NEURODEVELOPMENTAL DISORDERS AND EMPLOYMENT: SCOPING REVIEW

EMPLOYMENT OF INDIVIDUALS WITH NEURODEVELOPMENTAL DISORDERS: A SCOPING REVIEW OF CONTEXTUAL FACTORS

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TITLE: Employment of Individuals with Neurodevelopmental Disorders: A Scoping Review of Contextual Factors

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ABSTRACT

Background: Individuals with neurodevelopmental disorders are unemployed or underemployed at staggering rates. Employment for this population is impacted by many factors, including contextual issues. This review was conducted to enhance understanding of contextual factors influencing employment procurement for individuals with neurodevelopmental disorders.

Methodology: The Arksey and O'Malley scoping review framework was utilized to examine five databases and sources of grey literature regarding the contextual factors influencing employment procurement for individuals with neurodevelopmental disorders. Articles were analyzed using the International Classification of Functioning, Disability and Health criteria for Contextual Factors, including both Environmental and Personal Factors.

Results: The findings from 41 articles indicate that Contextual Factors, Environmental Factors and Personal Factors influence employment procurement by creating both barriers and facilitators to obtaining employment for individuals with neurodevelopmental disorders.

Conclusion: A focus on contextual factors that impact individuals with neurodevelopmental disorders may provide further insight into the facilitators and barriers influencing employment outcomes. Further research should aim to understand the strength of relationships and to expand the use and application of the International Classification of Functioning, Disability and Health's biopsychosocial framework. This

research can aid in promoting the employment outcomes for individuals with neurodevelopmental disorders.

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Table of Contents

LIST OF FIGURES AND TABLES

FIGURES

TABLES

LIST OF ABBREVIATIONS

ACS - Adult Consumer Survey

ADHD - Attention-Deficit/Hyperactivity Disorder

APA - American Psychiatric Association

ASD - Autism Spectrum Disorder

CBET - Community Based Employment Training

CET - Cognitive Enhancement Therapy

CRPD - Convention on the Rights of Persons with Disabilities

CDC - Centers for Disease Control and Prevention

CP - Cerebral Palsy

CPDC - Canadian Public Documents Collection

DSM-5 - Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

EST – Enriched Supportive Therapy

HFASD - High Functioning Autism Spectrum Disorder

ICD-10 - International Classification of Disease, Tenth Edition

ID - Intellectual Disability

IEPs - Individualized Education Plans

ILO - International Labour Organization

IPS - Individual Placement and Support

MD - Motor Disorder

NCI - National Core Indicators

NDD - Neurodevelopmental Disorder

NLTS – 2 - National Longitudinal Transition Study - 2

OECD – Organization for Economic Cooperation and Development

PDD-NOS - Pervasive Development Disorder Not Otherwise Specified

PS - Project SEARCH

RSA-911 - Rehabilitation Services Administration – 911

SE – Supported Employment

SEM – Structured Equation Modelling

SIS - Support Intensity Scale

SLD - Specific Learning Disorder

SLI – Speech Language Impairment

SUCCESS - Supported Employment, Comprehensive Cognitive Enhancement, and Social Skills

SSI – Supplemental Security Income

VR - Vocational Rehabilitation

VRCG - Rehabilitation Counselling and Guidance

WHO - World Health Organization

DECLARATION OF ACADEMIC ACHIEVEMENT

The following is a declaration that the research content in this document has been completed by Emily FitzGerald and recognizes the contributions of Dr. Peter Rosenbaum, Dr. Briano DiRezze and Laura Banfield in both the research process and thesis completion.

1 INTRODUCTION

Neurodevelopmental disorders (NDD) impact individuals worldwide and influence all parts of life, including employment (Kirby, 2016; Scott et al., 2019; Xei et al., 2018). Social, behavioural and academic challenges associated with NDD influence an individual's ability to obtain and maintain employment, a recognized marker in the transition to adulthood (Gonzalez, Rosenthal & Kim, 2011; McLaren, Lichtenstein, Lynch, Becker & Drake 2017; Scott et al., 2019; Wehman et al., 2014). Furthermore, obtaining employment integrated within the community is especially difficult for individuals with NDD (Nye-Lengerman, 2017; Wehman et al., 2016). Employment is associated with a higher quality of life (Bush & Tassé, 2017; Chen et al., 2015) highlighting the importance of equality and equity within the employment sector for all populations.

Employment procurement presents specific challenges for individuals with NDD, including the job search, job interviews, networking and interacting with potential employers and colleagues (Smith et al., 2014; Walker, Vasquez & Wienke, 2016; Wehman et al., 2012; Xei et al., 2018). These specific challenges and issues facing individuals with NDD are exemplified in the population's high unemployment rates (Statistics Canada, 2012; Wehman et al., 2012; Xei et al., 2018). Unemployment of individuals with NDD can negatively influence the lives of individuals, families and society as a whole (Järbrink et al., 2007; Knüppel, Telléus, Jakobsen & Lauritsen, 2019).

Although NDD are lifelong conditions, research has historically focused on children with NDD and the adult population remains underrepresented within the literature. However, researchers have begun to focus more attention onto the adult population, potentially due to the increasing prevalence of NDD, such as Autism Spectrum Disorder (Leonard et al., 2010). Higher

prevalence of diagnosis will lead to an increased population of individuals entering into adulthood (Shattuck et al., 2012) and encountering the challenge of employment, therefore heightening the current interest in the topic.

Moreover, research has also begun to identify and incorporate the impact of contextual factors regarding health and health states: health is no longer based solely on impairments in physiology. Currently an underrepresented area of research, Contextual Factors are beginning to gain traction for their influence on the health of individuals. Contextual Factors, such as Environmental and Personal Factors, are reported to have impact on the health and functioning of individuals, such as those with NDD (Dell'Armo & Tasse, 2019; Dreaver et al., 2019; Kirby, 2016; Palisano et al., 2017).

1.1 Study Purpose

The purpose of this study is to enhance understanding of Contextual Factors influencing employment procurement for individuals with NDD. Findings from this review are expected to highlight current research gaps, as well as barriers and facilitators, experienced by this population in regard to employment procurement.

1.2 Study Objectives

The objective of the proposed study is to identify Contextual Factors, both Personal and Environmental, that influence integrated employment procurement for individuals with NDD. The objectives are: (1) to identify the Environmental and Personal Factors influencing integrated employment procurement for individuals with NDD; (2) to determine what Contextual Factors are acting as facilitators or barriers to employment procurement; (3) to map and describe the

state of the literature regarding Contextual Factors and employment for individuals with NDD; and (4) to develop a comprehensive review of the Contextual Factors influencing employment for individuals with NDD.

1.3 Research Question

The overarching question addressed by this scoping review is as follows: *As reported in the literature, what Environmental and Personal Contextual Factors may be influencing integrated employment procurement for individuals with neurodevelopmental disorders?* The sub-question asks: *What Contextual Factors are found to be facilitators or barriers to employment procurement?*

2 BACKGROUND

This section introduces the topics that are central to the research question and objectives. NDD are first discussed in relation to research interest and prevalence. Employment and NDD are then discussed regarding information currently known. Following this, employment options for individuals with NDD are discussed. Lastly, the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) framework is introduced.

2.1 Neurodevelopmental Disorders

NDD are characterized as developmental challenges impacting personal, social, academic and/or occupational functioning of an individual (American Psychiatric Association [APA], 2013). Disabilities vary in severity and impact on functioning throughout individuals' lives and typically emerge in the early developmental period. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) categorizes NDD into seven groupings: Intellectual

Disabilities (ID), Communication Disorders (CD), Autism Spectrum Disorder (ASD), Attention-Deficit/Hyperactivity Disorder (ADHD), Specific Learning Disorder (SLD), Motor Disorders (MD), and Other Neurodevelopmental Disorders (APA, 2013). Specific disorders are further categorized within these headings (Appendix A) and further categorized within the DMS-5 subsections. Although specific NDD have individual characterizations, the DSM-5 grouping of these disorders depicts their inherent similarities and comparability for research purposes.

The United States Centers for Disease Control and Prevention (CDC) found that 15% of individuals aged 3-17 years in the United States were living with developmental disability in 2006 to 2008 (Baio, 2012). Moreover, the prevalence of ASD, a DSM-5 categorized NDD, is estimated to be 1 in 66 children in Canada (Ofner & Agence de santé publique du Canada, 2018). The prevalence rate in the United States is estimated to be 1 in 59 children (Baio, 2018). There has been an increase in the diagnostic rate of individuals with ASD and other NDD in past decades (Burgess & Cimera 2014; Hansen, Schendel, & Parner, 2015; Leonard et al., 2010). Moreover, ADHD has increased in prevalence throughout Canadian provinces (Vasiliadis et al., 2017). Whether this increased prevalence is due to changes in diagnostic criteria, diagnostic practices, or funding and research is debated (Leonard et al., 2010; Hansen et al., 2015). One theory describes the increased prevalence rate as a result of greater understanding of NDD, such as ASD (Leonard et al., 2010). Past and current research has focused on understanding the mechanisms and behaviours of NDD, leading to increased understanding and awareness for diagnosis.

Given these factors, researchers have placed priority on interventions and research into early childhood stages of development, due to the typical childhood onset of NDD. This focus has remained the central target for years, and the adult population has been researched to a lesser

extent. However, research on the adult population has increased in the past decade, although this population remains under-represented within the literature.

The United Nations Convention on the Rights of Persons with Disabilities (CRPD) describes disability as a human rights issue (World Health Organization [WHO] & World Bank, 2011). As NDD affect individuals worldwide, disability is inherently a global human rights issue. General principles promoting the human rights of individuals with disabilities within the CRPD include non-discrimination, full and effective participation and inclusion in society, equality of opportunity and accessibility (WHO & World Bank, 2011). These principles depict challenges facing individuals with disabilities, including NDD, and these challenges reflect on individuals' ability to have a fulfilling life, and impact all stages in life, including adulthood.

2.2 Neurodevelopmental Disorders and Employment

The transition period from adolescence to adulthood is rife with challenges for individuals with NDD (Anderson et al., 2018; Foley, Dyke, Girdler, Bourke & Leonard, 2012; Kirby, 2016). Key areas of challenge include higher education, health care, community integration, independent living and employment (Anderson et al., 2018; Chen, Sung & Sukyeong, 2015; Gonzalez, Rosenthal & Kim, 2011; Xei et al., 2018).

Distinguishing factors associated with NDD, such as social, behavioural and academic challenges, can manifest and hinder the transition into the employment sector (Gonzalez et al., 2011; McLaren et al., 2017; Scott et al., 2019; Wehman et al., 2014). Issues arise in job interviews (Smith et al., 2014; Walker, Vasquez & Wienke, 2016), integration in the workplace, and interacting and communicating with co-workers (Scott et al., 2019; Xei et al., 2018). In

comparison to the general population in Canada, with an employment rate of 73.6%, the employment rate for individuals with NDD is 22.3% (Statistics Canada, 2012).

Adults with NDD have increased challenges in accessing, securing and maintaining employment throughout life (Foley et al., 2012; Gauthier-Boudreault, Beaudoin, Gallagher & Couture, 2019; Gonzalez et al., 2011; Scott et al., 2019; Wehman et al., 2012) and this has led to unemployment and underemployment for the population (Wehman et al., 2012, Xei et al., 2018). Steps within the employment process result in varying challenges for this population. Employment procurement is viewed as a significant challenge facing individuals with NDD, including tasks such as job search, networking and interviews (Smith et al., 2014; Walker, Vasquez & Wienke, 2016; Wehman et al., 2012; Xei et al., 2018).

Employment is associated with increased financial security, physical and mental health, and higher quality of life (Bush & Tassé, 2017; Chen et al., 2015). Individuals with NDD are at greater risk of low quality of life and poor health associated with unemployment rates. As employment is linked to the health of individuals, unemployment and underemployment present as a health issue for individuals with NDD. Moreover, as NDD affect individuals worldwide, unemployment and underemployment manifests into a global health issue for individuals with NDD.

Research on the adult individuals with NDD has increased in recent years (Scott et al., 2019) and has highlighted the benefit of certain employment services for obtaining and maintaining employment, such as vocational training and intervention (Alverson & Yamamoto, 2018; Baker-Ericzen et al., 2018; Chiang, Cheung, Li & Tsai, 2013; Cimera, Burgess & Wiley, 2013; Cimera, Burgess & Bedesem 2014; Kaehne, 2016; Kaya, Hanley-Maxwell, Chan & Tansey, 2018; Sung, Sanchez, Kuo, Wang & Leahy, 2015; Wehman et all., 2014; Wehman et al.,

2017; Wehman et al., 2019). Additionally, studies have identified barriers for individuals with NDD toward employment, such as employer attitudes and receiving social security benefits (Gillan & Coughlan, 2010; Gonzalez et al., 2011; Nagib & Wilton, 2019). However, there is a lack of a comprehensive review analyzing the research thus far toward employment procurement for adults with NDD.

Available research depicts both unemployment and underemployment for individuals with NDD (Wehman et al., 2012, Xei et al., 2018). This study focuses on the issue of unemployment through the topic of employment procurement. Although underemployment is of concern for individuals with NDD, obtaining employment is an important first step toward employment.

2.3 Employment Types

There are three main types of employment experienced by individuals with NDD: sheltered employment, supported employment and competitive employment.

Sheltered employment is employment created for individuals with disabilities who are considered unable or unprepared to enter into the workforce (Hsu, Ososkie, & Huang, 2009). Sheltered employment or workshops provide training and work experience in a segregated environment (Hsu, Ososkie, & Huang, 2009) and are typically unpaid or subsidized work (Christensen & Richardson, 2017; Migliore, Grossi, Mank & Rogan, 2008). The Committee on the Rights of Persons with Disability has yet to declare sheltered employment as an act of discrimination (May-Simera, 2018), however, it is considered an outdated expression of the belief that individuals with NDD are unable to work in the community, and there has been a movement toward either closing or converting workshops currently in use (Christensen & Richardson, 2017). There is currently limited data available pertaining to the number of sheltered

workshops still in use. Policies and regulatory bodies are now promoting supported and competitive employment for persons with NDD (Christensen & Richardson, 2017; Dague, 2012).

Supported employment is paid employment at or above minimum wage that incorporates training and support for employment opportunities in society (Hsu, Ososkie, & Huang, 2009). Supported employment is characterized by a four-phase process: (1) jobseeker profile and assessment, (2) job development and career search, (3) job-site training and support, and (4) long-term supports to aid in job retention (Wehman et al., 2012). These supports incorporate individuals such as job coaches, career advisors and employment specialists who support the four-phase employment process (Wehman et al., 2012). Supported employment occurs in an integrated community position and aims to aid individuals in obtaining and maintaining employment (Cimera, 2012; Wehman et al., 2012)

Competitive employment is employment integrated in the community and paid at or above the minimum wage (Cimera, 2012; Sun et al., 2015). This type of employment differs from supported employment as it is without direct supports, either in obtaining or maintaining employment. Supported and competitive employment are classified together as integrated employment.

Integrated employment is associated with better employment outcomes in comparison to sheltered employment (Cimera, 2011; Migliore et al., 2008; National Disability Rights Network [NDRN], 2012; Rogan & Rinne, 2011). Research highlights the increased benefit of integrated employment; however, it is estimated that three times the number of individuals with ASD are in segregated employment in comparison to supported employment (Wehman et al., 2007). Moreover, the National Autism Indicators Report in the United States found only 14% of individuals with ASD had a community-based paid position, and the majority of individuals

participated in unpaid facility-based sheltered employment (Roux, Rast, Anderson & Shattuck, 2017).

