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Pre-Graduation Transition Services for Improving Employment Outcomes among Persons with Autism Spectrum Disorders: A Systematic Review

John D. Westbrook, Carlton J. Fong, Chad Nye, Ann Williams, Oliver Wendt, Tara Cortopassi



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Executive Summary/Abstract

BACKGROUND

As the number of individuals diagnosed with autism spectrum disorders (ASD) rises, attention is increasingly focused on potential employment outcomes for individuals with ASD, especially for those individuals that are exiting public school settings. Individuals without disabilities are eight times more likely to be employed than individuals with severe disabilities (National Organization on Disability, 2000). Individuals with ASD are among those least likely to be employed (Cameto, Marder, Wagner, & Cardoso, 2003; Dew & Alan, 2007).

Although economic conditions and employer attitudes are important factors in acquiring employment opportunities for individuals with ASD, appropriately addressing specific behaviors common among individuals with ASD can greatly improve employment outcomes (Schaller & Yang, 2005).

OBJECTIVE

To determine the effectiveness of pre-graduation interventions aimed at persons with autism spectrum disorders to shape behaviors, social interactions, and/or skills that result in employment in mainstream competitive employment settings.

SEARCH STRATEGY

Studies were identified using electronic search techniques of 30 computerized databases. The keywords used in the computerized bibliography searches were divided into three categories: population, treatment, and domain and design characteristics. The searches covered the period from 1943 through 2011. Grey literature identified through electronic searches was submitted to the same inclusion criteria as other studies. The same time range (1943 - 2011) and inclusion criteria were applied to a search of the grey literature for unpublished studies. References from individual studies were searched for potential studies to consider for inclusion. In addition, unpublished dissertations and theses were identified through the search strategy for review and consideration.

SELECTION CRITERIA

A two-stage process was used to determine inclusion or exclusion of studies: (1) title and abstract stage and (2) full text stage. The participant sample of the study was secondary school-age individuals (ages 14-22), with a diagnosis of Autism Spectrum Disorder (ASD). Interventions for this review were included if they were designed as an approach to prepare and/or place transition-age individuals with ASD into gainful employment. Interventions that address the acquisition of job-related skills/behaviors or social employment-appropriate skills/behaviors without an employment outcome were excluded. Studies with a research design of randomized controlled trials, quasi-experimental, or single subject experimental were coded for inclusion.

DATA COLLECTION AND ANALYSIS

The combined electronic and hand searches produced a total of 5,665 citations at Stage 1 Title/Abstract. Of these studies a total of 85 citations were advanced for collection of a full text copy of the study (Full-Text Stage 2). The search results were examined independently by three of the review authors.

RESULTS

This review was not able to identify definitive interventions that predictably and positively supported the development of transition programs designed to produce employment outcomes for individuals with ASD. Upon review of the full-text for each of the 85 studies, no studies were identified that met all the inclusion criteria specified for the review. The following describes the reasons for exclusion of the studies identified through the Stage 2 review procedures: studies that did not describe or assess an intervention (n = 40), did not present outcomes related with gainful employment (n = 38), did not contain participants with ASD (n = 3), or did not provide quantitative data (case study) (n = 4).

AUTHORS' CONCLUSIONS

While no definitive conclusions can be drawn based upon the current review, the authors did identify qualitative research and other related studies that addressed elements of potential successful employment placements for transition-age individuals with ASD that are detailed in Appendix B.

Given the regulations and funding often surrounding transition programming for students with disabilities, it is remarkable that such limited research attention has been paid to the effectiveness of interventions that produce the intended result of such programs. Future research efforts are needed to develop studies that utilize a rigorous experimental design to determine the relative effectiveness of the various interventions being utilized in transition

programming for students with ASD. It is also important for such studies to identify actual employment outcomes that result from presumed preparatory or facilitating interventions utilized in transition programs.

1 Introduction

According to the Centers for Disease Control and Prevention (CDC, 2012), 1 in 88 children were on the autism spectrum in 2012. This number is a 23% increase in the prevalence rate since the last CDC report issued in 2009. Additionally, functional limitations caused by autism spectrum disorders (ASD) continue into adulthood and often create barriers to independent living and stable long-term employment (Autism Society of America, 2008).

As the number of individuals diagnosed with ASD rises, attention is increasingly focused on potential employment outcomes for individuals with ASD, especially for individuals with ASD who are exiting public school settings. In the United States, vocational rehabilitation agencies are charged with providing service to support employment outcomes of individuals with disabilities, including those with ASD. Vocational rehabilitation agencies are seeing an increase in the number of transition-age people with ASD accessing their employment support services. In fact, the number of people with ASD accessing services increased from 1,908 in 2002 to 8,893 in 2010. This represents a 21% annual average increase (Butterworth et al., 2012). Individuals without severe disabilities are eight times more likely to be employed than individuals with very severe disabilities (National Organization on Disability, 2000). Individuals with ASD are among those least likely to be employed (Cameto, Marder, Wagner, & Cardoso, 2003; Dew & Alan, 2007).

Educational systems in Australia, the United Kingdom, and the United States start preparing youth with ASD for life after statutory education in the last years of their education (Autism Spectrum Australia, 2011; National Autistic Society, n.d.). In the U.K. and U.S., this planning begins at age 14. In the U.S., for example, transitional planning is explicitly defined and regulated via the Individuals with Disabilities Education Act (IDEA), which governs how states and public agencies provide transitional services to children with disabilities (IDEA, 2004). Transitional services in the IDEA refers to a coordinated set of activities for a student with a disability that are:

- designed to facilitate the student's movement from school to post-school activities, including postsecondary education, vocational education, and integrated employment (including supported employment);
- based on the individual student's strengths, preferences, and interests; and
- comprised of instruction, related services, community experiences, the development of employment, and other post-school adult living objectives (IDEA, 2012).

In addition, the IDEA requires that transition services be included in all Individualized Education Program (IEP) plans for students with a disability, as defined by federal regulations, upon reaching 16 years of age. IEP's may be developed for younger students with disabilities if determined to be appropriate by the student's IEP team. Transition services addressed by the IEP are to be a coordinated set of activities that promote movement from school to post-school activities such as: postsecondary education, vocational training, employment, adult services, independent living, and/or community participation.

Although economic conditions and employer attitudes are important factors in acquiring employment opportunities for individuals with ASD, appropriately addressing specific behaviors common among individuals with ASD can greatly improve employment outcomes (Schaller & Yang, 2005). Several studies have indicated that people with ASD are more likely to lose their employment for behavioral and social interaction reasons rather than their inability to perform work tasks (Dew & Alan, 2007; Hurlbutt & Chalmers, 2004; Unger, 1999). Further, Belcher and Smith (1994) found that higher levels of social inclusion and acceptance were correlated with longer job retention. Social challenges faced by persons with ASD identified by Mahwood and Howlin (1999) include: lack of social understanding, such as failure to respect others' personal space; talking too little or too much; over-reliance on supervisors; and inappropriate dress or personal habits. Behavior management challenges affecting employment for persons with ASD need to be better understood and addressed by employment support service providers, especially those that plan and implement school-to-work transition programs.

A need exists to better understand the factors that are related to effective and efficient transition to employment by transition-age young people with ASD. Rigorous examination in this area will promote more efficient and effective transition programming that more predictably produces employment outcomes for students with ASD exiting educational settings.

