based Employment Practices for Persons with IDD

Randomized Control Trial	RCT
Rehabilitation Services Administration- 911	RSA911
Single Subject Design	SSD
Supported Employment	SE
Supplemental Security Income	SSI
Work Preparation Centres	WPC
Youth Transition Demonstration	YTD
Vocational Rehabilitation	VR
Term	Abbreviation
Applied Behavior Analysis	ABA
Autism Spectrum Disorder	ASD
Achieving Success by Prompting Readiness for Education and Employment	ASPIRE
Disability Employment Services	DES
Developmental Disability	DD
Customized Employment	CE
Competitive Integrated Employment	CIE
Community Rehabilitation Providers	CRP
Individualized Education Program	IEP
Individualized Plan for Employment	IPE
Intellectual Disability	ID
Intellectual/Developmental Disabilities	IDD
Independent Variable/Intervention Codes	IV#
National Longitudinal Transition Study-2	NLTS2
National Technical Assistance Center on Transition	NTACT
Promoting Readiness of Minors in Supplemental Security Income Initiative	PROMISE
Randomized Control Trial	RCT
Rehabilitation Services Administration- 911	RSA911
Single Subject Design	SSD
Supported Employment	SE
Supplemental Security Income	SSI
Youth Transition Demonstration	YTD
Vocational Rehabilitation	VR