This review examines Contextual Factors influencing integrated employment procurement. Sheltered employment is not included, as research has described the significant increased benefits associated with integrated employment (Hedley et al., 2018). This scoping review aims to provide further information regarding integrated employment procurement for individuals with NDD.

2.4 International Classification of Functioning, Disability and Health as a Lens to Explore Employment Issues

Research has utilized varying definitions and measurements to describe factors impacting employment for individuals with NDD (Üstün, Chatterji, Bickenbach, Kostanjsek & Schneider, 2003), leading to a lack of coherence and generalizability within current research. The International Classification of Functioning, Disability and Health (ICF), created by the WHO, is a framework to classify and describe health and health-related states (World Health Organization [WHO], 2001). The ICF is complementary to the International Classification of Disease, Tenth Edition (ICD-10), which focuses on etiology. The ICF is a classification framework of functioning and disability and is divided into two parts: (1) Functioning and Disability, and (2) Contextual Factors (WHO, 2001).

Research is beginning to utilize this framework as a tool to examine health and health-related states through a biopsychosocial lens, incorporating Functioning and Disability and Contextual Factors (Anaby et al., 2013; Mahdi et al., 2018). Research has utilized this framework to further the understanding of Contextual Factors, specifically Environmental, and

their influence on functioning and health (Anaby et al., 2013; Mahdi et al., 2018). This study will utilize the ICF framework to examine how Contextual Factors, both Environmental and Personal impact employment procurement for individuals with NDD.

2.4.1 Functioning and Disability

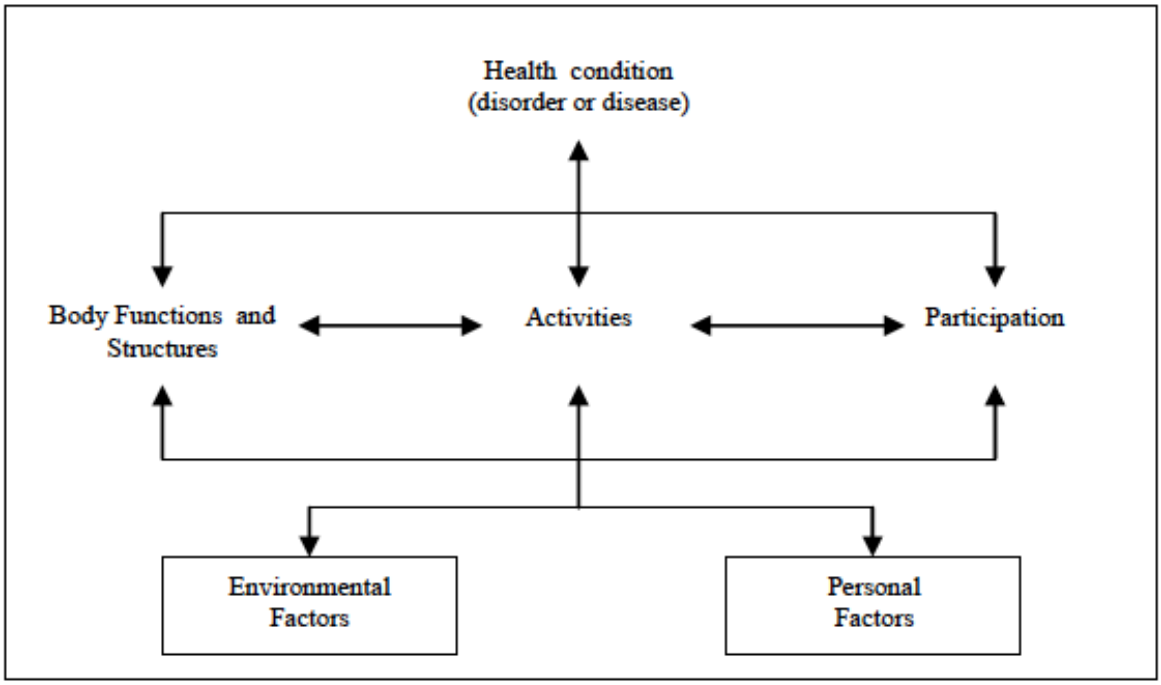
Part 1, Functioning and Disability, is divided into two components: (1) Body Functions and Structures, and (2) Activities and Participation. Within each component are one or more domains. Body Functions and Structures are comprised of two domains: body systems, and body structures, while Activities and Participation involve one domain: life areas (tasks, actions). *Body functions* are the physiological functions of the body systems, and *body structures* are the anatomical components of the body (WHO, 2001). *Activity* refers to the implementation of a task or action, and *participation* refers to involvement in a life component (WHO, 2001).

Each component can be expressed in positive or negative terms. Body Functions and Structures are designated by presence or lack of impairment and its features (WHO, 2001). Activity and Participation of individuals are classified through performance and capacity qualifiers (WHO, 2001). Performance describes what an individual does in their current environment (WHO, 2001). Capacity describes an individual's best ability to perform an action (WHO, 2001).

The ICF, Part 1 Functioning and Disability, acts as an overarching classification of bodily functions, activities, participation and impairments, and limitations or restrictions for all individuals, not only those with disability (WHO, 2001). Much of past research has focused on bodily function, and activity and participation (Simeonsson et al., 2003). The incorporation of Contextual Factors in understanding a person's functioning aids to develop a new and further

understanding of contributing factors to overall individual functioning. Figure 1 details the interactions among the ICF components.

Figure 1: Interactions among the factors of the ICF



2.4.2 Contextual Factors

Part 2 of the ICF, Contextual Factors, are divided into two components: (1) Environmental Factors and (2) Personal Factors (Figure 1). Within each component is a domain. The domain for Environmental Factors is external influences on functioning and disability (WHO, 2001). The domain for Personal Factors is internal influences on functioning and disability (WHO, 2001).

Environmental Factors

Environmental Factors, as noted, are the external influences on functioning and disability. These influences involve both individual and societal levels and include the immediate environment of the individual and the social structures, services and systems, respectively (WHO, 2001). Environmental Factors are composed of the physical, social and attitudinal components of an individual's life (WHO, 2001).

Environmental Factors are described as facilitators or barriers impacting a certain activity for an individual. Considerations for facilitating factors involve the accessibility of a resource, and whether this access is dependable and of high quality (WHO, 2001). Considerations for barriers include whether there is a hindrance due to the presence or absence of the factor, whether this is avoidable, and how strong it may be (WHO, 2001).

Environmental Factors are divided into five chapters for classification: (1) Products and technology, (2) Natural environment and human-made changes to environment, (3) Support and relationships, (4) Attitudes, and (5) Services, systems and policies. These Chapters are further subdivided into differing descriptive subsections (Appendix B). 'Products and technology' refer to natural or human-made products or technology in the immediate environment (WHO, 2001). 'Natural environment and human-made changes to environment' refer to animate and inanimate components of the natural or physical environment, components modified by people, and characteristics of individuals within the environment (WHO, 2001). 'Support and relationships' refer to the physical and emotional support provided to another by a person or animal (WHO, 2001). 'Attitudes' refer to the attitudes of individuals external to the person with NDD (WHO, 2001). Lastly, 'Services, systems and policies' are factors that provide benefits, programmes and

operations, systems that organize, control and monitor services, and policies that govern and regulate systems (WHO, 2001).

The ICF framework utilizes an alphanumeric system to denote Body Functions, Body Structures, Activities and Participation, and Environmental Factors. This review is focusing on the Contextual Factors influencing employment of individuals with NDD. As the review is focused on the broad understanding of the current research regarding employment and NDD, it will not be describing the Environmental Factors by their detailed ICF alphanumeric system, but rather by the five chapters noted above and their subsections. These categories will be noted as either facilitators or barriers to employment procurement. Past research utilizing the ICF as a framework for examination have used similar categorizations to describe the impacts of Environmental Factors on health and health-related states (Anaby et al., 2013; Dougall et al., 2018).

Personal Factors

Personal Factors are the components of an individual's life that are not an obvious part of the health condition or state (WHO, 2001). They are considered factors that influence how disability is experienced but are not health-related issues (WHO, 2001).

Personal Factors have no developed qualifying criteria within the ICF; however, within this review they will be qualified by either their presence or absence, and whether they are known to be facilitators or barriers toward employment procurement.

Personal Factors have yet to be coded within the ICF due to the expansive range of factors to be considered within cultural and societal factors influencing this component. However, this scoping review will be coding Personal Factors, utilizing key terms found within

the ICF describing them. There are ten Personal Factors coded within this review: (1) Age, (2) Coping styles, (3) Profession, (4) Gender, (5) Education, (6) Character, (7) Social background, (8) Past and current experiences, (9) Overall behaviour pattern, and (10) Other factors that influence how disability is experienced by the individual (i.e. Ethnicity/Race). As Personal Factors are included within the ICF, these factors are significant to health and related states (WHO, 2001). Including these factors ensures the fuller consideration of Contextual Factors in relation to employment procurement. Researchers utilizing Contextual Factors to examine health and health-related states have focused on the influence of Environmental Factors (Anaby et al., 2013, Mahdi et al., 2018) and excluded Personal Factors. This research is unique in the examination of Contextual Factors influencing employment as both Environmental and Personal Factors are included in the examination.

This review is not coding for Functioning and Disability, although Contextual Factors are closely related to this section in the ICF. Given the scope of project, the specific focus of Contextual Factors was chosen due to the more recent interest and importance of these factors and their influence on functioning and disability.

The aim of this study and the use of the ICF was to describe outcomes of current research regarding employment procurement of individuals with NDD within the setting of Contextual Factors established in the ICF. In order to develop a coherent and applicable base of knowledge for further research this scoping review will offer a comprehensive review of current research on employment procurement for individuals with NDD, utilizing the universal framework for health, the ICF. The use of the ICF will create a uniform and systematic coding scheme for future application in research

3 METHODOLOGICAL FRAMEWORK

3.1 Scoping Review Framework

A scoping review framework was utilized as the methodological approach in this study. The scoping review framework created by Arksey and O'Malley (2005) was chosen for application. This framework adheres to methodological integrity and is aligned with the broad research question and objectives. Scoping reviews are best utilized to define conceptual boundaries, identify gaps in research, and report and clarify key concepts related to the topic area (Peters et al., 2017). These functions align with the key study objectives. The major methodological components of a scoping review include: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data, (5) collating, summarising and reporting the results, and (6) consultation exercise (Arksey & O'Malley, 2005). The consultation exercise, typically viewed as optional, is not included in this review. The following sections describe the use and application of these components within this review.

3.2 Stage 1: Identifying the Research Question:

As noted, the objective of the study was to enhance an understanding of Contextual Factors influencing employment procurement for individuals with NDD. To facilitate this objective, the research question remained broad to enable the incorporation of a wide range of articles and topics. The research question guiding this scoping review was: *'As reported in the literature, what Environmental and Personal Contextual Factors may be influencing integrated employment procurement for individuals with neurodevelopmental disorders?'*.

3.3 Stage 2: Identifying Relevant Studies

3.3.1 Search Strategy

Initial review of the literature and consultation with a McMaster Health Sciences Librarian built and developed the search strategy utilized in the study. Before the scoping review commenced, relevant databases were searched for scoping reviews previously completed on the topic of employment procurement and NDD. No such studies were found.

Three main concepts were developed for the search strategy in relation to the study purpose and question: (1) Diagnosis/Neurodevelopmental Disorder, (2) Intervention (Employment-focused), and (3) Outcome (Job procurement) (Table 1). Keywords were developed in relation to each of these concepts. The diagnosis of a DSM-5 NDD was a necessary component in creating the appropriate population of interest. Major section headings of the DSM-5 were used for the creation of keywords (Appendix A). Intervention, or lack thereof, was a component of the main research question, as the initial search of literature described and highlighted interventions impacting employment procurement. Lastly, outcome was a main concept incorporated, as this review aimed to understand Contextual Factors influencing employment procurement, and therefore required an understanding of employment outcomes.

Table 1 presents the keywords developed in association with the three main concepts and Appendix C reports keywords per database. Language was adapted for specific databases in regard to terminology and syntax.

Table 1: Key concepts and keywords creating search strategy

KEY CONCEPTS	KEYWORDS
Diagnosis/Neurodevelopmental Disorder	• developmental disability or neurodevelopment disability

	• intellectual disability or global developmental delay • communication disorder or language disorder or speech sound disorder or childhood-onset fluency disorder or stutter • autism • attention-deficit hyperactivity disorder or ADHD or learning disorder • motor disorder or developmental coordination disorder or stereotypic movement disorder • tic disorder or Tourette's • ((adult or middle aged or young adult) not (child not (child and adult)))
Intervention (Employment-focused)	• support or service or vocation or intervention or accommodation or environment
Outcome (Job procurement)	• employment or job or employee or employer or job interview or unemployment or work experience or job experience • competitive employ or support employ or shelter employ

3.3.2 Electronic Database Search

Five electronic databases were utilized in this review. The databases included were Embase, PsycINFO, Ovid MEDLINE, Sociological Abstracts, and ERIC. Databases were chosen from a variety of disciplines to provide multiple perspectives on the topic of Contextual Factors influencing employment for individuals with NDD. The use of clinical, sociological and educational databases enabled a larger scope of potential articles and applicable information, within the context of Contextual Factors in the ICF.

3.3.3 Grey Literature Search

Grey literature was considered and approached methodically. Specific databases were chosen for examination, including the Organization for Economic Cooperation and Development (OECD), Canadian Public Documents Collection (CPDC), International Labour Organization (ILO) and Web of Science for conference proceedings.

Due to the expansive nature of grey literature, the choice to focus on specific databases enabled a more focused approach to searching the literature. Choices were made in consultation with a McMaster University librarian, and incorporated organizations, conferences and databases focused on employment and/or NDD.

Although grey literature provides further information regarding employment procurement for individuals with NDD, the grey literature reviewed did not align with the inclusion criteria developed for this study. More specifically, the grey literature was largely anecdotal and did not focus on interventions potentially leading to increased employment opportunity, which was a main component of the study search strategy.

Moreover, due to the objectives of the study to map, describe and create a comprehensive review of the literature on Contextual Factors and employment, and the use of the specific inclusion criteria developed, grey literature was not found to be included in the final number of articles for review.

3.3.4 Reference Lists

Reference lists of all 41 articles retrieved and selected were reviewed for potential articles for inclusion. Review articles were not included within the review; however, their reference lists

were scanned for potential articles meeting inclusion criteria. No articles from reference lists were included within the final inclusion of articles.

3.4 Stage 3: Study Selection

The study selection process is depicted in Figure 2. The initial search terms resulted in detection of 2482 articles. Once duplicate articles were removed, 1554 remained for title and abstract review. At this stage, inclusion and exclusion criteria were developed. Once titles and abstracts were reviewed using the inclusion and exclusion criteria, 1262 were excluded and 292 articles remained. These 292 articles were included in the full-text review. Again, inclusion and exclusion criteria were utilized for the full-text review. Consultation with advisors was done when articles posed additional questions of inclusion. Specific questions on the article content and inclusion criteria were discussed and applied to determine inclusion of articles in question.