1.1 CONTRIBUTION OF THE REVIEW

This review intended to identify and describe the effectiveness of behavioral and social interventions that prepare school-age youth with autism spectrum disorders for employment after graduation. In addition, the review intended to serve as guidance for planners of transition programs and as an indicator of where further research would be beneficial.

More needs to be known about the effectiveness of strategies that are successful in supporting the transition of youth with ASD into employment settings. As the population of persons with ASD grows, more demands and expectations will center on schools and vocational support agencies to effectively facilitate their transition into appropriate work and community living settings.

A glossary to assist readers in understanding the differences in terminology related to the

variety of employment outcomes and job support interventions is provided in Appendix 8.1: Glossary of Job Support and Intervention Terminology. This review highlights trends and gaps in the current relevant literature base.

2 Objective

The objective of this review was to determine the effectiveness of pre-graduation interventions aimed at persons with ASD to shape behaviors, social interactions, and/or skills that result in employment in mainstream competitive employment settings.

This review did not include interventions that were provided to solely develop employment readiness outcomes (e.g., increase in work-related skills that were not utilized in actual paid work) or behavior shaping that was not translated to an actual work setting. The review required studies to demonstrate an actual employment outcome as a result of a school-to-work transition program or related interventions that may be provided by other agencies, such as state departments of vocational rehabilitation, within the transition process for youth with autism spectrum disorders.

3 Methods

3.1 CRITERIA FOR INCLUSION AND EXCLUSION OF STUDIES IN THE REVIEW

A two-stage process was used to determine inclusion or exclusion of studies: (1) title and abstract stage and (2) full text stage.

3.1.1 Title and Abstract Stage

Studies were assessed and selected for advancement to the next stage of inclusion if evaluation met at least one of the two following criteria:

3.1.1.1 *Participants*

The participant sample of study was transition-age individuals (14-22 years), with a diagnosis of Autism Spectrum Disorder (ASD). The review was designed to identify effective interventions that could be implemented by school-to-work programs or other pre-graduation vocational development programs; therefore, adult employment programs were excluded. For a review on the effectiveness of employment assistance for adults out of school, see Westbrook, Nye, Fong et al. (2012).

3.1.1.2 *Intervention*

Interventions for this review were included if they were designed as an approach to prepare and/or place transition-age individuals with ASD in a gainful competitive employment setting earning minimum wage or above. Due to the significant rates of unemployment among persons with ASD, this review sought to identify school-to-work transition services that were effective in producing employment outcomes for students with ASD. Interventions that addressed the acquisition of job-related skills/behaviors or social employment-appropriate skills/behaviors without an employment outcome were excluded. The types of employment targeted for inclusion were competitive, supported, or integrated employment. Studies in which the experimental groups assigned to sheltered work or non-integrated work interventions were excluded from the review due to not providing the integrated or mainstream format of employment.

If these criteria were not clear from the title or abstract, the study was advanced for retrieval

of the full text to determine eligibility.

3.1.2 Full-Text Stage

Full-texts of studies from all citations/abstracts advanced from Stage 1 were retrieved for a final determination of inclusion in the review and analysis. All of the following criteria were required for each study in order to be included in the review and analysis.

3.1.2.1 Research Design

Included studies had to use an experimental or randomized controlled trial design (RCT), quasi-experimental design (QED), or single subject experimental design (SSED) to report the effects of the intervention.

3.1.2.2 Participants

The recipients of the intervention were individuals with an ASD, were of secondary school age (14-22 years), and were involved in transition from school-to-work activities. Study participants eligible for inclusion were individuals diagnosed with Asperger Syndrome, Autism, Rett Syndrome, Childhood Disintegrative Disorder, or Pervasive Developmental Disorder-Not Otherwise Specified, as defined in the DSM-IV-TR (American Psychiatric Association, 2000). Study participants with ASD and other secondary disabilities were included. However, study participants with primary disabilities such as intellectual disability, schizophrenia, attention deficits, or other non-autism related conditions were excluded.

Participants not employed at the time of the study intervention were the focus of this review. Reviewers did not exclude studies in which the participant pool included both participants who had an employment history and those who did not. Individuals who were employed prior to an intervention study were not excluded in this review.

3.1.2.3 Intervention

The intervention under investigation had to be directed towards addressing skills and/or behaviors needed by individuals with ASD for employment. Eligible interventions addressed social, behavioral, cognitive, or specific employment skills (e.g., operating a cash register) related to the acquisition and maintenance of employment among the study participants. Interventions of interest involved relatively specific and structured experiences in a school-to-work transition process designed to support employment placement, for example, providing guidance in completion of applications, résumés, and engaging in interviews; shaping of work skills and appropriate employment setting social skills; or teaching of appropriate work-related communication skills.

Interventions for inclusion were a part of school-based transition programming or could have been ancillary transition services that were provided by other agencies such as a state

vocational rehabilitation agency. Interventions to be included in this review were to be divergent in their scope and area of focus: for example, the development of social skills rather than development of work-specific skills because of the particular needs of the subject group. This is appropriate due to the wide variation in personal characteristics that are displayed across the autism spectrum. To accommodate this need and appropriate variation in interventions, studies for inclusion focused across social, behavioral, and/or skill-oriented interventions. Interventions of any length duration were included provided adequate description was provided. Interventions for inclusion were required to demonstrate an employment outcome as a component of the transition process.

3.1.2.4 Outcome Measures

Eligible outcomes included attainment of an employment placement and specific data about the duration and/or retention of that placement. Eligible gainful employment consisted of competitive, integrated, or supported employment. Employment at sheltered work or non-integrated work settings was not considered as an outcome measure for this review. Employment encompassed full or part-time placements. Employment assistance interventions of any length duration were included. Although school-based transition services may focus on producing a variety of outcomes (e.g., community participation and independent living, among others), this review focuses only on those services that produced employment outcomes due to the key function employment can play in many quality of life areas of persons with ASD.

3.1.2.5 Publication Status

Published and unpublished studies were included in the evidence pool.

3.1.2.6 Country of Origin and Language of Publication

Studies that were conducted in any country were eligible. We did not exclude studies reported in languages other than English, but we did not specifically search for non-English literature; however, we did search five international databases. Non-English language studies that were retrieved or reviewed required the reviewers to obtain translation assistance from native speakers (e.g., Higuchi & Noutomi, 2010).

3.2 SEARCH STRATEGY FOR IDENTIFICATION OF RELEVANT STUDIES

The search strategy used for identification of relevant studies is highlighted below.

3.2.1 Electronic Searches

Studies were identified using electronic search techniques of 30 computerized databases. We consulted database thesauri where they were available to ensure that the universe of

appropriate synonyms had been included in the intervention and outcome search term categories. Search terms and search strategies were modified to fit individual databases.