A second reviewer examined the 1554 articles by title and abstract review. Any differences in inclusion of articles were reviewed by the advisory committee. Two articles were found to present conflicting results in the final inclusion of articles. The primary researcher excluded one article included by the second reviewer and included one article excluded by the second reviewer. The advisor committee reviewed the two articles in question and made the final inclusion decision. Following full-text review, 41 articles were chosen for analysis.

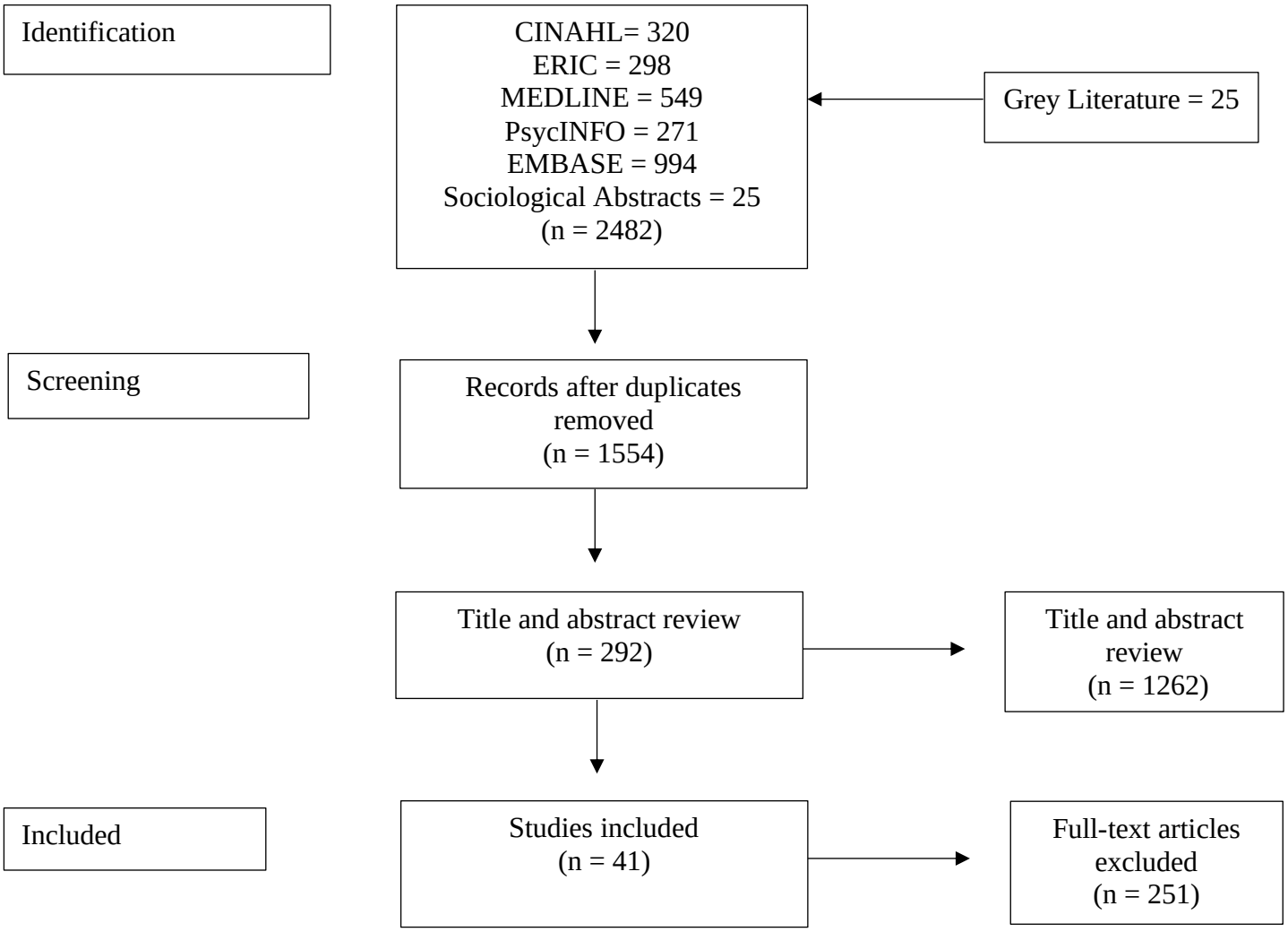


Figure 2: Study selection process

3.4.1 Inclusion/Exclusion Criteria

Type of Participant

Inclusion criteria involved individuals between the ages of 18 and 65 years of age with NDD. Ages 18 to 65 are typical markers of working-age adults. Participants under 18 were included if the study was measuring the transition period to adulthood and included data on individuals both above and below 18 years of age.

Participants were also required to have a DSM-5 categorized NDD. The DSM-5 was updated by the American Psychiatric Association (APA) in 2013 (APA, 2013). The revised classification of NDD contains seven categories: Intellectual Disabilities, Communication Disorders, Autism Spectrum Disorder, Attention-deficit/Hyperactivity Disorder, Specific Learning Disorder, Motor Disorders and Other Neurodevelopmental Disorders (APA, 2013). All participants included were required to have one or more NDD categorized by the DSM-5. Participants without a DSM-5-categorized disorder were excluded from the review. Studies were also excluded if they included participants without a DSM-5 NDD alongside participants with a DSM-5 NDD.

Concept

This review aimed to determine Contextual Factors influencing employment procurement for individuals with NDD. After reviewing current literature and its relation to the research question and objectives, three core concepts were created: (1) Diagnosis/Neurodevelopmental Disorder, (2) Intervention (Employment-focused), and (3) Outcome (Job Procurement).

Additionally, as noted in Section 2.4, the ICF is divided into two parts: (1) Functioning and Disability, and (2) Contextual Factors, with components in each. The components of every section have chapters which create the measurable elements of the ICF. In association with the key concepts noted in Table 1, inclusion criteria involved having one or more elements of the Environmental or Personal Factors, as depicted within the ICF, influencing research outcomes. These Contextual Factors were required to have been a factor evaluated within the study design or a determined factor influencing outcome once evaluation took place. Articles without Environmental or Personal Factors discussed were excluded from review.

Context

The context of this review is directly linked to the Contextual Factors described within the ICF. The review aimed to examine what is influencing employment procurement for individuals with NDD within the context of the specific Contextual Factors categorized within the ICF.

Contextual Factors were studied in relation to employment procurement and excluded articles about context based on employment environment once a job was obtained. Studies discussing employees were only included if they were discussing the transition from sheltered workshop to competitive employment. Moreover, sheltered employment was only included in this context. Studies discussing sheltered employment in any other context were excluded.

Studies were included from 2006 to 2019. The year 2006 was chosen as the initial year for inclusion because the ICF was ratified and published in 2001 (WHO, 2001). Passage of time was required to establish a base of understanding and to publish research in relation to the ICF framework, so 2006 was chosen as the first year of inclusion, five years after the ICF was published.

The study excluded review articles, including systematic reviews, scoping reviews and meta-analyses. The current study only incorporated individual research articles. All studies were required to be peer-reviewed, excluding grey literature.

Table 2: Inclusion and Exclusion Criteria

	Inclusion Criteria:	**Exclusion Criteria:**
Population	• >18 years of age <65 years of age	• <18 years of age >65 years of age

	• <18 if included with population of those >18 • Neurodevelopmental disorder categorized in DSM-5	• Neurodevelopmental disorder not categorized in DSM-5 • Studies including individuals outside of DSM-5 categories
Concept	• Environmental and Personal factors influencing employment procurement • Integrated employment • Sheltered workshop to integrated employment	• Employment procurement not focus of study • Articles studying job site performance/maintenance • Sheltered workshop
Context	• Environmental and Personal Factors influencing employment procurement • Outcomes influencing job procurement • Publication years 2006-2019 • Peer Reviewed Articles • Grey Literature	• No mention of Personal OR Environmental factors influencing employment • On the job supports • Review Articles

3.5 Step 4: Charting the Data

The primary researcher reviewed all studies throughout review process. The 41 articles included were charted for the synthesis and interpretation of all relevant data obtained from the articles. The specific information extracted was categorized and charted within an Excel spreadsheet (Appendix D). Two separate charts were created for articles of primary data analyses and secondary data analysis. The information extracted included the citation, country of origin, primary objective, sample characteristics, study design, intervention (if applicable), outcome

evaluation (in relation to research question), results (in relation to research question), ICF Environment Factors (Facilitator/Barrier) and ICF Personal Factors (Facilitator/Barrier).

3.6 Step 5: Collating, Summarizing and Reporting Results

In alignment with Arksey and O'Malley's (2005) approach, a basic numerical analysis was completed alongside a thematic analysis utilizing the chapter designations from the ICF.

The numerical analysis included the nature and distribution of the literature. A tally was performed in an Excel sheet for all numerical questions posed. The themes for thematic analysis were obtained from the ICF chapters and applied to articles appropriately. Themes were collected from the Contextual Factors section in the ICF and designated into Environmental and or Personal Factors and their descriptive subheadings. Facilitating factors and barriers influencing employment procurement were also reported.

4 RESULTS

General findings of the review are reported, including research type, NDD studied, publication year and location of study. Following these broad results, the ICF Contextual Factors are divided into the subsections – Environmental Factors and Personal Factors – to detail findings from the review in relation to the research question: '*As reported in the literature, what Environmental and Personal Contextual Factors may be influencing integrated employment procurement of individuals with neurodevelopmental disorders?'* and the sub-question: *'What Contextual Factors are found to be facilitators or barriers to employment procurement?'.*

The results are drawn from the 41 articles identified as fulfilling the criteria outlined in Section 3.4 and Table 2.

4.1 General Findings

4.1.1 Research Type

Research types were divided into two subsections: articles with primary data analysis and articles reporting secondary data analysis, representing 22 and 19 of the articles, respectively. Primary data analysis is defined as the collection of original data for analysis (Hox & Boeije, 2015). Secondary data analysis is defined as the use of datasets not originally collected for the purpose of carrying out the specific research question being addressed in the current report (Trinh, 2018).

Among the included articles for review, 22 (54%) were primary data and incorporated both observational and interventional studies. Eighteen (82%) of the primary data analyses were observational studies, in which there is no manipulation of variables by the researcher. Four (18%) of the primary data analyses were interventional studies and involved the manipulation of a variable by the researcher.

Of the included articles for review 19 (46%) were secondary data articles. All articles with secondary data analyses were based upon two large datasets developed in the United States and one dataset based in Canada. Specific datasets were not part of the inclusion criteria. Rehabilitation Services Administration - 911 (RSA-911), the National Longitudinal Transition Study - 2 (NLTS-2) and the 2012 Canadian Survey on Disability were the datasets on which the secondary data analyses were based.

The RSA-911 is a collection mechanism and dataset consisting of 150 variables describing demographic characteristics, services received and employment outcomes for adults that receive state vocational training within the United States (Sung et al., 2015). Twelve articles (63%) included in this review based their research on this dataset. The NLTS-2 is a longitudinal

study of transition-aged youth who participated in high school special education in the United States (Dell'Armo & Tassé, 2019). Six (32%) articles included in the review based their research on this dataset. One (5%) article used the 2012 Canadian Survey on Disability as their database for review. The 2012 Canadian Survey on Disability is a national cross-sectional population-based survey for individuals with disabilities in Canada regarding everyday activities and challenges related to their long-term condition or health problem (Zwicker, Zaresani & Emery, 2017).

4.1.2 Demographic Data

As Figure 3 depicts, ASD was the NDD studied most frequently in the literature regarding employment procurement for individuals with a DSM-5-categorized NDD. Twenty-seven of the studies (66%) focused on ASD, which includes the disorders Autism, Asperger's, and PDD-NOS. ID was the second most studied type of NDD, and 14 articles (34%) studied this population. Individuals with Specific Learning Disorder, Communication Disorders and Motor Disorders were participants in 3 (7%), 1 (2%) and 1 (2%) articles, respectively. Some articles studied multiple disorders accounting for the unequal percentage findings.

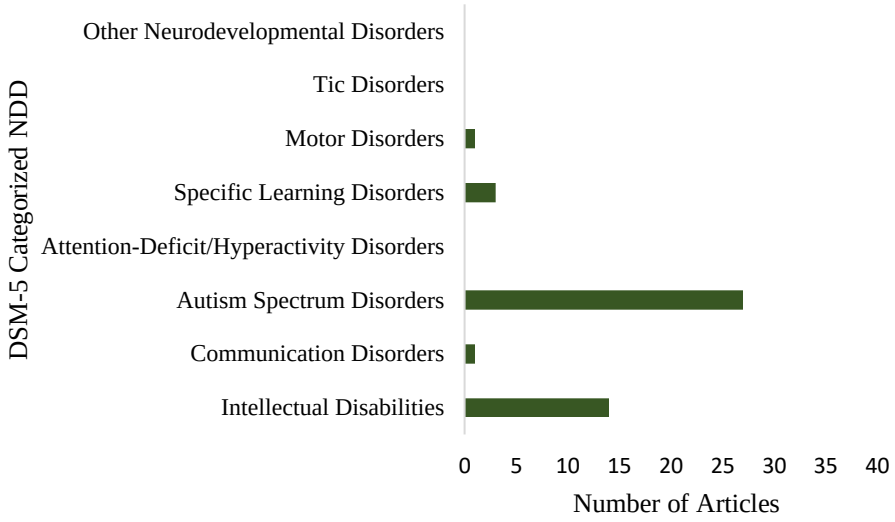


Figure 3: Distribution of DSM-5 NDD studied within literature

Articles meeting the inclusion criteria were found from 2008 to 2019 (Figure 4). As depicted in Figure 4, 6 (15%) articles were published in 2018, followed by 5 (12%) in 2012, 2016 and 2017 each, 4 (10%) in both 2019 and 2014, 3 (7%) in 2015, 2013 and 2010 each, 1 (2%) in both 2008 and 2009, and no (0%) published in both 2006 and 2007.

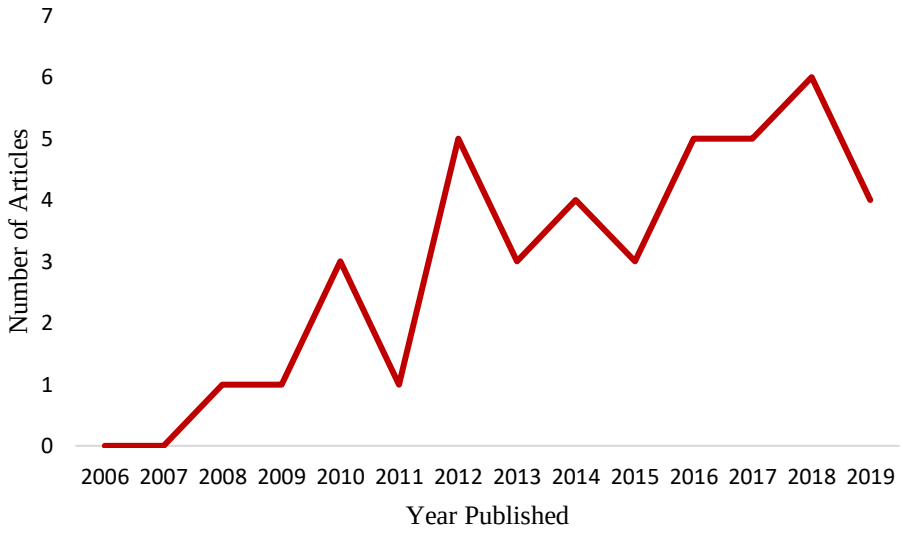


Figure 4: Number of articles published per year

Thirty-one studies (76%) were done in the United States, followed by 2 (5%) in Canada, 2 (5%) in England, 1 (2%) in Taiwan, 1 (2%) in Japan, 1 (2%) in the United Kingdom, 1 (2%) in Ireland, 1 (2%) based in both Australia and Sweden, and lastly 1 (2%) considered worldwide.

4.2 ICF Contextual Thematic Findings: Environmental Factors

4.2.1 Overall Findings

Environmental Factors were found to influence employment procurement in 93% of articles. Moreover, 84 Environmental Factors were found affecting employment in the literature. Of these, 67% were facilitating factors influencing employment and 33% were barriers to obtaining employment. The three ICF Environmental chapters found influencing employment included ‘Support and relationships’, ‘Attitudes’ and ‘Services, systems and policies’. As Figure 5 depicts, ‘Support and relationships’ had seven facilitators and five barriers noted within the articles influencing employment for individuals with NDD. Additionally, ‘Attitudes’ were found to have six facilitators toward employment and five barriers. Lastly, ‘Services, systems and policies’ were noted as facilitating factors 44 times and as barriers 18 times.

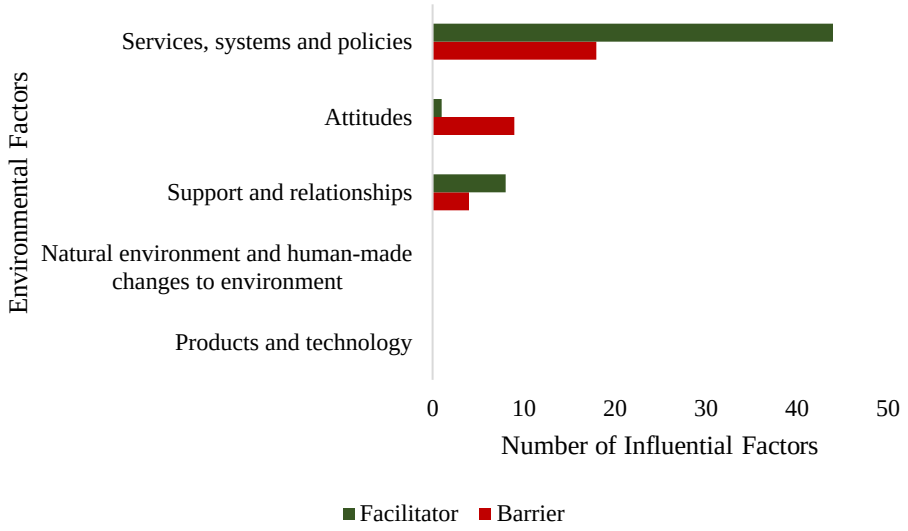


Figure 5: Number of Environmental Factors influencing employment procurement.

4.2.2 Environmental Chapter Findings: Facilitators and or Barriers (See Table 3)

Table 3: Environmental Factors influencing employment

Environmental Factors	Facilitators	Barriers
Chapter 1 Products and technology	**0**	**0**
Chapter 2 Natural environment and human-made changes to environment	**0**	**0**
Chapter 3 Support and relationships	**8**	**4**
Immediate family	5	2
Extended family	0	0
Friends	0	0
Acquaintances, peers, colleagues, neighbours, and community members	0	0
People in positions of authority	2	1
People in subordinate positions	0	0
Personal care providers and personal assistants	1	0
Strangers	0	0
Domesticated animals	0	0

Health professionals	0	0
Health-related professionals	0	1
Support and relationships, other specified	0	0
Support and relationships, unspecified	0	0
Chapter 4 Attitudes	**1**	**9**
Individual attitudes of immediate family members	1	4
Individual attitudes of extended family members	0	0
Individual attitudes of friends	0	0
Individual attitudes of acquaintances, peers, colleagues, neighbours and community members	0	0
Individual attitudes of people in positions of authority	0	5
Individual attitudes of people in subordinate positions	0	0
Individual attitudes of personal care providers and personal assistants	0	0
Individual attitudes of strangers	0	0
Individual attitudes of health professionals	0	0
Individual attitudes of health-related professionals	0	0
Societal attitudes	0	0
Social norms, practices and ideologies	0	0
Attitudes, other specified	0	0
Attitudes, unspecified	0	0
Chapter 5 Services, systems and policies	**44**	**18**
Services, systems and policies for the production of consumer goods	0	0
Architecture and construction services, systems and policies	0	0
Open space planning services, systems and policies	0	0
Housing services, systems and policies	0	0
Utilities services, systems and policies	0	0
Communication services, systems and policies	0	0
Transportation services, systems and policies	1	2
Civil protection services, systems and policies	0	0
Legal services, systems and policies	0	0

Associations and organizational services, systems and policies	0	0
Media services, systems and policies	0	0
Economic services, systems and policies	0	0
Social security services, systems and policies	0	9
General social support services, systems and policies	0	0
Health services, systems and policies	0	0
Education and training services, systems and policies	22	2
Labour and employment services, systems and policies	23	5
Political services, systems and policies	0	0
Services, systems and policies, other specified	0	0
Services, systems and policies, unspecified	0	0

Products and technology

No articles found the Environmental Factor 'Products and technology' to be creating a facilitator or barrier toward employment procurement (Table 3).

Natural environment and human-made changes to environment

No article found 'Natural environment and human-made changes to environment' to be creating a facilitator or barrier toward employment procurement (Table 3).

Support and Relationships

Of the 13 descriptive Environmental Factors classified under 'Support and relationships', four were found to influence employment procurement for individuals with NDD. The four descriptive elements included 'Immediate family', 'People in positions of authority', 'Personal care providers and personal assistants' and 'Health-related professionals'. As shown in Table 3,

'Immediate family' was found to facilitate employment procurement five times and create barriers twice. 'People in positions of authority' were noted twice to influence employment procurement as a facilitator and once a barrier. 'Personal care providers and personal assistants' were found to have one facilitating factor toward employment procurement. Lastly, 'Other health-related professionals' were found to have one barrier influencing employment procurement for individuals with NDD.

Attitudes

The Environmental Factor 'Attitudes' has 14 descriptive elements, two of which were found to influence employment procurement for individuals with NDD from the selected studies. 'Individual attitudes of immediate family members' and 'Individual attitudes of people in positions of authority' both influenced employment outcomes. As noted in Table 3, 'Individual attitudes of immediate family members' were found once as a facilitator and four times as a barrier to obtaining employment. Additionally, 'Individual attitudes of people in positions of authority' were noted five times as barriers to employment procurement.

Services, systems and policies

The Environmental Factor 'Services, Systems and Policies' has 20 descriptive elements, four of which were found to influence employment procurement for individuals with NDD. The four descriptors included 'Transportation services, systems and policies', 'Social security services, systems and policies', 'Education and training services, systems and policies' and 'Labour and employment services, systems and policies'. As Table 3 reports, 'Transportation services, systems and policies' were found to facilitate employment procurement once and create a barrier

to employment twice. ‘Social security services, systems and policies’ were noted nine times as barriers to employment procurement. ‘Education and training services, systems and policies’ were found as facilitating factors to obtaining employment 22 times and a barrier twice. Finally, ‘Labour and employment services, systems and policies’ were found as facilitating factors for obtaining employment 23 times and barriers five times.

4.3 ICF Contextual Thematic Findings: Personal Factors

4.3.1 Overall Findings

Eight Personal Factors were represented in the literature and were found to influence employment procurement in 90% of articles. A total of 90 Personal Factors were noted as influential factors within the literature impacting employment; 63% and 37% were found to be facilitating factors influencing employment and barriers influencing employment, respectively.

As Figure 6 depicts, ‘Education’ was found on 17 occasions to facilitate employment procurement. ‘Education’ was followed by ‘Overall behaviour pattern’ with eight facilitating factors, ‘Gender’ with seven facilitating factors, ‘Past and current experiences’, ‘Social background’ and ‘Age’ each with six facilitating factors, ‘Ethnicity/Race’ with four facilitating factors and ‘Character’ with three facilitating factors toward employment.

Also noted in Figure 6, ‘Social background’ was found on 11 occasions to create barriers to employment procurement. ‘Social background’ was followed by ‘Gender’ with seven barriers, ‘Past and current experiences’ with five, ‘Ethnicity/Race’ with four, ‘Age’ and ‘Overall behaviour pattern’ each with two barriers, and ‘Character’ and ‘Education’ each with one factor creating a barrier to obtaining employment.

As previously noted, the ICF has not created any criteria for classifying Personal Factors. The Personal Factors utilized as criteria in the study were developed through choice words found within the ICF describing Personal Factors. Subsections of Personal Factors were not utilized in the review, in comparison to chapters in Environmental Factors.

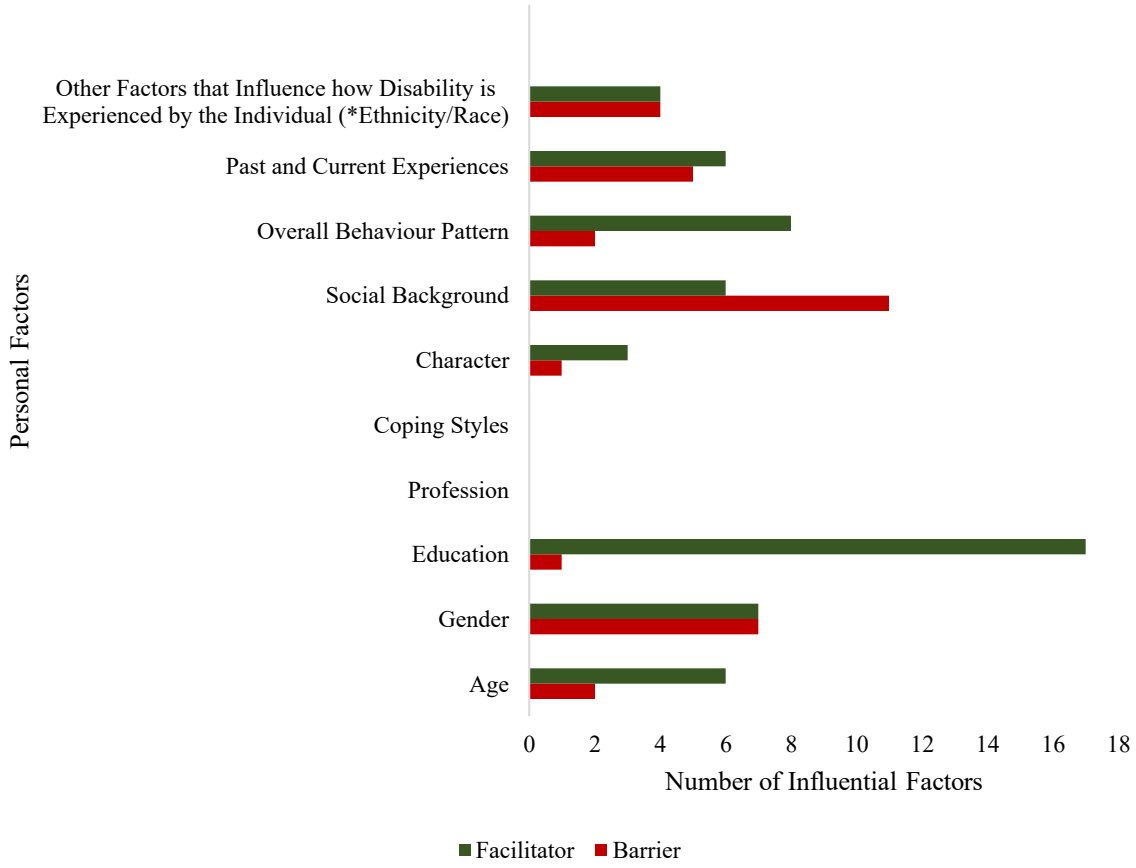


Figure 6: Number and chapter of Personal Factors influencing employment procurement.

5 DISCUSSION

The findings from the scoping review represent the current state of research on Contextual Factors influencing employment procurement for individuals with NDD. The results describe the influences as either facilitators and or barriers toward employment procurement. This discussion

analyzes and explores the results of this review, discusses gaps in the body of literature and limitations in the review, and offers recommendations for the future.

5.1 Research Type

The two major types of articles included in the review were primary data analyses and secondary data analyses. Both types of articles were found to study the two Contextual Factors, Environmental Factors and Personal Factors.

Primary data analyses had both observational and interventional-focused articles within the review. As noted in subsection 4.2.1, 82% of articles were observational and 18% were interventional. The randomized control trial (RCT) is considered the gold-standard approach to intervention in research. Only four studies included in the review were RCTs (Eack et al., 2018; Wehman et al, 2014; Wehman et al., 2017; Wehman et al., 2019), indicating a paucity of interventional studies within the current literature regarding employment procurement for individuals with NDD. Moreover, as RCTs are considered an effective research methodology in controlling for key variables and in making statements about effectiveness of intervention, this gap in research may result in a limitation in understanding issues faced by individuals with NDD regarding employment procurement.

5.2 Neurodevelopmental Disorders

Two-thirds (66%) of the articles included in the review focused their population sample on ASD. Although employment procurement for individuals with ASD is a new focus in research, there is evidence to suggest individuals with ASD fare worse in employment outcomes compared to other individuals with NDD (Schall et al., 2015; Migliore, Timmons, Butterworth & Lugas,

2012). This evidence may account for why researchers have chosen to narrow their scope and population to individuals with ASD. Researchers noted the importance of studying this population due to these findings (Schall et al., 2015; Migliore et al., 2012).

One-third (34%) of the articles focused their study population on ID, though 38% of individuals with ASD have co-occurring ID (Centers for Disease Control [CDC], 2012). The correlation between ID and ASD may account for the number of studies researching ID. The remaining DSM-5-categorized NDD were studied between zero and three times, indicating a gap in the literature regarding NDD and employment outcomes.

5.3 Environmental Factors

Understanding the Environmental Factors in the literature that influence employment procurement for individuals with NDD was instrumental in answering the research question and objectives. The following subsections discuss the results of Environmental Factor chapters depicted in the ICF and their influences on employment procurement.

5.3.1 Products and Technology

No references to the Environmental Factor 'Products and technology' were found in articles. Therefore, there were no 'Products and technology' noted to influence employment procurement for individuals with NDD. Throughout the literature, much of the comment on 'Products and technology' refers to workplace modifications or on-the-job training (Burke et al., 2013; Gentry et al., 2015; Khalifa et al., 2019) and therefore does not directly influence employment procurement, but instead seems to influence employment maintenance and success.

5.3.2 Natural Environment and Human-made Changes to Environment

'Natural environment and human-made changes to environment' were not found in the included articles. Moreover, 'Natural environmental and human-made changes to the environment' were not found to influence employment procurement for individuals with NDD. Again, this Environmental Factor is found in literature to be associated with on-the-job experience and modification, such as through accommodations for 'Light' and 'Sound' (Baldwin, Costly & Warren, 2014; Müller, Schuler, Burton & Yates, 2003).

5.3.3 Support and relationships

'Supports and relationships' are Environmental Factors that influenced employment procurement for individuals with NDD in the literature. Studied within 20% of the articles, 'Support and relationships' were found to influence employment procurement as both facilitators and barriers.