Databases searched included:

1. ABI Inform Global
2. Academic One File
3. Academic Search Complete
4. Australia Education Index
5. ARD (Autism Research Database)
6. Bing
7. British Education Index
8. Canadian Research Index
9. CBCA Education
10. CINAHL Plus with Full Text
11. CIRRIE (Center for International Rehabilitation Research Information and Exchange Database)
12. Cochrane Central Registry of Controlled Trials
13. Dissertation Abstracts International
14. Educational Full Text
15. Ed Line and Electronic Texts in Education
16. ERIC
17. FRANCIS
18. Google (advanced)
19. Google Scholar
20. NARIC REHABDATA
21. Professional Development Collection
22. Psychology and Behavioral Sciences Collection
23. PsycINFO
24. PubMed/MEDLINE
25. Sage Family Studies Abstracts
26. Science and Technology Collection
27. Sociological Abstracts
28. Web of Science
29. WorldCat [for monographs]
30. Yahoo! (advanced)

3.2.2 Search Terms

The keywords used in the computerized bibliography searches were divided into three categories: population, treatment, and domain and design characteristics. The searches covered the period from 1943 through 2011. The first paper identifying a condition called autism was published in 1943 (Kanner, 1943); therefore, the start date for the search was

1943 (similar to a previous review: see Westbrook, Nye, Fong et al., 2012). All search terms were truncated using the appropriate conventions in order to include variations in endings of words and in spelling. Terms from the three categories were connected with “or” within each category and connected with “and” between categories.

Population

autis*
childhood disintegrative disorder*
pervasive developmental disorder*
spectrum disorder*
ASD
Asperger*
Rett*

Age

adolescen*
school age*
high school*
teen*
secondary*
young*
youth*
student*

Treatment

intervention*
model*
program*
practice*
instruction*
training*
service*
transition*
education*
school to work*

Domain

employ*
behavior*
rehab*

vocation*
work*
occupation*
trade*
career*
skill*
job*

Design

experiment*
control group*
single*
effect*
random*

For more information on the search strategy, see Appendix 8.2: Documentation of Search Strategies for the Systematic Review.

3.2.3 International Contacts

Our efforts to find studies from outside the United States included searching in five non-United States and international databases, including Australia Educational Index, British Education Index, Canadian Research Index, CBCA Education, and FRANCIS. These databases did yield studies that were reviewed in Stage 1 of the title/abstract review procedures.

3.2.4 Grey Literature

Grey literature—such as unpublished manuscripts, dissertations and theses, or government reports—identified through electronic searches was submitted to the same inclusion criteria as other studies. The time range (1943 - 2011) and inclusion criteria for grey literature were the same as specified for the published studies.

3.2.5 Cross-Referencing of Bibliographies

The references in relevant journal articles and other reports of research results were scanned for additional studies for inclusion in the review.

3.2.6 Conference Programs

Recent conference programs and conference syntheses (2010-2011) from relevant associations and conferences were used to identify unpublished studies eligible for review inclusion.

Professional organizations/events that were examined included:

Autism Society of America
National Association of Rehabilitation Research and Training Centers International
Society for Autism Research
National Alliance for Autism Research
Autism Research Institute
National Autistic Society (UK)
Autism Research Centre (Cambridge)

Conference proceedings that were reviewed included:

Asia Pacific Autism Conference 2011
Penn Autism Network 2011 Conference.
Council for Exceptional Children (CEC) Annual Conference 2011

3.3 CODING PROCEDURES AND CATEGORIES

Studies were screened for inclusion/exclusion decisions at two stages, Stage 1: title and abstract and Stage 2: full-text. The same three coders served as independent reviewers at both stages. Inter-rater reliability was tested at both stages. A fourth party was not needed to resolve a coding value difference.

3.3.1 Title and Abstract Stage

At Stage 1, the decision for advancing the retrieved titles and abstracts to the full text stage retrieval was made independently by all reviewers. Inter-rater reliability was established with a random sample of 25 titles and abstracts. Reviewers demonstrated a 96% rate of agreement. When differences did arise, resolution occurred through discussion and agreement of the three reviewers. Titles and abstracts were advanced to full-text stage based on meeting two criteria from the following questions (items a, b, and c) or a designation by a reviewer of 'unsure' (item d):

- a. Are the participants identified, described, and defined under the Autism Spectrum Disorder category?
- b. Are the participants of secondary school age (ages 14-22)? Are the participants enrolled in a school-to-work transition program or secondary-level education/program?
- c. Is this abstract/citation about employment?
- d. Unsure of meeting inclusion criteria?

3.3.2 Full-Text Level

At the Stage 2 level, full texts of all citations advanced from Stage 1 were obtained and coded

for an inclusion/exclusion decision. The decision for advancing the retrieved full-text studies to an inclusion status was made by three reviewers for each study, independently evaluating each study. An inclusion decision for advancement to the coding stage of the process required that a study met all the criteria presented earlier. Inter-rater reliability was established prior to initiating coding activities, minimizing coding disagreements. Coders demonstrated agreement in ranking a random sample of 20 studies at a 100% rate of agreement.

At the Stage 2 level, the three reviewers recorded all excluded studies and the reason for exclusion independently. For more information, see Appendix 8.4: Reasons Stage 2 Studies were Excluded from the Systematic Review.

When multiple studies used the same sample or outcome data, the study providing the most complete information focusing on our desired intervention outcome was selected for inclusion.

3.4 ASSESSMENT OF METHODOLOGICAL QUALITY

Included studies were coded by three independent reviewers for methodological quality on dimensions that included:

- Design type
 - RCT Individual Randomized Design
 - RCT Group Randomized Design
 - Quasi-Experiment: Equivalent Comparison Design (individuals)
 - Quasi-Experiment: Equivalent Comparison Design (groups)
 - Quasi-Experiment: Non-Equivalent Comparison Design (individuals)
 - Quasi-Experiment: Non-Equivalent Comparison Design (groups)
 - Quasi-Experiment: Regression Discontinuity
 - Single Group Quasi-Experiment: Interrupted Time Series Design
 - Single Group Pre-test/Post-test design
 - Withdrawal Single Subject Experimental Design (ABAB)
 - Multiple Baseline Single Subject Experimental Design (MBL)
 - Survey: Cross Sectional
 - Survey: Longitudinal
- Unit of assignment (e.g., individual vs. group/class)
- Unit of analysis (e.g., Intention to Treat, Test only, Treated)
- Attrition from pre-test to post-test
- Fidelity of implementation (e.g., following replicable program of intervention)
- Blinding of assessors/interventionists

Other data were to be extracted and coded from the primary studies included: publication source, subject characteristics, sample source, employment setting, intervention

characteristics, type of employment, and outcome measurement. See Appendix 8.3 for the coding form.

3.5 CALCULATING EFFECT SIZES

The magnitude of the intervention effect was to be calculated using the commonly accepted statistical formulae and dedicated programs available. The protocol of this systematic review (Westbrook, Nye, Wendt et al., 2012) describes these statistical formulae in depth.

However, due to the lack of studies that met inclusion criteria, effect size calculations and syntheses were not possible.

3.6 TREATMENT OF QUALITATIVE RESEARCH

Qualitative research was not included in the analysis of the intervention research. However, a significant body of relevant qualitative and descriptive literature was identified by the authors in the Stage 1 and Stage 2 reviews. Reviewers summarized the trends from these related qualitative and descriptive studies in Appendix 8.2.

4 Results

4.1 INFORMATION RETRIEVAL

The combined electronic and hand searches produced a total of 5,665 citations at Stage 1 Title/Abstract. Of these studies a total of 85 citations were advanced for collection of a full text copy of the study (Stage 2 Full-Text). The search results were examined independently by three of the review authors.