Facilitators

'Immediate family', 'Personal care providers and personal assistants' and 'People in positions of authority' were elements of 'Support and relationships' found to facilitate employment procurement. Andrews and Rose (2010) found parents and care providers were influential in aiding and motivating individuals with NDD to obtain employment. The support provided influenced the beliefs and motivations of individuals' ability to obtain employment (Andrews & Rose, 2010). Moreover, Gillan and Coughlan (2010) and

Petner-Arrey, Howell-Moneta & Lysaght (2016) found that parents advocating for their children increased opportunities in obtaining employment.

'People in positions of authority' also facilitated individuals in obtaining employment. Lindstrom, Hirano, McCarthy & Alverson (2014) found employers' openness to hiring individuals and providing support through customized positions facilitated individuals with NDD in obtaining employment. Kaehne (2016) also noted 'People in positions of authority', more specifically employers throughout internship programs, were supportive in aiding individuals in obtaining employment after internship.

Barriers

Interestingly, 'Immediate family', 'People in positions of authority' and 'Health-related professionals' were 'Support and relationships' found to create barriers to obtaining employment. Hsu et al. (2009) and Nagib and Wilton (2018) found overprotective parents influenced the number of participants that transitioned into competitive employment. Lack of support associated with employment procurement, due to beliefs of potential dangers and stigmatization of children, was found to impact employment procurement negatively (Hsu et al., 2009). Migliore (2008) found that 'Immediate family' and 'People in positions of authority' that promoted sheltered employment created barriers for individuals with NDD to obtain competitive employment. Nagib and Wilton (2018) also found a lack of support provided by 'Health-related professionals', more specifically employment counsellors, resulted in negatively influencing employment outcomes.

These findings indicate 'Support and relationships' may constitute facilitators or barriers influencing employment procurement for individuals with NDD. As 'Immediate family', such as parents, can play a large role in the transition stage of young adults, their support can be crucial in the employment outcome of individuals with NDD. Moreover, 'People in positions of authority', such as employers, can be influential in supporting individuals in obtaining employment. It is also suggested that support and relationships from 'Personal care providers and personal assistants' and 'Health-related professionals' can influence employment outcomes, detailing the impact multiple individuals have on the growth and development of individuals with NDD.

5.3.4 Attitudes

'Attitudes' are Environmental Factors found influencing employment procurement for individuals with NDD. One-fifth of the articles (20%) included in the review mentioned the influence of 'Attitudes' on employment procurement. 'Attitudes' were found to be both a facilitator and a barrier to obtaining employment.

Facilitators

The Environmental Factor 'Attitudes' was found to facilitate employment procurement once throughout the literature. Kirby (2016) found 'Individual attitudes of immediate family members' as a facilitator to employment when parental attitudes favoured employment procurement. The attitudes of parents were found to influence subsequent aid or benefit to the facilitation of employment procurement.

Barriers

The Environmental Factor 'Attitudes' was more frequently found to be a barrier to employment procurement for individuals with NDD. The specific 'Attitudes' found to be influential included 'Individual attitudes of immediate family members' and 'Individual attitudes of people in positions of authority'.

Gillian and Coughlan (2010) determined 'Individual attitudes of immediate family members', specifically parents, as barriers to transition to employment due to the perception of a child's vulnerability and cognitive limitations. Moreover, parental attitudes and beliefs of their child's inability, vulnerability and safety in a work environment hindered the transition period toward employment (Gillian & Coughlan, 2010; Migliore et al., 2008). Parental attitudes and beliefs, such as fear and worry, were also noted as barriers to employment procurement (Hsu & Huang, 2009; Kirby, 2016).

Furthermore, researchers found 'Individual attitudes of people in positions of authority' also created barriers to obtaining employment for individuals with NDD (Andrews & Rose, 2010; Gillian & Coughlan, 2010; Migliore et al., 2008; Nagib & Wilton, 2019; Zwicker et al., 2017). Employers were noted to have attitudes that could hinder the chances of individuals successfully transitioning into employment (Gillian & Coughlan, 2010). Andrews and Rose (2010) also found that employers might create attitudinal barriers for individuals with NDD trying to obtain employment. Researchers noted how individuals with NDD felt judged throughout interviews and experienced bullying that negatively contributed in motivation to obtain employment (Andrews & Rose, 2010).

Discrimination by employers was also found as a barrier to obtaining employment for individuals with NDD (Nagib & Wilton, 2019; Zwicker et al., 2017). Moreover, Migliore et al. (2008) found employers did not believe in the value of integrated employment and promoted sheltered employment.

The findings suggest that the Environmental Factor 'Attitudes' creates both barriers and facilitators to employment procurement. More specifically, 'Individual attitudes of immediate family members' and 'Individual attitudes of people in positions of authority', such as parents and employers, respectively, play a role in influencing employment outcomes. It is logical that these subsections of 'Attitudes' are influential, as parents and employers are arguably closest to individuals with NDD as they try to obtain employment. Results also indicate that 'Attitudes' more frequently hinder and create barriers to employment procurement, suggesting an underlining issue associated with individuals' attitudes toward people with NDD.

5.3.5 Services, systems and policies

The Environmental Factor 'Services, systems and policies' had both facilitators and barriers to employment procurement. 'Services, systems and policies' were found to have the most facilitating factors and barriers of all Environmental Factors (Table 3).

Facilitators

'Services, systems and policies' were the most frequently studied factor in the included articles. 'Transportation services, systems and policies', 'Educational and training

services, systems and policies' and 'Labour and employment services, system and policies' were the subsections of 'Services, systems and policies' found in the literature to facilitate employment procurement.

'Transportation services, systems and policies' were found to facilitate employment procurement when transportation services were available (Ditchman, Miller & Easton 2018). Transportation is a frequent barrier for youth with NDD (Hendricks & Wehman, 2009) and these findings contribute to the evidence that transportation relates to employment outcomes.

'Education and training services, systems and policies' were noted as facilitators to employment procurement 22 times (Table 3). Researchers frequently noted the influences of 'Education and training services, systems and policies' and the facilitating influences they have on employment procurement (Alverson & Yamamoto, 2018; Baker-Ericzen et al., 2018; Chen et al., 2015; Christensen & Richardson, 2017; Cimera et al., 2012; Cimera et al., 2013; Eack et al., 2018; Kaya et al., 2018; Lindstrom et al., 2014; Migliore et al., 2012; Migliore, Butterworth & Zalewska, 2014; Schall et al., 2015; Sung et al., 2015; Wehman et al., 2014; Wehman et al., 2016; Wehman et al., 2017; Wehman et al., 2019; Wei et al., 2018; Yokotani, 2010). This finding aligns with the general population as it is typical that further education increases one's chances of obtaining employment. This finding requires further exploration to determine if this is a confounding variable or a prerequisite to employment success.

'Labour and employment services, systems and policies' were found as facilitating factors 23 times (Table 3). Researchers were found to highlight the influence these services have on facilitating employment through interventions and support such as supported employment (Alverson & Yamamoto, 2018; Baker-Ericzen et al., 2018; Chen et al., 2015; Chiang et al., 2013; Christensen & Richardson, 2017; Cimera et al., 2012; Cimera et al., 2013; Ditchman et al., 2018; Dreaver et al., 2019; Kaehne, 2016; Kaya et al., 2018; Lindstrom et al., 2014; McLaren et al., 2017; Migliore et al., 2012; Migliore et al., 2014; Nye-Lengerman, 2017; Schall et al., 2015; Sung et al., 2015; Wehman et al., 2012; Wehman et al., 2014; Wehman et al., 2017; Wehman et al., 2019).

Barriers

The Environmental factor 'Services, systems and policies' was also found to act as a barrier to employment procurement. More specifically, 'Transportation services, systems and policies', 'Social security services, systems and policies', 'Education and training services, systems and policies' and 'Labour and employment services, systems and policies' were the subsections of 'Services, systems and policies' found to create barriers toward employment procurement.

"Transportation services, systems and policies' were found to create barriers to employment when individuals were unable to access transportation, or services were unavailable (Ditchman et al., 2018; Migliore et al., 2008). Transportation can create barriers for individuals with NDD, in relation to accessibility or service availability. For example, Migliore et al., (2008) found some individuals chose to work in sheltered

employment, rather than integrated employment, because of the available transportation services associated with sheltered employment. The barrier presented itself as a lack of transportation services with integrated employment (Migliore et al., 2008). This research exemplifies the effects of transportation services on employment procurement for individuals with NDD.

'Social security services, systems and policies' were found to create a barrier for individuals with NDD in obtaining employment (Chen et al., 2015; Ditchman et al., 2018; Gillan & Coughlan, 2010; Gonzalez et al., 2011; Kaya et al., 2018; Migliore et al., 2012; Migliore et al., 2014; Nagib & Wilton, 2019; Zwicker et al., 2017). In this case, the barrier was not that there was a lack of social security but rather the opposite. The availability and use of 'Social security services, systems and policies' was associated with lower employment procurement rates (Chen et al., 2015; Ditchman et al., 2018; Gillan & Coughlan, 2010; Gonzalez et al., 2011; Kaya et al., 2018; Migliore et al., 2012; Migliore et al., 2014; Nagib & Wilton, 2019; Zwicker et al., 2017). For example, Gonzalez et al. (2011) found public support, including social security, significantly influenced the probability an individual obtained employment. The study suggests this is related to the lack of motivation to work due to current income, and also the possibility of losing social security eligibility if participants obtained employment (Gonzalez et al., 2011). This finding was unexpected as social security aid is typically viewed as beneficial to individuals struggling with income.

‘Education and training services, systems and policies’ were also found to create a barrier to employment procurement for individuals with NDD. Lack of accessible education and training, alongside lack of sufficient education, were found as barriers to employment procurement (Nagib & Wilson, 2019; Zwicker et al., 2017). ‘Labour and employment services, systems and policies’ were also noted to create barriers to employment procurement. Lack of appropriate services, information and support were found to create barriers to employment procurement (Carroll & Dockrell, 2012; Gillan & Coughlan, 2010; Nagib & Wilson, 2019; Nye-Lengerman, 2017; Petner-Arrey et al., 2016). Elements of ‘Services, systems and policies’ were found as facilitators more often than barriers. The only barriers associated with ‘Education and training services, systems and policies’ were those in which the service was absent. There were no barriers associated with increased education in relation to employment procurement. Furthermore, ‘Labour and employment services, systems and policies’ were considered barriers only when there were insufficient services or a lack of services. This information suggests ‘Education and training services, systems and policies’ and ‘Labour and employment services, systems and policies’ benefit individuals with NDD in obtaining employment when they are available and sufficient.

‘Services, systems and policies’ were found to be both barriers and facilitators to employment procurement. It is evident that ‘Services, systems and policies’, as the most frequently noted chapter of Environmental Factors, play a significant role in the success of individuals in obtaining employment.

Environmental Factors, a subsection of Contextual Factors in the ICF, were found to influence employment procurement for individuals with NDD, both as facilitators and barriers. Subsections of Environmental Factors found influencing employment procurement included 'Support and relationships', 'Attitudes' and 'Services, systems and policies'.

5.4 Personal Factors

The following section describes the findings of the review in relation to 'Personal Factors', a subsection of the Contextual Factors described in the ICF. As noted in section 2.4.2, Personal Factors have not been classified in the ICF. However, this review has evaluated the influence of Personal Factors on employment procurement for individuals with NDD through the use of key dialogue describing Personal Factors noted within the ICF. Through the use of descriptive Personal Factors noted within the ICF, this review has elicited the descriptive factors of (1) Age, (2) Coping styles, (3) Profession, (4) Gender, (5) Education, (6) Character, (7) Social background, (8) Past and current experiences, (9) Overall behaviour pattern, and (10) Other factors that influence how disability is experienced by the individual (I.e. Ethnicity/Race). Results are discussed in relation to these ten components. Not all Personal Factors were found in the included articles. Additionally, some factors were found to be both barriers and facilitators to employment procurement.

5.4.1 Age

'Age' was found as both a facilitator and barrier to employment procurement (Figure 6).

Older age was found to facilitate employment procurement for individuals with NDD (Chen et al., 2015; Roux et al., 2013; Wei et al., 2018). Older individuals had an easier process in obtaining employment and a higher percentage of employment in comparison to younger individuals, who experienced increased barriers to employment procurement (Chen et al., 2015; Roux et al., 2013; Wei et al., 2018).

Additionally, it is reported that beginning vocational training (VT) at a younger age was related to better employment outcomes later in life (Cimera et al., 2013; Cimera et al., 2014). More specifically, individuals who had individualized education plans (IEPs) focused on transition services by age 14 were found to have higher rates of employment, in comparison to individuals who obtained services by age 16 (Cimera et al., 2013; Cimera et al., 2014). Kaehne (2016) also found beginning Project SEARCH (PS) services, a VT program, at a younger age was associated with better employment outcomes.

'Age' was an influential factor impacting employment procurement. The increased barriers associated with younger age groups may highlight the need for future research to focus on this specific population. These findings also highlight the specific importance of the transition period from high school to young adulthood for individuals with NDD.

5.4.2 Gender

Employment procurement for individuals with NDD differed between genders. Males were reported to have higher percentages of employment procurement in comparison to

females (Alverson & Yamamoto, 2018; Gonzalez et al., 2011; Kaya et al., 2018; Migliore et al., 2012; Nye-Lengerman, 2017; Wei et al., 2018). Nagib and Wilton (2019) found females encountered barriers to employment procurement in comparison to males. These barriers were associated with female gender roles, and the stereotypes associated with past expectations of remaining in the home environment (Nagib & Wilton, 2019).

However, one study by Chiang et al. (2013) found females had higher employment rates in comparison to males. This was the only study to find this. Researchers noted the findings as contradictory to other studies and suggested this may be due to differing ages and variables studied and suggested further research on gender differences in employment (Chiang et al., 2013). As this study differs from others within the review, it is also suggested that further research be done to understand the different employment experiences between males and females, including the kinds of employment identified.

Research suggests that males and females experience different challenges to achieving employment (Nagib & Wilton, 2019). Low number of female participants in research may influence the current lack of understanding in the different gender experiences (Sung et al., 2015). However, the findings from this study align with current research suggesting females have lower rates of employment procurement than males (Holwerda et al., 2013).

5.4.3 Education

The Personal Factor ‘Education’ was the most frequently found facilitator to employment procurement for individuals with NDD. Education, including VT and secondary

education, both influenced employment procurement. Individuals who obtained VT were found to obtain employment at a higher rate than those who did not (Alverson & Yamamoto, 2018; Baker-Ericzen et al., 2018; Chiang et al., 2013; Cimera et al., 2013; Cimera et al., 2014; Kaehne, 2016; Kaya et al., 2018; Sung et al., 2015; Wehman et all., 2014; Wehman et al., 2017; Wehman et al., 2019). Furthermore, four studies in the review focused on the vocational education project, PS (Kaehne, 2016; Wehman et all., 2014; Wehman et al., 2017; Wehman et al., 2019). This project depicted results leading to increased employment rates compared to individuals who did not obtain the services (Kaehne, 2016; Wehman et all., 2014; Wehman et al., 2017; Wehman et al., 2019).

Secondary education, or further education, was also found to increase employment procurement for individuals with NDD compared to those with lower education levels (Butler et al., 2016; Chiang et al., 2013; Wei et al., 2018; Yokotani, 2010). Highlighting the importance of education and its relation to employment procurement, the studies described the increased employment rates for individuals with higher education. Butler et al. (2016) reviewed higher education in relation to life outcomes, including employment, and found having at least two semesters in college increased employment obtainment in comparison to those not in college. Yokotani (2010) also found that individuals with more education had an advantage in obtaining employment. Moreover, Chiang et al. (2013) found graduation from high school was a significant factor between individuals who were employed and those who were not. Lastly, Wei et al. (2018) found individuals who had never enrolled in postsecondary education were less likely to find employment on their own.

A lack of sufficient 'Education' was found as a barrier to employment procurement on one occasion. Carrol & Dockrell (2012) found that individuals who lacked proper credentials or felt they lacked the proper education created barriers to obtaining employment.

The Personal Factor 'Education' has been shown to influence employment procurement in current literature both as a facilitator and a barrier. As noted in 5.3.5, the only barriers associated with 'Education and training, services, systems and policies' are those related to a lack of services or availability. Similar findings are depicted for the Personal Factor 'Education', as the only barrier found within literature is attributed to a lack of sufficient education. Therefore, sufficient and available education is found to benefit and facilitate employment procurement for individuals with NDD.

5.4.4 Profession/Coping styles

'Profession' and 'Coping styles' were not found to influence employment procurement (Figure 6). 'Profession' was irrelevant within the contexts of this study focusing on employment procurement. 'Coping styles' were not mentioned, nor were they a criterion in any of the studies, which may explain why this Personal Factor was not examined.

5.4.5 Character

'Character' was found in literature as both a facilitator and barrier to employment procurement (Figure 6). Andrews & Rose (2010) found different factors influencing

'Character', specifically motivation, on employment outcomes. The general findings discussed how individual motivation facilitated employment procurement (Andrews & Rose, 2010). Dell'Armo & Tasse (2019) found adaptive behaviour to facilitate employment procurement for individuals. Adaptive behaviour was characterized as social, practical and conceptual skills relating to individual character (Dell'Armo & Tasse, 2019). Moreover, Carroll & Dockrell (2012) found that individuals who viewed themselves as actors in their transition process facilitated employment procurement.

Nagib & Wilton (2019) found that low self-esteem created barriers to employment procurement. This finding was the only 'Character' barrier associated with employment found in the literature.

The Personal Factor 'Character' was found to influence employment procurement for individuals with NDD. This finding describes the impact personal character can have on employment success and the importance of promoting growth of character attributes.

5.4.6 Social Background

'Social Background' was found as both as a facilitator and barrier to employment procurement (Figure 6). Unexpectedly, 'Social background' was the most frequently found Personal Factor to create barriers to employment procurement, as described below.

Obtaining social security benefits aligns with one's social background. Therefore, as an Environmental Factor, 'Social security systems, services and policies', was found to

create barriers on nine occasions; the Personal Factor 'Social background' was also found to create barriers to employment procurement due to negative influences of social security and its relationship with employment procurement (Chen et al., 2015; Ditchman et al., 2018; Gillan & Coughlan, 2010; Gonzalez et al., 2011; Kaya et al., 2018; Migliore et al., 2012; Migliore et al., 2014; Nagib & Wilton, 2019; Zwicker et al., 2017). These findings suggest that although social security helps to increase income, it may deter individuals from finding or obtaining work due to the restrictions around working and receiving benefits (Gonzalez et al., 2011). The association found between social security services and 'Social background' thus requires further attention. These findings suggest social security benefits do not necessarily aid individuals in obtaining employment, a typical stage in adult life.

Furthermore, 'Social background' and correlated household incomes were found as both a facilitator and barrier to employment procurement within the literature. Higher household incomes were found to facilitate employment procurement for individuals with NDD (Chiang et al., 2013; Kirby, 2016; Roux et al., 2013; Wei et al., 2018). On the other hand, lower household incomes were found to be a barrier to employment procurement (Roux et al., 2013; Shattuck et al., 2012; Wei et al., 2018). Chiang et al. (2013) also found parents with higher education aided to facilitate employment procurement for their children.

These findings suggest that the 'Social background' of individuals with NDD can impact the acquisition of employment, acting as both a facilitator and a barrier. 'Social

background' can be influenced by the individual or those around them, highlighting the importance of social supports and networks for individuals with NDD.

5.4.7 Overall behaviour pattern

'Overall behaviour pattern' was found to both facilitate and create barriers to employment (Figure 6). Social skills, such as conversation, social cognition and body language were found to facilitate employment procurement (Baker et al., 2018; Chiang et al., 2013; Dell'Armo & Tasse, 2019; Eack et al., 2018; Kirby, 2016; Roux et al., 2013; Wei et al., 2018). Individual motivation was also found to act as a facilitator to employment procurement (Andrews & Rose, 2010). Carrol & Dockrell (2012) also found that individuals' ability to respond positively to challenges and failures facilitated employment procurement.

Hsu et al. (2009) found that lack of confidence and interest in employment created a barrier to obtaining employment. Christensen & Richardson (2007) found poor social skills at the beginning of their study created a barrier to obtaining employment.

'Overall behaviour pattern' was found to influence employment procurement for individuals with NDD. These results highlight the impact that personal attributes play within employment.

5.4.8 Past and current experiences

'Past and current experiences' were found to create both facilitators and barriers to employment procurement. Past employment experiences were found as facilitators to employment (Cimera, 2012; Lindstrom et al., 2014; Nye-Lengerman, 2017; Sung et al., 2015; Wehman et al., 2014; Wehman et al., 2019). Moreover, unsuccessful or unenjoyable past employment experiences were also found to create barriers to employment procurement (Hsu et al., 2009; Migliore et al., 2008; Nagib & Wilton, 2019; Zwicker et al., 2017). Migliore et al. (2014) also found that participants' current experiences in home states and their associated differing regulations and policies created barriers for individuals to obtain employment.

These findings highlight the importance of the Personal Factor 'Past and current experiences' on employment outcomes. Working to create more enjoyable or helpful employment experiences will promote future growth for individuals with NDD.

5.4.9 Ethnicity/Race

'Ethnicity/Race' were found as both a facilitator and barrier to employment procurement. It was found as a facilitator for Caucasians (Alverson & Yamamoto, 2018; Kirby, 2016; Nye-Lengerman, 2017) and European Americans (Gonzalez et al., 2011), but as a barrier when the population was non-white (Alverson & Yamamoto, 2018; Gonzalez et al., 2011), or African-American (Nye-Lengerman, 2017), or African-American or Hispanic (Shattuck et al., 2012).

This evidence suggests there is a disadvantage to employment procurement for individuals who are non-white, African-American or Hispanic. Researchers have found similar findings for individuals in the general population concerning the relationship between race and employment (Whitaker, 2019; Zschirnt & Ruedin, 2016). The results found in this study show how widely these observations apply.

5.5 Gaps in Research

Scoping reviews are created, in part, to discover current gaps in literature, which are important for future research and understanding (in this case, of employment for individuals with NDD).

There are gaps in current research methodology and design in literature regarding employment procurement for individuals with NDD. Although 22 of the articles included (54%) were primary data articles, only four were interventional studies. Research interventions (e.g. RCTs) are effective approaches for understanding and answering research questions. Future research should expand and implement further methodological designs, including RCTs, for growth and varied expansion of knowledge on the topic.

Additionally, the number of articles identified that study people with ASD (68%), in comparison to other NDD (46%), infers there is a current gap in research and knowledge pertaining to non-ASD NDDs. Future research should aim to focus on those disorders not represented within literature, or on NDD as a whole. Further research will aid in our understanding of employment procurement in these populations.

Furthermore, there is a gap in the literature on Contextual Factors studied in regard to employment procurement for individuals with NDD. The Environmental Factors ‘Products and

technology' and 'Natural environment and human-made changes to environment', and Personal Factors, 'Coping styles' and 'Profession' were not found in the literature. Future research should examine the influence of these specific Contextual Factors on employment procurement for individuals with NDD.

5.6 Limitations

This study has noteworthy limitations. By only including studies after the year 2006 this review may have excluded information from studies before this time (although efforts were made to find earlier studies referenced in the primary papers that were included). Additionally, it was decided to include only articles written in English, which may have excluded relevant literature created in other languages.

Additionally, the inclusion criteria created limitations to generalizability of this study. Choosing to utilize the DSM-5 headings for search terms may have limited the inclusion of articles studying other disorders within the DSM-5 categories, such as Cerebral Palsy (CP). CP is considered a Motor Disorder within the DSM-5 but is not noted within the DSM-5 category headings. Articles pertaining to CP may have been excluded due to the use of the general heading 'Motor Disorder'. ASD is a heading within the DSM-5 and may account for the high number of articles within the included articles studying this NDD. Moreover, impacts of interventions, or observations on this specific population, may not be generalizable to all NDD, potentially limiting study generalizability.

Furthermore, secondary analyses of survey data have inherent limitations. Results reported in these studies are based upon existing data sources that may not represent the most relevant or recent information. Moreover, limitations of the observational and interventional studies include

small sample sizes, and variables measured based on reliability of individual reports, such as NDD diagnosis. These limitations may have influenced study findings and generalizability of findings.

Studies on sheltered employment were only included if the research focused on the transition from sheltered employment to integrated employment; all other studies regarding sheltered employment were excluded. However, the NLTS-2 database, utilized for a number of secondary analyses included within the study, may report on data representing sheltered employment procurement. Documents describing the NLTS-2 dataset do not explicitly describe the inclusion of data on sheltered employment procurement; however, literature describes the examination of income based on minimum wage or above (Cameto, Marder, Wagner, & Cardoso, 2003) leading to the assumption that the dataset includes incomes below minimum wage. Incomes below minimum wage are not considered integrated employment (Cimera, 2011; Migliore et al., 2008). The inclusion of data regarding sheltered employment may influence the findings from the study, although as the NLTS-2 is a rich dataset on individuals with NDD and employment it was deemed important to include within the analysis.

Lastly, labelling of Contextual Factors in literature was performed by one researcher. This may lead to limitations in the interpretation of the finding due to a potential detection bias. However, steps were taken to minimize this potential challenge including the discussion of terms with the supervisory committee associated with Contextual Factors, specifically Personal Factors, before and during the extraction of data.

5.7 Implications for Research

Gaps in the current literature lead to potential avenues for future research. Studies included in the review focused on specific NDD separately or comparatively. Future research should focus on the broad classification of NDD and the barriers and facilitators influencing employment procurement facing the population as a whole. Focusing on a specific NDD lessens the generalizability and can decrease the feasibility of targeting this group for employment interventions through public policy. Nevertheless, research focussing on specific disorders is also of value to progressing our understanding of this issue and to increasing our understanding of specific issues facing specific NDD.

Specific barriers and facilitators found within the articles should also be further researched. Personal Factors, such as 'Social background', 'Gender', 'Past and current experiences', 'Ethnicity/Race', 'Overall behaviour pattern', 'Age', 'Education' and 'Character' should be studied to understand the significance of the barriers and facilitators impacting employment for individuals with NDD. Moreover, the Environmental Factors 'Support and relationships', 'Attitudes' and 'Services, systems and policies' should be a focus of future research to understand the impact of barriers and facilitators associated with employment procurement for this population.

As noted throughout this report, the ICF has not created classifications for the Contextual Factor subsection Personal Factors. For uniformity in research and application of the ICF, future research should be focused on analyzing and creating universal categories for Personal Factors within the ICF framework.

6 CONCLUSION

The issue of unemployment and underemployment for individuals with NDD is complex. Many factors contribute to the challenges associated with employment procurement for this population. As the population of individuals entering adulthood with NDD is growing, and current employment rates are low, the topic of employment procurement is more important than ever.

Understanding the current Contextual Factors influencing employment procurement for individuals with NDD will enable future researchers to focus on specific problems faced by the population, such as the relation between social security and employment procurement. Additionally, this information will aid to inform researchers and policy makers of the current facilitating factors aiding employment procurement, such as education and labour services, and those creating barriers to employment, such as employer attitudes and transportation. This information is critical for understanding and combating current and future issues related to limitations in employment procurement for this population.

This research exemplifies the importance and impact of Contextual Factors in the functioning of an individual's life. Past research and policy have focused on disorders and the issues limiting functioning, usually within the person with the condition; this research focuses on the Contextual Factors influencing functioning, rather than on the disorder or the individual alone. Altering the approach in addressing this issue, utilizing the ICF framework, enables a new view and understanding of influential factors impacting employment for individuals with NDD. Further research to understand the strength of these factors will aid our understanding of employment procurement for individuals with NDD. Additionally, further use of the ICF will

help to create a comprehensive and consistent base of applicable and generalizable knowledge for future research and policy action.

Lastly, this research helps us to develop information on the human rights of individuals with NDD, through the understanding of Contextual Factors creating barriers and facilitators to employment procurement. Further advocacy and research into this specific area will aid to further the equality and rights of individuals with NDD worldwide. As obtaining employment has a multitude of associated benefits, including the potential increase of health, functioning, and overall quality of life, further research and improvement in employment rates will increase the global health and equality of individuals with NDD worldwide.

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8 APPENDICES

APPENDIX A: DSM-5 Neurodevelopmental Disorders

1. **Intellectual Disabilities**
    a. Intellectual disabilities (Intellectual developmental disorder)
    b. Global developmental delay
    c. Unspecified intellectual disability (Intellectual development disorder)
2. **Communication Disorders**
    a. Language disorders
    b. Speech sound disorder
    c. Childhood-onset fluency disorder (stuttering)
    d. Social (pragmatic) communication disorder
    e. Unspecified communication disorder
3. **Autism Spectrum Disorder**
    a. Autism spectrum disorder
4. **Attention-Deficit/Hyperactivity Disorder**
    a. Attention-deficit/hyperactivity disorder
    b. Other specified attention-deficit/hyperactivity disorder
    c. Unspecified attention-deficit/hyperactivity disorder
5. **Specific Learning Disorder**
    a. Specific learning disorder
6. **Motor Disorder**
    a. Developmental coordination disorder
    b. Stereotypic movement disorder
    c. Tic disorders
        i. Tourette's disorder
        ii. Persistent (chronic) motor or vocal tic disorder
        iii. Provisional tic disorder
        iv. Other specified tic disorder
        v. Unspecified tic disorder
7. **Other Neurodevelopmental Disorders**
    a. Other specified neurodevelopmental Disorders
    b. Unspecified neurodevelopmental Disorders

(APA, 2013)

APPENDIX B: Environmental Factor Chapters and Subsections

ENVIRONMENTAL FACTORS	
Chapter 1 Products and technology	Products or substances for personal consumption Products and technology for personal use in daily living Products and technology for personal indoor and outdoor mobility and transportation Products and technology for communication Products and technology for education Products and technology for employment Products and technology for culture, recreation and sport Products and technology for the practice of religion and spirituality Design, construction and building products and technology of buildings for public use Design, construction and building products and technology of buildings for private use Products and technology of land development Assets Products and technology, other specified Products and technology, unspecified
Chapter 2 Natural environment and human-made changes to environment	Physical geography Population Flora and fauna Climate Natural events Human-caused events Light Time-related changes Sound Vibration Air quality Natural environment and human-made changes to environment, other specified Natural environment and human-made changes to environment, unspecified
Chapter 3 Support and relationships	Immediate family Extended family Friends Acquaintances, peers, colleagues, neighbours and community members People in positions of authority People in subordinate positions