Upon review of the full-text for each of the 85 studies, no randomized controlled, quasi-experimental, nor single-subject experimental studies were retained for having met all inclusion criteria described earlier. Should such studies be identified for updates of this review, the methods outlined previously will be employed. A list of the excluded studies and the reasons for exclusion are presented in Appendix 8.4. Studies did not describe or assess an intervention (n = 40), did not present outcomes related with gainful employment (n = 38), did not contain participants with ASD (n = 3), or did not provide quantitative data (case study) (n = 4). None of the 85 studies were included into a pool for further analysis.

4.2 RISK OF BIAS

The review team included three individuals at both stages of this review. Inter-rater reliability was tested using a random sample of 25 studies at Stage 1 Title/Abstract. The resulting inter-rater reliability from the 25–study sample was found to be 96%. Reviewers established consensus regarding advancement to Stage 2 of these titles and abstracts through discussion.

Reviewers at Stage 2 coded individual full-text studies for research design, participant characteristics, intervention, and outcome characteristics. Inter-rater reliability was established at this stage with a random sample of 20 studies. The resulting rate of reliability was 100%. Any coding differences at Stage 2 were resolved through discussion between the three reviewers resulting in a consensus decision regarding the inclusion or exclusion.

The assessment of individual study bias was not possible, as no studies met inclusion criteria for a full review.

4.3 EFFECTS OF INTERVENTIONS

No eligible studies were found; that is, none of the 85 full-text studies met the inclusion criteria; thus, effect size calculations and syntheses were not possible.

5 Discussion

This systematic review endeavored to determine the effectiveness of pre-graduation transition-oriented interventions aimed at persons with autism spectrum disorders to shape behaviors, social interactions, and/or skills that result in employment in mainstream competitive settings. The relevant studies identified through this review did not provide a clear linkage between interventions that shaped behaviors, modified social behaviors, or produced competitive skills with an employment outcome for persons with ASD. While transition services can appropriately focus on a variety of outcomes—such as vocational training, postsecondary education, adult support services, community participation, and independent living, among others—this review focused on the outcome of employment. Due to the very low rate of employment of persons with ASD after exiting the educational system, the authors wanted to identify interventions that were most successful in supporting employment attainment and maintenance. Without an employment outcome associated with a program evaluation, the authors were unable to determine if any change in behaviors, social skills, and/or work-related skills produced through study interventions was sufficient to support successful entry into a competitive employment setting.

Because employment is the major intended outcome of school-to-work pre-graduation transition programs for students with disabilities, it was surprising that the literature generally did not establish the effect of behavior shaping, social skill development, and vocational skill development on the actual employment outcome of the participants. In most cases, the studies that focused on transition programming could have tracked students for a longer period to identify those that were successful in moving into a competitive employment placement following the study intervention. No studies were identified that developed a design utilizing an experimental control group format. However, single subject experimental designs that were utilized and documented change in behaviors/skills did not facilitate understanding in terms of the adequacy of the change to support competitive employment placement.

This review intended to identify elements of a school-to-work transition program that implemented interventions designed to meet the specific transition needs of individuals with ASD. The available data for drawing a ‘what works’ conclusion did not serve as a foundation for the authors to determine the effectiveness of interventions in approaching job searching, job placement, or on-the-job supports such as job coaching to achieve successful employment outcomes for transition program participants with ASD. The scientific quality of

the available studies is weak and generally do not utilize comparison group study designs. In addition, as stated earlier, studies do not link transition interventions to successful employment outcomes for subjects.

5.1 LIMITATIONS OF STUDIES

The primary limitation of this review is the lack of rigorously designed studies that allow for a causal interpretation of the measured outcomes related to persons with ASD (14-22 years of age) achieving employment outcomes through participation in tailored and specific interventions of a pre-graduation transition program. Studies identified in this review did not link transition interventions with the intended transition outcome of entry into the competitive employment workforce. Given the absence of a scientifically rigorous literature base addressing the effectiveness of school-to-work transition programs, there is clearly a need to establish an evidence base in order to assess and guide the implementation of programs that best prepare students with ASD to transition into adult integrated work experiences.

5.2 IMPLICATIONS FOR RESEARCH

This systematic review demonstrates the lack of available research that focuses on the employment outcomes produced by pre-graduation transition programs/services for school-age (14–22 years) persons with ASD. Given the federal regulations and supporting funding surrounding transition programming for students with disabilities, it is remarkable that such limited research attention has been paid to the effectiveness of interventions that produce the intended result of such programs. Future research efforts are needed to develop experimental studies that would utilize a randomized controlled design to determine the relative effectiveness of the variety of interventions being utilized in transition programming for students with ASD. It is also important for such studies to identify actual employment outcomes that result from presumed preparatory or facilitating interventions utilized in transition programs.

Although the currently available studies focusing on effective transition programming for students with ASD are limited, the basis for designing such studies appears to be both practical and feasible. Extending transition studies to include results in the form of employment outcomes for the participants are readily understood and quite possible in the field. While individual studies of transition programming for students with ASD may lack statistical power due to the low incidence in the population, it is quite feasible to link studies across the transition programming being carried out in most secondary settings involving students with disabilities. Linking studies and creating larger sample sizes will greatly facilitate the production of meaningful results for students with ASD as they attempt transition into mainstream employment settings. In other words, future research needs to focus on the implementation of studies with small “N” group samples that can, over time,

provide a synthetic larger “N” that could support a meta-analysis producing higher quality results that would be useful in both school-based planning and implementation of transition programming for students with ASD.

5.3 PLANS FOR UPDATING THE REVIEW

The authors will examine the review every three years after publication for update as per C2 policy.

6 Acknowledgements

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8 Appendices

8.1 GLOSSARY OF JOB SUPPORT AND INTERVENTION TERMINOLOGY

This glossary is provided to assist readers in understanding the differences in terminology related to different types of employment outcomes and job support interventions.

<u>Type</u>	<u>Characteristics</u>
Competitive Employment	occurs in a work setting in which the person with a disability receives wages and benefits that are customary for the position and at a wage level that is at or above the minimum wage
Covert Audio Coaching	utilizes two-way radio technology that allows the trainer (or coach) to use radio communications with a trainee via an earpiece, thus, allowing the trainer to deliver directions from a distance and heard only by the trainee
Full-time Employment	employers are allowed to determine whether an employee is to be considered full-time, generally refers to employment that involves 36 or more hours per work week
Integrated Employment	a mainstream work setting in which persons with disabilities and persons without disabilities work together and interact socially
Job Coaching	refers to the training of an employee with a disability by an approved specialist, known as a job coach, who uses structured intervention techniques to help the employee learn job tasks to the employer's specifications and to learn the interpersonal skills necessary to be accepted as a worker at the job site; job coaching services can also include job development,

	advocacy, counseling, travel training, and other services aimed at maintenance of employment
Job Development	services to develop job openings through direct contact with employers for individuals with disabilities seeking employment and who need assistance in their job search and attainment
Job Tailoring	refers to modification of a job to make it feasible for the particular capabilities/abilities of an individual with a disability and may include a range of options including reduction in work hours, job sharing, flexible work hours, elimination of non-essential work components, modification of the work environment, and the use of technology or other accommodations, among others
Non-Integrated Employment	work settings in which persons with disabilities and persons without disabilities do not work together as co-workers and interact socially
Part-time Employment	generally considered to be less than 35 hours per work week and is determined by the employer
School-to-work transition	school-based programs that prepare youth with disabilities (14-22 years) for adulthood; services often include a vocational component
Sheltered Employment	refers to a wide range of segregated vocational and non-vocational programs for individuals with disabilities such as in sheltered workshops, work activity centers, adult activity centers, day activity centers, and others; the missions, services provided, and funding sources vary widely; however, in most of these settings individuals do not earn minimum wage and work alongside other disabled individuals as co-workers
Supported Employment	competitive employment in an integrated work setting, or employment in an integrated work setting in which individuals are working toward competitive work consistent with their strengths, resources, priorities, concerns, abilities, capabilities, interests, and informed choice by individuals with significant disabilities who have not traditionally been in competitive employment, have had interrupted or intermittent work due to their

significant disability, and who, due to the nature of their disability, need intensive supports for a period followed by extended services to support job maintenance

Video-Based Modeling

promotes observational learning of desired behaviors through video demonstrations that are observed and imitated by trainees

Video Self Modeling

uses the video-based modeling techniques; however, the video demonstration features the trainee in the performance of the behaviors rather than an unknown individual

Vocational Rehabilitation

a dynamic process that enables persons with functional, psychological, developmental, sensory, cognitive, and emotional impairments or health conditions to overcome barriers to accessing, maintaining, or returning to employment or another occupation

8.2 A NONSYSTEMATIC REVIEW OF SELECTED, EXCLUDED STUDIES

8.2.1 Implications Of Associated Qualitative Research And Other Related Studies

This review initiated with an original question focusing on the effectiveness of transition program services in achieving employment outcomes for school-aged (14-22 years of age) youth with ASD. In the course of the review process, a significant body of qualitative and related descriptive research was identified that highlights some trends related to answering the original review question. The studies used to suggest information relevant to the five areas of note discussed in this section were identified through the review's search strategy, were among the 85 studies identified for full-text review, and do address factors/characteristics associated with transition services for students with ASD. The nature of these studies, however, do not allow the authors to have authoritative findings upon which readers can have scientifically-based confidence. A summary of the findings from selected qualitative or descriptive research is described here focusing on their possible implications for effective transition program interventions for transition-aged persons with ASD and future research need areas. Areas of note include:

- Employability of transition-age persons with ASD
- Characteristics of effective school-based transition programs
- Modeling and behavior-shaping techniques
- Social skill interventions
- Family-centered approaches

8.2.1.1 Employability of Transition-Age Persons with ASD

The National Longitudinal Transition Study-2 (NLTS-2) (National Center on Special Education Research, Institute of Education Sciences, 2011) found in a follow-up study that youth with ASD eight years after exiting high school demonstrated limited employment outcomes when compared to their non-disabled peers. Of those working (37.2%), the average number of hours worked per week (24.1 hours) was the lowest of all disability groups included in the study. However, about 63% indicated that they had been employed at some point after leaving high school but were not employed at the time of the interview. Schaller and Yang (2005), found that persons with ASD tended to experience greater successful entry into competitive employment as their age increased from 21 to 45 years of age. Individuals with ASD and a secondary condition (e.g., emotional disability, mobility-related disability, or other disability) were less likely to move into competitive employment than their peers with ASD and no secondary disability. In addition, Schaller and Yang (2005) found that African American persons with ASD were less likely to have a successful employment outcome than their Caucasian counterparts in terms of services provided through state vocational rehabilitation agencies.

8.2.1.2 Characteristics of Effective School-Based Transition Programs

The general school settings of pre-graduation transition programs appear to have an effect on the success of the program in achieving employment outcomes with its participants. Ryndak, Ward, Alper, Montgomery, and Storch (2010) found that those receiving special education services in inclusive general education settings achieved better adult outcomes reflected in community integration, work contexts and interactions with others. Moon, Simonsen, and Neubert (2011) found that special education students and their families indicated that teaching transitioning youth with disabilities about self management skills (e.g., toileting, hygiene, and dressing), functional community based skills (e.g., using the public bus system), and self advocacy skills (e.g., reporting sexual abuse) are important factors in the transitioning process. In fact, Moon et al. (2011) indicated the importance of age-appropriate, integrated community-based transition-related experiences rather than solely academic instruction in a classroom in the final years of public education for students with disabilities in order to maximize transition success.

Others such as McDonough and Revell (2010) noted the importance of transition program planners, knowledge, and utilization of the array of state and local community services that are available to support elements of the transition program for students with disabilities (e.g., One Stop Centers, Community Rehabilitation Programs, and State Vocational Rehabilitation Programs). Assistance in negotiating the transition between the entitlement program of public school special education to the eligibility-based adult support system was suggested as a key in planning and implementing a successful pre-graduation transition program.

Due to the nature of ASD, transition program planning benefits from an interdisciplinary team approach that emphasizes: assessment and intervention approaches that support early intervention, extensive job acquisition and placement supports, and on-going follow up with all students in the transition process. Qualitative data suggest that employers may be more inclined to hire an individual with ASD by the early provision of information about ASD and the nature of the disability and its implication for the workplace (e.g., people with ASD may demonstrate less distraction by the social aspects of the workplace) (Higgins, Koch, Boughfman, & Vierstra, 2008).

8.2.1.3 Modeling and Behavior-Shaping Techniques

A growing body of literature is addressing the use of modeling techniques to support the acquisition of vocationally oriented skills/behaviors of students with disabilities, including students with autism spectrum disorders. For example, Bennett, Brady, Scott, Dukes, and Frain (2010) studied the effect of performance feedback provided through covert audio coaching via an earpiece on the on-the-job performance of individuals with disabilities in supported employment settings. The study participant with autism demonstrated an increase from 20% accuracy to 90% accuracy in job performance through the covert audio intervention.

The use of video-based modeling interventions has also been shown to be effective in shaping employment-focused skill acquisition by transition-aged youth with ASD. For example, Allen, Wallace, Renes, Bowen, and Burke (2010) found that video modeling of isolated skills and utilization of the skills in an actual work setting were effective in teaching the performance of a vocational task in a social setting by transition-aged (16-18 years old) individuals with ASD. In addition, Bellini and Akullian (2007) reviewed 23 single-subject experimental video modeling studies with children and adolescents with ASD and concluded that the technique was effective in positively shaping behaviour, including social-communication skills. Some studies have indicated that video self modeling featuring the study participant versus video adult modeling featuring an unfamiliar adult is more effective with some transition-aged individuals with ASD (Cihak & Schrader, 2008).

Others, such as Rigsby-Eldridge and McLaughlin (1992) found adult staff modeling with verbal reinforcement (praise) to be effective in shaping the work-related behaviors of young (20 year old) individuals with ASD and low IQ (15-40 estimated). This type of modeling involved adult staff performing tasks or behaviors that study participants were to adopt through visually monitoring and receiving praise when study participants approximated those tasks or behaviors.

8.2.1.4 Social Skill Interventions

Transition-aged students with ASD generally experience difficulties or limitations in social interaction with others. In transition situations, these individuals often experience stress, anxiety, and depression (Hillier, Fish, & Siegel 2011). These psychological factors may be related to some of the core challenges experienced by students with ASD in attempting to make transition to competitive employment work settings. The extent to which anxiety can impair a student with ASD in his/her ability to interact with others, or whether the social interaction difficulties lead to increased anxiety is not clear. Researchers such as Gillott, Furniss, and Waller (2006) found higher levels of general and social anxiety among children with autism when compared to a typically developing non-disabled control group and a control group with language impairment.