	Personal care providers and personal assistants Strangers Domesticated animals Health professionals Health-related professionals Support and relationships, other specified Support and relationships, unspecified
Chapter 4 Attitudes	Individual attitudes of immediate family members Individual attitudes of extended family members Individual attitudes of friends Individual attitudes of acquaintances, peers, colleagues, neighbours and community members Individual attitudes of people in positions of authority Individual attitudes of people in subordinate positions Individual attitudes of personal care providers and personal assistants Individual attitudes of strangers Individual attitudes of health professionals Individual attitudes of health-related professionals Societal attitudes Social norms, practices and ideologies Attitudes, other specified Attitudes, unspecified
Chapter 5 Services, systems and policies	Services, systems and policies for the production of consumer goods Architecture and construction services, systems and policies Open space planning services, systems and policies Housing services, systems and policies Utilities services, systems and policies Communication services, systems and policies Transportation services, systems and policies Civil protection services, systems and policies Legal services, systems and policies Associations and organizational services, systems and policies Media services, systems and policies Economic services, systems and policies

	Social security services, systems and policies General social support services, systems and policies Health services, systems and policies Education and training services, systems and policies Labour and employment services, systems and policies Political services, systems and policies Services, systems and policies, other specified Services, systems and policies, unspecified

(WHO, 2001)

APPENDIX C: Search Strategies for Electronic Databases

Database(s): **OVID Embase**

Search Strategy:

#	Searches	Results
1	((developmental adj2 disabilit*) or (neurodevelopment* adj2 disabilit*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]	8422
2	((intellectual adj2 disabilit*) or (global adj2 developmental adj2 delay*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]	23571
3	((communication adj2 disorder*) or (language adj2 disorder*) or (speech adj2 sound adj2 disorder*) or (childhood-onset adj2 fluency adj2 disorder*) or stutter*).mp.	17283
4	autis*.mp.	63301
5	((attention-deficit adj2 hyperactivity adj2 disorder*) or ADHD or (learning adj2 disorder*)).mp.	61935
6	((motor adj2 disorder*) or (developmental adj2 coordination adj2 disorder*) or (stereotypic adj2 movement adj2 disorder*)).mp.	7676
7	((tic adj2 disorder*) or Tourettes).mp.	3339
8	developmental disorder/ or developmental delay/	35027
9	motor development/ or motor dysfunction/	62919
10	communication disorder/ or language disability/	19978
11	tic/ or gilles de la tourette syndrome/	10688
12	attention deficit disorder/	53898
13	autism/ or asperger syndrome/ or "pervasive developmental disorder not otherwise specified"/	55879
14	intellectual impairment/	22798
15	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	272039
16	(employment or job* or employee* or employer* or unemployment or (job adj2 interview*) or (work adj2 experience*) or (job adj2 experience*)).mp.	223133
17	employment/ or employment status/ or full time employment/ or parttime employment/ or permanent employment/ or self employment/ or supported employment/ or temporary employment/	57055
18	((competitive* adj2 employ*) or (support* adj2 employ*) or (shelter* adj2 employ*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]	3772

19	16 or 17 or 18	223883
20	(support* or service* or vocation* or intervention* or accommodation* or environment*).mp.	4269163
21	((adult* or middle aged or young adult*) not (child* not (child* and adult))).mp.	6042620
22	15 and 19 and 20 and 21	1351
23	limit 22 to (english and yr="2006 - 2019" and journal and adult <18 to 64 years>)	**994**

Database(s): **OVID PsycINFO**

Search Strategy:

#	**Searches**	**Results**
1	((developmental adj2 disabilit*) or (neurodevelopment* adj2 disabilit*).mp.	15098
2	((intellectual adj2 disabilit*) or (global adj2 developmental adj2 delay*)).mp.	15612
3	((communication adj2 disorder*) or (language adj2 disorder*) or (speech adj2 sound adj2 disorder*) or (childhood-onset adj2 fluency adj2 disorder*) or stutter*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	13798
4	autis*.mp.	49063
5	((attention-deficit adj2 hyperactivity adj2 disorder*) or ADHD or (learning adj2 disorder*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	34778
6	((motor adj2 disorder*) or (developmental adj2 coordination adj2 disorder*) or (stereotypic adj2 movement adj2 disorder*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	2844
7	((tic adj2 disorder*) or Tourettes).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	2860
8	neurodevelopmental disorders/ or attention deficit disorder/ or autism spectrum disorders/ or developmental disabilities/ or intellectual development disorder/ or learning disorders/	72003
9	movement disorders/	3129
10	tics/ or tourette syndrome/	3403
11	communication disorders/ or language disorders/	7800
12	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11	133602
13	(employment or job* or employee* or employer* or unemployment or (job adj2 interview*) or (work adj2 experience*) or (job adj2 experience*)).mp.	181212
14	employment status/ or employability/ or employment history/ or self-employment/ or unemployment/ or job applicants/ or supported employment/	19965

15	((competitive* adj2 employ*) or (support* adj2 employ*) or (shelter* adj2 employ*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	4498
16	13 or 14 or 15	181712
17	(support* or service* or vocation* or intervention* or accommodation* or environment*).mp.	1246267
18	((adult* or middle aged or young adult*) not (child* not (child* and adult))).mp.	815389
19	12 and 16 and 17 and 18	1026
20	limit 19 to ((320 young adulthood or 340 thirties or 360 middle age) and "0100 journal" and english and yr="2006 - 2019")	**271**

Database(s): **Ovid MEDLINE(R)**

Search Strategy:

#	Searches	Results
1	((developmental adj2 disabilit*) or (neurodevelopment* adj2 disabilit*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	17662
2	((intellectual adj2 disabilit*) or (global adj2 developmental adj2 delay*)).mp.	27013
3	((communication adj2 disorder*) or (language adj2 disorder*) or (speech adj2 sound adj2 disorder*) or (childhood-onset adj2 fluency adj2 disorder*) or stutter*).mp.	13905
4	autis*.mp.	33250
5	((attention-deficit adj2 hyperactivity adj2 disorder*) or ADHD or (learning adj2 disorder*)).mp.	31063
6	((motor adj2 disorder*) or (developmental adj2 coordination adj2 disorder*) or (stereotypic adj2 movement adj2 disorder*)).mp.	6693
7	((tic adj2 disorder*) or Tourettes).mp.	2356
8	developmental disorder/ or developmental delay/	0
9	motor development/ or motor dysfunction/	0
10	communication disorder/ or language disability/	1772
11	tic/ or gilles de la tourette syndrome/	3026
12	attention deficit disorder/	23250
13	autism/ or asperger syndrome/ or "pervasive developmental disorder not otherwise specified"/	16218
14	intellectual impairment/	0
15	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	119781

16	(employment or job* or employee* or employer* or unemployment or (job adj2 interview*) or (work adj2 experience*) or (job adj2 experience*)).mp.	143232
17	employment/ or employment status/ or full time employment/ or parttime employment/ or permanent employment/ or self employment/ or supported employment/ or temporary employment/	29458
18	((competitive* adj2 employ*) or (support* adj2 employ*) or (shelter* adj2 employ*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2651
19	16 or 17 or 18	143711
20	(support* or service* or vocation* or intervention* or accommodation* or environment*).mp.	8301621
21	((adult* or middle aged or young adult*) not (child* not (child* and adult))).mp.	4596014
22	15 and 19 and 20 and 21	779
23	limit 22 to (yr="2006 - 2019" and ("young adult and adult (19-24 and 19-44)" or "middle age (45 to 64 years)") and english and journal article)	**549**

Sociological Abstracts - **25**

(noft(developmental NEAR/2 disabilit*) OR (neurodevelopment* NEAR/2 disabilit*) OR noft(intellectual NEAR/2 disabilit*) OR (global NEAR/2 developmental NEAR/2 delay*) OR noft(communication NEAR/2 disorder*) OR (language NEAR/2 disorder*) OR (speech NEAR/2 sound NEAR/2 disorder*) OR (childhood-onset NEAR/2 fluency NEAR/2 disorder*) OR (stutter*) OR noft(autis*) OR noft(attention-deficit NEAR/2 hyperactivity NEAR/2 disorder*) OR (ADHD) OR (learning NEAR/2 disorder*) OR noft(motor NEAR/2 disorder*) OR (developmental NEAR/2 coordination NEAR/2 disorder*) OR (stereotypic NEAR/2 movement NEAR/2 disorder*) OR noft(tic NEAR/2 disorder*) OR (Tourettes)) AND (noft(employment OR job* OR employee* OR employer* OR unemployed OR (job NEAR/2 interview*) OR (work NEAR/2 experience*) OR (job NEAR/2 experience*)) OR (noft(competitive* NEAR/2 employ*) OR noft(support* NEAR/2 employ*) OR noft(shelter* employ*))) AND ((noft(adult* OR middle aged OR young adult*)) NOT ((noft(child)) NOT (noft(child) AND noft(adult*)))) AND noft(support* OR service* OR vocation* OR intervention* OR accommodation* OR environment*) AND stype.exact("Scholarly Journals") AND la.exact("English") AND yr(2006-2019)

ERIC - **298**

(noft(developmental NEAR/2 disabilit* OR neurodevelopment* NEAR/2 disabilit*) OR noft((intellectual NEAR/2 disabilit*) OR (global NEAR/2 developmental NEAR/2 delay*)) OR noft((communication NEAR/2 disorder*) OR (language NEAR/2 disorder*) OR (speech NEAR/2 sound NEAR/2 disorder*) OR (childhood-onset NEAR/2 fluency NEAR/2 disorder*) OR stutter*) OR noft(autis*) OR noft((attention-deficit NEAR/2 hyperactivity NEAR/2 disorder*) OR (ADHD) OR (learning NEAR/2 disorder*)) OR noft((motor NEAR/2 disorders)

OR (developmental NEAR/2 coordination NEAR/2 disorder*) OR (stereotypic movement disorder*)) OR noft((tic disorder*) OR Tourettes)) AND ((noft(employment OR job* OR employee* OR employer* OR unemployment OR (job NEAR/2 interview*) OR (work NEAR/2 experience*) OR (job NEAR/2 experience))) OR (noft(competitive* NEAR/2 employ*) OR noft(support* NEAR/2 employ*) OR noft(shelter* NEAR/2 employ*))) AND ((noft(adult* OR middle aged OR young adult*)) NOT noft((Child*) NOT (child* AND (adult)))) AND noft(support* OR service* OR vocation* OR accommodation* OR intervention*) AND rtype.exact("080: Journal Articles") AND la.exact("English") AND yr(2006-2019)

CINAHL – **320**

	Search ID#	Search Terms	Search Options	Actions
☐	S19	S12 AND S16 AND S17 AND S18	**Limiters** - Published Date: 20060101-20191231; Publication Type: Journal Article; Age Groups: Adult: 19-44 years, Middle Aged: 45-64 years; Language: English **Search modes** - Boolean/Phrase	View Results (320) | View Details | Edit
☐	S18	((adult* or middle aged or young adult*) not (child* not (child* and adult*)))	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S17	support* or service* or vocation* or intervention* or accommodation* or environment*	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S16	S13 OR S14 OR S15	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S15	(MH "Employment") OR (MH "Part Time Employment") OR (MH "Employment, Supported") OR (MH "Job Interviews") OR (MH "Employment Status") OR (MH "Unemployment") OR (MH "Temporary Employment") OR (MH "Self Employment") OR (MH "Employment of Disabled")	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S14	"competitive* employ*" or "support* employ*" or "shelter* employ*	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S13	employment or job* or employee* or employer* or unemployment or "job interview*" "job experience*" or "work experience*"	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S12	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit
☐	S11	(MH "Tic") OR (MH "Tourette Syndrome")	**Search modes** - Boolean/Phrase	Rerun | View Details | Edit

☐	S10	(MH "Asperger Syndrome") OR (MH "Autistic Disorder") OR (MH "Pervasive Developmental Disorder-Not Otherwise Specified")	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S9	(MH "Learning Disorders")	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S8	(MH "Motor Skills Disorders") OR (MH "Attention Deficit Hyperactivity Disorder") OR (MH "Intellectual Disability") OR (MH "Developmental Disabilities") OR (MH "Communicative Disorders")	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S7	"tic disorder*" or Tourettes	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S6	"motor disorder*" or "developmental coordination disorder*" or "stereotypic movement disorder*"	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S5	"attention deficit hyperactivity disorder*" or ADHD or "learning disorder*"	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S4	autis*	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S3	"communication disorder*" or "language disorder*" or "speech sound disorder*" or "childhood-onset fluency disorder*" or stutter*	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S2	"intellectual disabilit*" OR "global developmental delay*"	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit
☐	S1	"developmental disabilit*" or "neurodevelopment* disabilit*"	**Search modes** - Boolean/Phrase	Rerun	View Details	Edit

APPENDIX D: Data Extraction Chart

Article Citation	**Country of Origin (of study)**	**Primary Objective of the Study**	**Sample Characteristics (Including NDD type)**	**Study Design**	**Intervention (if applicable)**	**Outcome Evaluation (In relation to question)**	**Results - In relation to question (Increased employment procurement?)**	**ICF Environmental Factors (Facilitator/ Barrier)**	**ICF Personal Factors (Facilitator/ Barrier)**
Andrews, A., & Rose, J. L. (2010). A preliminary investigation of factors affecting employment motivation in people with intellectual disabilities. Journal of Policy and Practice in Intellectual Disabilities, 7(4), 239–244. https://doi.org/10.1111/j.1741-1130.2010.00272.x	England	To determine what factors motivate and deter people with ID to work	ID (mild), 10 individuals (8 males, 2 females), Ages 18-22	Qualitative: Focus group	N/A	Thematic analysis - Motivating factors influencing employment procurement	Monetary gain, social aspects, and perceived competence found to be three most influential factors motivating people for employment	**Attitudes** - Individual attitudes of people in positions of authority (Barrier) **Support and Relationships** - Immediate family (Facilitator); Personal care providers and personal assistants (Facilitator)	**Character** (Facilitator), **Overall Behaviour Pattern** (Facilitator)

Hsu T, Ososkie J, & Huang Y. (2009). Challenges in transition from sheltered workshop to competitive employment: Perspectives of Taiwan social enterprise transition specialists. *Journal of Rehabilitation*, *75*(4), 19–26. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/23224594	Taiwan	To investigate the transition from sheltered employment to competitive	4 transition specialist discussing individuals with mental retardation (mild to moderate)	Qualitative: Face-to-face Interviews	N/A	Thematic analysis - Experience with employment	Challenges in transition were noted for individuals with mental retardation, parents and the community	**Attitudes** - Individual attitudes of immediate family members (Barrier)	**Past and Current Experiences** (Barrier), **Overall Behaviour Pattern** (Barrier)
Eack, S. M., Hogarty, S. S., Greenwald, D. P., Litschge, M. Y., Porton, S. A., Mazefsky, C. A., & Minshew, N. J. (2018). Cognitive enhancement therapy for adult autism spectrum disorder: Results of an 18-month randomized clinical trial. Autism Research, 11(3), 519–530. https://doi.org/10.1002/aur.1913	United States	To examine the efficacy of Cognitive Enhancement Therapy (CET) for improving core cognitive and employment outcomes in adult autism	ASD, 54 individuals, verbal adult outpatients, Ages 16-45	18-month parallel arm randomized-controlled trial of CET (Single-blind trial of CET or Enriched Supportive Therapy [EST])	18-month cognitive remediation intervention vs supportive therapy	Major Role Adjustment Inventory determining competitive employment outcome	CET participants were significantly more likely to gain competitive employment than those in EST within 18-month time period	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Overall Behaviour Pattern** (Facilitator); **Education** (Facilitator)