Interestingly, it has been shown that children with ASD and higher intelligence quotients report themselves as being less socially competent and display higher levels of depression than their nondisabled counterparts (Hedley & Young, 2006; Vickerstaff, Heriot, Wong, Lopes, & Dosseter, 2007). Due to its potential impact on employment outcomes of students with ASD, more high quality research in this area needs to be conducted to better inform current transition planning and practice and to suggest effective treatment options.

As pointed out in the authors' previous systematic review (Westbrook, Nye, Fong et al., 2012), social skills vary significantly across the range of the spectrum of autism. A variety of conditions ranging from hygiene issues to inappropriate co-worker communication are highly related to the successful transition and maintenance of an individual with ASD in the

workplace. An effective transition program would be required to deal with varying social needs among students with ASD.

8.2.1.5 Family-Centered Approaches

The authors were interested in the degree to which the involvement of parents of transition-aged individuals with ASD would affect employment outcomes of pre-graduation transition programs. Our review has found that there is very limited literature available in this area; however, it appears that family involvement must be carefully managed to support a positive contribution to the achievement of the transition program goals. For example, family involvement in helping the individual with ASD prepare to meet the behavioral expectations of community-based rehabilitation service providers is helpful; however, it is not helpful when family members dictate their employment preferences rather than the preferences voiced by the family member with ASD (Moon et al., 2011).

8.2.2 Characteristics of Discussion Studies Cited

Study/Journal	Participants	Duration	Outcomes
National Longitudinal Transition Study-2 (National Center on Special Education Research, Institute of Education Sciences, 2011)	Individuals with Disabilities (including with autism)	Eight years following exit from high school	37.2% of the persons with autism were employed. 63% had been employed but were no longer working.
Schaller & Yang (2005) <i>Rehabilitation Counseling Bulletin</i>	450 people with autism receiving competitive employment VR services and 365 people with autism receiving supported employment VR services in 2001	Correlation study using data archives for 2001 in National Rehabilitation Services Administration 911 database	27.19 average hours worked in competitive employment. 22.21 average hours worked in supported employment. 75.3% Successful closure rate in supported employment. 58.4% successful closure rate in supported employment. As age increased from 21 to 45 years, so did the percent of individuals closed successfully.
Ryndak, Ward, Alper, Montgomery, & Storch (2010) <i>Educational Training in Autism and Developmental Disabilities</i>	Two individuals with developmental disabilities	Seven years	Those receiving special education services in inclusive general education settings achieved better adult outcomes reflected in community integration, work contexts, and interactions with others.
Moon, Simonsen, & Neubert (2011) <i>Educational Training in Autism and Developmental Disabilities</i>	Twelve community Rehabilitation Program staff in four regions across one mid-Atlantic state	Fiscal year 2010	Best training for transitioning youth includes: self management, advocacy, skills, authentic work experience, and meaningful assessments.

McDonough & Revell (2009) <i>Journal of Vocational Rehabilitation</i>	Contextual review	2010	Need for transition planners to be aware and utilize community relevant resources to support employment outcomes for persons with ASD.
Higgins, Koch, Boughfman, & Vierstra (2008) <i>Work</i>	Review of findings related to Asperger classified individuals with ASD	2008	Persons with Asperger's may have less distraction by social aspects of the workplace than other workers without ASD.
Bennett, Brady, Scott, Dukes, & Frain (2010) <i>Focus on Autism and other Developmental Disabilities</i>	Three individuals with autism (1) and intellectual disabilities (2)	Intervention delivered from 6.7 to 13.2 minutes per session	Covert audio coaching is effective in increasing the work performance of supported employees with changes that are durable several weeks following removal of interventions.
Allen, Wallace, Renes, Bowen, & Burke (2010) <i>Education and Treatment of Children</i>	Four males with ASD	Baseline and modeling session in SSED design; Follow up one month after	Video modeling was effective in promoting effective initial acquisition of job skills but not appropriate for full-time employment.
Bellini & Akullian (2007) <i>Exceptional Children</i>	23 single subject studies published between 1987 and 2005; 73 participants across all studies	Meta-analyses of modeling relevant literature	PND scores indicated that video modelling and video self modeling were both effective in permitting shell acquisition and maintained over time.
Cihak & Schrader (2008) <i>Journal of Special Education Technology</i>	Four participants (16-21 years of age) with ASD and intellectual disabilities	Received video modelling and video self modelling interventions	Video modelling and video self-modeling were equally efficient at teaching persons with ASD the acquisition and maintenance of vocational skills three and six weeks after acquisition.
Rigsby-Elderidge & McLaughlin (1992) <i>Journal of Developmental and Physical Disabilities</i>	Two 20 year old male students diagnosed as health impaired-autism	Both students were in grade 12 of high school; Data were collected in school, (1hr) work (2hrs), and community settings (1hr); Baseline (5-25 days) and follow-up (24-45 days)	Modeling and praise were effective to improve self-initiated speech. Interaction was effective in improving social skills and interpersonal behaviors.
Hillier, Fish, Siegal, & Beversdorf (2011) <i>Journal of Development and Physical Disabilities</i>	Forty-nine young adults with ASD	Eight one-hour weekly meetings with small groups of 5-7 individuals	Participation in social and vocational skill program intervention significantly reduced feelings of depression and anxiety.
Gillott, Furniss, & Waller (2006) <i>Autism</i>	Fifteen high functioning children with ASD Fifteen children with language impairment Fifteen non-disabled children	Survey, questionnaires, assessments administered	Children with autism had highest levels of anxiety. Children with autism had higher levels of social anxiety.
Vickerstaff, Heriot, Wong, Lopes, & Dosseter (2007) <i>Journal of Autism and Developmental Disorders</i>	30 children diagnosed as high functioning people with ASD	Administered Wechsler Abbreviated Scale of Intelligence and the Diagnostic Interview for Social and Communication Disorders	Social competence was rated as low by parents and teachers of children with ASD. Higher functioning persons with ASD rate themselves lower in social competence than those with ASD and lesser intelligence.

Hedley & Young (2006) <i>Autism</i>	Thirty six families with adolescents with ASD	Survey/assessment administration Children's Depression Inventory Social Competence Scale	Social comparison results are important in understanding depression in persons with ASD. Persons with ASD demonstrate higher levels of depression.
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8.3 DOCUMENTATION OF SEARCH STRATEGIES FOR THE SYSTEMATIC REVIEW

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
ABI Inform Global	May 2009	1943 - 2011	US/ PROQUEST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Academic One File	Jan 2012	1980 – 2011	US/ GALE	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Academic Search Complete	Jan 2012	1943 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Australia Education Index	Feb 2012	1979 - 2011	AU/ PROQUEST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
ARD (Autism Research Database)	Jan 2012	1943 --2011	UK/ The National Autistic Society	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*) [Project Description]

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
Bing	March 2012	1943 – 2011	US	autism and employment and transition and experiment
British Education Index	July 2012	1975 - 2011	UK/ PROQUEST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Canadian Research Index	June 2009	1982 - 2008	CN/ PROQUEST	sub (autis* OR asperger*) OR (childhood w/1 disintegrative w/1 disorder*) OR (pervasive w/1 developmental w/1 disorder*) OR (pervasive w/1 developmental w/1 disorder w/2 otherwise w/1 specified) OR spectrum w/1 disorder* [in Citation and Document Text] AND treatment* OR intervention* OR model* OR program* OR practice* OR instruction* OR train* OR service* OR supported employ* [in Citation and Document Text] AND employ* OR adult* OR rehabilitation* OR vocation* OR workplace*
CBCA Education	Feb 2012	1982 - 2011	CN/ PROQUEST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
CINAHL Plus with Full Text	Jan 2012	1943 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
CIRRIE	Jan 2012	1990 - 2011	US/ University at Buffalo	autis and ALL POPULATION TERMS autis and transition autis and employ autis and school asperger and ALL POPULATION TERMS asperger and transition asperger and employ asperger and school

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
Cochrane Central Registry of Controlled Trials	Jan 2012	2005 - 2011	US/ The Cochrane Collaboration	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Dissertation Abstracts International	May 2009	1943 - 2011	US/ PROQUEST	(autis* OR childhood with disintegrative disorder* OR pervasive developmental disorder* OR pervasive developmental disorder not otherwise specified OR spectrum disorder* OR Asperger*) AND (treatment* OR intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR supported employ* OR workplace*) AND (adult* OR employ* OR rehabilitat* OR vocational*)
Educational Full Text	Jan 2012	1943 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Ed Line and Electronic Texts in Education	Jan 2012	1943 – 2011	UK/ PROQUEST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
ERIC	Jan 2012	1966 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
FRANCIS	July 2009	1984 – 2011	FR/CSA	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
Google (advanced)	March 2012	1943 – 2011	US	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Google Scholar	Feb 2012	1943 – 2011	US	autism and employment and transition and experiment
NARIC REHABDATA	Jan 2012	1956 – 2011	US/ National Rehabilitation Information Center	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*) [with all the words]
Professional Development Collection	Jan 2012	1965 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Psychology and Behavioral Sciences Collection	Jan 2012	1965 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
PsycINFO	Jan 2012	1943 – 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
PubMed/MEDLINE	Jan 2012	1943 - 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Sage Family Studies Abstracts	Jan 2012	1958 - 2011	US/ OCLC	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Science and Technology Collection	Jan 2012	1943 - 2011	US/ EBSCOHOST	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Sociological Abstracts	Jan 2012	1952 - 2011	US/CSA	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
Web of Science	Jan 2012	1943 - 2011	US/ Thomson Reuters	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*)
WorldCat [for monographs]	Jan 2012	1943 - 2011	US/ OCLC	(autis* OR (childhood with disintegrative disorder*) OR (pervasive developmental disorder*) OR (spectrum disorder*) OR ASD* OR Asperger* OR Rett*) AND (adolescen* OR (school age*) OR (high school*) OR teen OR secondary OR young OR youth OR student*) AND (intervention* OR model* OR program* OR practice* OR instruction* OR training* OR service* OR (school to work*) OR transition* OR education*) AND (behavior* OR employ* OR rehab* OR vocation* OR occupation* OR trade* OR work* OR career* OR skill* OR job*) AND (experiment* OR (control group*) OR single* OR effect* OR random*) [in Title]

Database	Date Searched	Years of Coverage	Country/ Supplier	Strategy
Yahoo! (advanced)	March 2012	1943 – 2011	US	autism and employment and transition and experiment

8.4 CODING FORM: EMPLOYMENT FOR INDIVIDUALS WITH AUTISM STUDIES

Full Citation (APA style):

Is this an Intervention Study?

- Yes**
- Unclear**
- No, then STOP!**

Were the Participants at least 18 Years Old?

- Yes**
- Unclear**
- No, then STOP!**

Were the Participants out of secondary school or not in a school-to-work transition program?

- Yes**
- Unclear**
- No, then STOP!**

I. Publication Source:

- | | |
|---|--|
| <input type="checkbox"/> Journal Article | <input type="checkbox"/> Organizational Report |
| <input type="checkbox"/> Conference paper | <input type="checkbox"/> Book or Book Chapter |
| <input type="checkbox"/> Master/Doctoral Thesis | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Technical Report | |

II. Subject Characteristics (pg.)

Groups	Pretest (n)	Posttest (n)	Attrition (n)	1 st Followup (n)	F Attrition (n)	Age (yr; mos)	%Male
T:							
T:							
CP:							
CP:							
CO:							
RG:							
RG:							

Note: For groups, T=treatment, CP=comparison, CO=control and RG=Reference Group. “Attrition” is the difference between the pretest and posttest “n” and “F_Attrition” is the difference between the posttest and 1st followup “n.”

Comments:

III. Sample Source (pg.)

- Public Agency
- Private Agency
- Not Reported
- Other

Comments:

IV. SES (pg.)

- | | | |
|---------------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Low | <input type="checkbox"/> Upper | <input type="checkbox"/> Unclear |
| <input type="checkbox"/> Low-Middle | <input type="checkbox"/> Labeled Mixed | <input type="checkbox"/> Not Reported |
| <input type="checkbox"/> Middle | <input type="checkbox"/> Unlabeled | |
| <input type="checkbox"/> Middle-Upper | Mixed | |

Comments:

V. Education (pg.)

- | | |
|---|--|
| <input type="checkbox"/> Some High School | <input type="checkbox"/> Some College |
| <input type="checkbox"/> High School Graduate | <input type="checkbox"/> College Diploma |
| <input type="checkbox"/> Other: | |

Comments:

VI. Study Community Setting (pg.)

- | | | | |
|--------------------------------|-----------------------------------|--------------------------------|-----------------------------|
| <input type="checkbox"/> Urban | <input type="checkbox"/> Suburban | <input type="checkbox"/> Rural | <input type="checkbox"/> NR |
|--------------------------------|-----------------------------------|--------------------------------|-----------------------------|

Comments:

Geographic Setting:

VII. Employment Setting (pg.)

- Integrated/Competitive (work is performed alongside non-disabled co-workers)
- Non-integrated (work is performed entirely alongside disabled co-workers)
- Supported Employment
- Not Reported

Comments:

Intervention Characteristics (pg. _____)

XI. Describe Intervention Characteristics (pg. _____)

Details of Intervention intended for treatment/comparison groups including how and when administered:

Average Length of Intervention Program (pg. _____):

Length of time of participation activity (pg. _____): _____ per

Number of Sessions (pg. _____):

Primary Type of Employment:

Wholesale Trade

- Retail Trade
- Transportation & Warehousing
- Information
- Finance
- Professional
- Education & health
- Leisure & Hospitality
- Other Service:

Goods-processing Industries

- Construction Other Service:
- Manufacturing

Public Administration

- Local government Federal government
- State government Other Service:

Comments:

XII. Outcome Measure(s):

1. Length of Time to Place in Employment:
2. Length of Time Employed:
3. Re-employments Included: Yes No Not Reported
4. Employment Status: Full Time Part Time
5. Hours worked per week:
6. Post-placement Hourly Wages:
7. Dropped Out Before Placement Occurred:
8. Employer Evaluation:
9. Co-Worker Evaluation:
10. Participant Evaluation:

Comments:

Design Characteristics (pg _____)

XIII. Research Design Characteristics:

Which of the following research design types were used to examine the impact of program effects for employment placement?

- RCT Individual Randomized Design
- RCT Group Randomized Design
- Quasi-Experiment: Equivalent Comparison Design (individuals)
- Quasi-Experiment: Equivalent Comparison Design (groups)
- Quasi-Experiment: Nonequivalent Comparison Design (individuals)
- Quasi-Experiment: Nonequivalent Comparison Design (groups)
- Quasi-Experiment: Regression Discontinuity
- Single Group Quasi-Experiment: Interrupted Time Series Design
- Single Group Pretest/Posttest design
- ABAB Single Subject Design
- MBL Single Subject Design
- Survey: Cross Sectional
- Survey: Longitudinal
- Other Design:
- If none of the above then **STOP!**

Comments:

XIV. Method of Random Assignment (pg _____)

- Random Number Generation
- Coin Flip
- Envelope
- Other
- NR

Comments:

XV. Recruitment Pool (pg _____)

- Referral
- Criterion
- Pre-placement Test Score
- Existing Group
- Volunteer
- Waiting List

Other NR

Comments:

XVI. Blinding

Researcher (pg) Assessor (pg)
 Participant (pg) Employer (pg)
 Intervener (pg) Other (pg)

Comments:

XVII. Fidelity of Implementation

Intervention implemented as described (pg)

No Yes NR

Comments:

XVIII Effect Size Characteristics (Use d-Index Value if Provided)

Groups Compared: **Group 1:** **Group 2:**

Outcomes

Groups	1	2	1	2	1	2	1	2
Mean	_____	_____	_____	_____	_____	_____	_____	_____
SD	_____	_____	_____	_____	_____	_____	_____	_____
N-Post	_____	_____	_____	_____	_____	_____	_____	_____
N-FollowUp 1	_____	_____	_____	_____	_____	_____	_____	_____
N-FollowUp 2	_____	_____	_____	_____	_____	_____	_____	_____
N-FollowUp 3	_____	_____	_____	_____	_____	_____	_____	_____
N-FollowUp 4	_____	_____	_____	_____	_____	_____	_____	_____
d-index	_____	_____	_____	_____	_____	_____	_____	_____
F value	_____	_____	_____	_____	_____	_____	_____	_____

8.5 REASONS STAGE 2 STUDIES WERE EXCLUDED FROM THE SYSTEMATIC REVIEW

Reason for Exclusion: *Not an intervention study (n = 40)*

Belcher, R. G., & Smith, M. D. (1994). Coworker attitudes toward employees with autism. *Journal of Vocational Rehabilitation, 4*(1), 29-36.

Bellini, S., & Akullian, J. (2007). A meta-analysis of video modelling and video self-modeling interventions for children and adolescents with Autism Spectrum Disorders. *Exceptional Children, 75*(3), 264-287.

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Berry, H. (1998). Analyzing a work incentive: The plan for achieving self-support and school-to-work transition. *Career Development for Exceptional Individuals, 21*, 45-60.

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Bowman, R. A. (2008). *The impact of inclusion for students with Asperger syndrome or high functioning autism in transition* (MS thesis). Southwest Minnesota State University: Marshall, Minnesota.

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Dolyniuk, C. A., Kamens, M. W., Corman, H., DiNardo, P. O., Totaro, R. M., & Rockoff, J. C. (2002). Students with developmental disabilities go to college: Description of a collaborative transition project on a regular college campus. *Focus on Autism and Other Developmental Disabilities, 17*, 236-241.

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Franklin, C., Harris, M. B., & Allen-Meares, P. (2006). Effective interventions and resources for working with students with mental health diagnoses. In *The school services sourcebook: A guide for school-based professionals*. New York, NY: Oxford University Press.

Gal, E., Meir, A. B., & Katz, N. (2013). Development and reliability of the Autism Work Skills Questionnaire (AWSQ). *American Journal of Occupational Therapy, 67*(1), 1-5.

Higgins, K. K., Koch, L. C., Boughfman, E. M., & Vierstra, C. (2008). School-to-work transition and Asperger syndrome. *Work: A Journal of Prevention, Assessment and Rehabilitation, 31*, 291-298.

Holjes, M. K., Nay, D. J., & Routon, V. L. (1987). *Transition from school to work: Project funded by the U.S. Department of Education*. Final Program Evaluation Report. Employment Opportunities, INC.

Inge, K., & Dymond, S. (1994). Challenging behaviors in the workplace: Increasing a student's access to community-based vocational instruction. *Journal of Vocational Rehabilitation, 4*(4), 272-284.

Jarbrink, K., McCrone, P., Fombonne, E., Zanden, H., & Knapp, M. (2007). Cost-impact of young adults with high-functioning autistic spectrum disorder. *Research in Developmental Disabilities, 28*, 94-104.

Jennes-Coussens, M., Magill-Evans, J., & Koning, C. (2006). The quality of life of young men with Asperger syndrome: A brief report. *Autism, 10*, 403-414.

Kobayashi, R., Murata, T., & Yoshinaga, K. (1992). A follow-up study of 201 children with autism in Kyushu and Yamaguchi areas, Japan. *Journal of Autism and Developmental Disorders, 22*(3), 395-411.

Liptak, G. S., Kennedy, J. A., & Dosa, N. P. (2011). Social participation in a nationally representative sample of older youth and young adults with autism. *Journal of Developmental and Behavioral Pediatrics, 32*(4), 277-283.

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- Sellers, P. D. J. (2011). *Employment: Connecting individuals with ASD to the business world*. Paper presented at the Autism Society's 42nd National Conference on Autism Spectrum Disorders.
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- Smith, F. A., & Lugas, J. (2010). Vocational rehabilitation employment outcomes for transition-age youth with autism and other disabilities. *DataNote Series, Data Note XXVI*. Boston, MA: Institute for Community Inclusion.
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- Smith, M. D., Belcher, R. G., Juhrs, P. D., & Nabors, K. (1994). Where people with autism work. *Journal of Vocational Rehabilitation, 4*(1), 10-17.
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Spence-Cochran, K. G. (2004). *An investigation of the proficiency level of high school students with autism and mental retardation within community-based job settings: The relationship between the use of a hand-held computer compared to staff modeling for accurate novel job skill acquisition and student learning* (PhD Dissertation). University of Central Florida: Orlando, Florida.

Williams, R. (2010). *Getting recruitment and employment right: Understanding the barriers that people on the autism spectrum can face*. Paper presented at the Undiscovered Workforce Conference of the Autism Research Institute National Autistic Society (UK).

Worksupport.com e-Newsletter (2008, July). *Information, resources and research about work and disability issues*. VCU Rehabilitation Research and Training Center on Workplace Supports and Job Retention.

Yokotani, K. (2011). Avoidant attachment style indicates job adaptation of people with high functional autistic spectrum disorder. *Education and Training in Autism and Developmental Disabilities*, 46(2), 291-296.

Reason for Exclusion: Outcomes were not gainful employment (n = 38)

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Andrews, D. G. (1992). *Behavioral interventions of maladaptive behaviors of students with autism in community settings* (PhD dissertation). Georgia State University: Atlanta, Georgia.

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Bucholz, J. L., Brady, M. P., Duffy, M. L., Scott, J., & Kontosh, L. G. (2008). Using literacy-based behavioral interventions and social stories to improve work behavior in employees with developmental disabilities. *Education and Training in Developmental Disabilities*, 43(4), 486-501.

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Reason for Exclusion: Participants did not have ASD (n = 3)

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Reason for Exclusion: Did not have quantitative data (n = 4)

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