Wehman P., Schall C., McDonough J., Sima A., Brooke A., Ham W., … Riehle E. (2019). Competitive employment for transition-aged youth with significant impact from autism: A multi-site randomized clinical trial. *Journal of Autism and Developmental Disorders*. Advance publication online. doi: 10.1007/s10803-019-03940-2	United States	To determine how Project SEARCH (PS) improves competitive integrated employment outcomes for young adults served in public special education programs	ASD, 156 individuals, Ages 18-21, attending local public school with PS -- control group at public school with individualized education plans (IEPs) and community-based employment training (CBET)	Prospective multi-site, parallel block randomized clinical trial	Intervention group: Project SEARCH Program -- Control: weekly CBET and IEPs	Data collection at baseline (age, gender, race, medical diagnosis, IEP eligibility, previous employment history, hours in CBET), data at graduation and 1-year follow-up, (current employment, CBET in previous school year) in-person interviews	Treatment group had higher employment rate at graduation and 1-year follow up	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator),	**Past and current experiences** (Facilitator), **Education** (Facilitator)

Wehman, P. H., Schall, C. M., McDonough, J., Kregel, J., Brooke, V., Molinelli, A., … Thiss, W. (2014). Competitive employment for youth with autism spectrum disorders: Early results from a randomized clinical trial. Journal of Autism and Developmental Disorders, 44(3), 487–500. https://doi.org/10.1007/s10803-013-1892-x	United States	To examine effectiveness of obtaining employment for students with ASD in a randomized clinical trial of PS compared to high school students' IEPs	ASD, PDD-NOS, or Asperger's, 40 students, 24 in treatment group and 16 in control, Aged 18-21	Randomized clinical design with discrete treatment and control groups (3-year time frame)	Intervention group: Project SEARCH -- control group: educational supports identified in their IEPs	3 time periods: Interviews included diagnosis, gender, student's IEP, employment history, employment goals, independent living supports needed, behavioural supports needed, and Support Intensity Scale (SIS)	Significant difference in number of participants who obtained employment in treatment group compared to control	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Past and current experiences** (Facilitator), **Education** (Facilitator)

Zwicker, J., Zaresani, A., & Emery, J. C. H. (2017). Describing heterogeneity of unmet needs among adults with a developmental disability: An examination of the 2012 Canadian Survey on Disability. *Research in Developmental Disabilities*, *65*, 1–11. https://doi.org/10.1016/j.ridd.2017.04.003	Canada	To describe the unmet employment, education and daily needs of adults with developmental disabilities (DD), with a sub analysis of persons with ASD and CP in Canada, to inform efficient and equitable policy development	ASD or CP, Aged 15-64 -- 117700 individuals with CP and 29550 individuals with ASD	Secondary analysis of 2012 Canadian Survey on Disability -- National cross-sectional population-based survey of adults with disability	N/A	Support for persons with DD, labour force outcomes, and education	Barriers exist in obtaining employment -- Persons with DD experience lowest labour force participation rates of any disability category (CP and ASD lower than other DD) and less than a third of the rate of general population	**Attitudes**: Individual attitudes of people in positions of authority (Barrier); **Services, Systems and Policies**: Education and training services, systems and policies (Barrier), Social services, systems and policies (Barrier)	**Past and Current Experiences** (Barrier)

Baker-Ericzen, M. J., Fitch, M. A., Kinnear, M., Jenkins, M. M., Twamley, E. W., Smith, L., … Leon, J. (2018). Development of the supported employment, comprehensive cognitive enhancement, and social skills program for adults on the autism spectrum: Results of initial study. Autism, 22(1), 6–19. https://doi.org/10.1177/1362361317724294	United States	To investigate the feasibility, acceptability and initial estimates of outcomes for the newly developed Supported Employment, Comprehensive Cognitive Enhancement, and Social Skill (SUCCESS) intervention	ASD, 8 individuals, Aged 18-29	Cohort study: SUCCESS integrated curriculum implemented within supported employment	25 sessions comprised of: cognitive enhancement and social skills -- teaching technical skills specific to software testing	Data collection at baseline and post-intervention -- Executive functioning skills, Social cognitive communication skills, vocational skills -- Employment rates	Employment rates more than doubled post-intervention -- executive functioning and social cognitive abilities increased within a supported vocational employment setting	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Education** (Facilitator) **Overall Behaviour Pattern** (Facilitator)

Kaya, C., Hanley-Maxwell, C., Chan, F., & Tansey, T. (2018). Differential vocational rehabilitation service patterns and outcomes for transition-age youth with autism. Journal of Applied Research in Intellectual Disabilities: JARID, 31(5), 862–872. https://doi.org/10.1111/jar.12443	United States	To investigate the relationship between demographic variables, VR services and employment outcomes for youth with autism	Autism, 3243 VR clients, Aged 19-25	Secondary Analysis: Quantitative correlational design	N/A	Competitive employment -- Independent variables: demographic variables (age, gender, race, education level and receipt of cash benefits) and VR services	Gender, education level and cash benefits are significant predictors to employment -- VR services were significantly associated with competitive employment	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator), Social security services, systems and policies (Barrier)	**Gender** (Facilitator/Barrier), **Education** (Facilitator), **Social Background** (Barrier)
Butler, L. N., Sheppard-Jones, K., Whaley, B., Harrison, B., & Osness, M. (2016). Does participation in higher education make a difference in life outcomes for students with intellectual disability? Journal of Vocational Rehabilitation, 44(3), 295–298. https://doi.org/10.3233/JVR-160804	United States	To determine life outcomes for adults with ID who attend a college or university versus those who do not	ID, 19 students (attending college) -- 158 people between ages 18-30 were the non-student group	Secondary Analysis: Survey of life outcomes of students who completed two semesters of college -	N/A	National Core Indicators (NCI) Adult Consumer Survey (ACS) (survey)	Increased competitive employment for students with higher education	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Education** (Facilitator)

				compared against randomly selected individuals receiving developmental disability waivers (non-students)					
Cimera, R. E., Burgess, S., & Bedesem, P. L. (2014). Does providing transition services by age 14 produce better vocational outcomes for students with intellectual disability? Research & Practice for Persons with Severe Disabilities, 39(1), 47–54. https://doi.org/10.1177/1540796914534633	United States	To determine if two additional years of transition services produced better vocational outcomes later in life for individuals with ID	ID, 7520 individuals who received transition services in IEPs by age 14 and 7520 individuals who received transition services at age 16	Secondary data analysis -(RSA 911)	N/A	Successful community employment (paid at least minimum wage)	Individuals from the early transition states (age 14) were significantly more likely to be employed by case closure	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Age** (Facilitator), **Education** (Facilitator)

Cimera, R. E., Burgess, S., & Wiley, A. (2013). Does providing transition services early snable students with ASD to achieve better vocational outcomes as adults? Research and Practice for Persons with Severe Disabilities, 38(2), 88–93. https://doi.org/10.2511/027494813807714474	United States	To determine if two additional years of transition planning enable students with ASD to achieve better employment outcomes than students starting 2 years later	ASD, 453 individuals who received transition services in IEPs by age 14 and 453 individuals who received transition services at age 16	Secondary data analysis - (RSA 911)	N/A	Successful employment (cases closed because community employment was obtained)	Individuals from the early transition states (age 14) were more likely to be employed by case closure	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Age** (Facilitator), **Education** (Facilitator)
Yokotani, K. (2010). Educational level signals unobserved abilities of people with high functioning autism spectrum disorders. *Psychological Reports*, *107*(1), 227–235.	Japan	To determine if those with job experience would have more years of education than those without job experience	High Functioning ASD (HFASD), Asperger syndrome, and PDD NOS, 22 individuals, mean age of 26.7 -- all attended a day-care facility	Qualitative: Questionnaires	N/A	Employment Duration: how many jobs they had and how long they lasted -- Education Level: last school they had attended or present school	People with HFASD and more years of education have a comparative advantage in obtaining a job	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Education** (Facilitator)

Wehman, P., Schall, C. M., McDonough, J., Graham, C., Brooke, V., Riehle, J. E., … Avellone, L. (2017). Effects of an employer-based intervention on employment outcomes for youth with significant support needs due to autism. Autism, 21(3), 276–290. https://doi.org/10.1177/1362361316635826	United States	To develop and investigate an employer-based 9-month intervention for high school youth with ASD to learn job skills and acquire employment	49 individuals with ASD, Ages 18-21 -- control group: high school education services, treatment group: PS-ASD intervention	Randomized clinical control trial comparing PS-ASD supports with high school education services as usual	Full school year of PS-ASD	Phone interview (regarding employment status) -- Baseline (general demographics and SIS interview), graduation, 3-month follow-up and 12-month follow-up	Treatment group acquired community-based employment at a rate significantly higher than control group	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Education** (Facilitator)
Wehman, P., Brooke, V., Brooke, A. M., Ham, W., Schall, C., McDonough, J., … Avellone, L. (2016). Employment for adults with autism spectrum disorders: A retrospective review of a customized employment approach. Research in Developmental Disabilities, 53–54, 61–72. https://doi.org/10.1016/j.ridd.2016.01.015	United States	To explore the impact of supported employment (SE) on employment outcomes of adults with ASD	ASD, 64 individuals, aged 15-59, all referred for SE services	Retrospective analysis of individuals who obtained SE services, Service delivery model -- (1) job seeker profile (2) career	N/A	Demographic data, time spent directly with or working for the jobseeker (intervention time), employment procurement	63 of 64 participants obtained competitive integrated employment	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator)	N/A

				search (3) job site training (4) long term support					
Schall, C. M., Wehman, P., Brooke, V., Graham, C., McDonough, J., Brooke, A., … Allen, J. (2015). Employment interventions for individuals with ASD: The relative efficacy of supported employment with or without prior project SEARCH training. Journal of Autism and Developmental Disorders, 45(12), 3990–4001. https://doi.org/10.1007/s10803-015-2426-5	United States	To report on the findings from a study that explores the difference between SE only and SE after PS-ASD on obtaining competitive employment	ASD, 45 participants, 25 participated in PS-ASD and SE and 20 participated in SE only	Retrospective clinical records review	N/A	Review of employment outcomes, hours of intervention in each SE phase and demographic factors	Competitive employment for both participant groups -- Less intervention time needed for PS-ASD group	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator), Education and training services, systems and policies (Facilitator)	**Education** (Facilitator)

Petner-Arrey, J., Howell-Moneta, A., & Lysaght, R. (2016). Facilitating employment opportunities for adults with intellectual and developmental disability through parents and social networks. Disability and Rehabilitation: An International, Multidisciplinary Journal, 38(8), 789–795. https://doi.org/10.3109/09638288.2015.1061605	Canada	To better understand the experiences of people with IDD gaining and keeping productivity roles	IDD, 74 individuals or their caregiver, aged 21-54 (13 individuals with IDD interviewing independently, 21 caregivers and 40 pairs of individual and caregiver)	Qualitative semi-structured interviews -- Coding methods consistent with grounded theory approach	N/A	Demographic questionnaire and activity profile, Independent Behaviour-Revised Short Form and Vocational Integration Questionnaire	Parents play an important role in obtaining work for children with ASD	**Support and relationships**: Immediate family (Facilitator), **Services, systems and policies**: Labour and employment services, systems and policies (Barrier)	**Social Background** (Facilitator)
Chiang H.-M., Cheung Y.K., Li H., & Tsai L.Y. (2013). Factors associated with participation in employment for high school leavers with autism. Journal of Autism and Developmental Disorders, 43(8), 1832–1842. https://doi.org/10.1007/s10803-012-1734-2	United States	To identify the factors associated with participation in employment for high school leavers with autism	Autism, 830 secondary school students (aged 13-16 in Wave 1)	Secondary data analysis of NLTS2 Waves 1 to 4	N/A	Paid employment since graduation -- independent variables: family characteristics, student characteristics, and transition planning services	8 significant variables: household income, parental education, gender, social skills, graduated from high school, career counseling in high school	**Services, systems and policies:** Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Social Background** (Facilitator [2]); **Gender** (Facilitator/Barrier); **Overall Behaviour Pattern** (Facilitator); **Education** (Facilitator)

Sung, C., Sanchez, J., Kuo, H.-J., Wang, C.-C., & Leahy, M. J. (2015). Gender differences in vocational rehabilitation service predictors of successful competitive employment for transition-aged individuals with autism. Journal of Autism and Developmental Disorders, 45(10), 3204–3218. https://doi.org/10.1007/s10803-015-2480-z	United States	To determine whether there is gender-specific VR service predictors of employment status in transition-aged individuals with ASD	ASD, 1696 individuals, aged 16-25 (857 males, 839 females)	Secondary Data Analysis: RSA-911 (year 2011)	N/A	Employment status at case closure -- Two sets of predictor variables (a) demographic characteristics and work disincentives and (b) VR services	Gender-Independent influences: previous work experience, postsecondary education, and greater case expenditure, job placement and on-the-job supports	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Past and Current Experiences** (Facilitator), **Education** (Facilitator)
Nagib W., & Wilton R. (2019). Gender matters in career exploration and job-seeking among adults with autism spectrum disorder: Evidence from an online community. *Disability and Rehabilitation*. Advanced publication online. doi: 10.1080/09638288.2019.1573936	World wide database (Largely North American)	To explore the role of gender in career exploration and job-seeking experiences among adults with autism	ASD, 714 threads posted, (252 women, 255 men),	Qualitative content analysis of randomly sampled posts from an online autism forum	N/A	Uses conceptual framework adapted from the theory of change (a) contemplation (b) preparation (c) action associated with employment	Employment procurement issues: Poor past experiences in employment, few opportunities in labour market, female gender role expectations, counselors lack of commitment/ interest, job interview/application	**Support and Relationships**: Immediate family (Barrier), Health-related professionals (Barrier); **Services, Systems and Policies**: Social security services (Barrier), Education and training services, systems and	**Gender** (Barrier), **Character** (Barrier), **Past and Current Experiences** (Barrier), **Social Background** (Barrier)

							issues, lack of vocational support	policies (Barrier), Labour and employment services, systems and policies (Barrier); **Attitudes**: Individual attitudes of people in positions of authority (Barrier)	
McLaren, J., Lichtenstein, J. D., Lynch, D., Becker, D., & Drake, R. (2017). Individual placement and support for people with autism spectrum disorders: A pilot program. Administration and Policy in Mental Health and Mental Health Services Research, 44(3), 365–373. https://doi.org/10.1007/s10488-017-0792-3	United States	To examine employment for individuals who participated in the Individual Placement and Support (IPS) model program	HFASD, 5 individuals, aged 19-28	Case Study	IPS supported employment program	Baseline demographic data; evaluation of employment procurement	All participants gained competitive employment during year 1	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator)	N/A

Wei, X., Yu, J. W., Wagner, M., Hudson, L., Roux, A. M., Shattuck, P., & Blackorby, J. (2018). Job searching, job duration, and job loss among young adults with Autism spectrum disorder. Journal of Vocational Rehabilitation, 48(1), 1–10. https://doi.org/10.3233/JVR-170922	United States	To examine the job search experience, job duration, and job loss of young adults with ASD and four other types of disabilities	ASD, 660 individuals, aged 26-28 (remained in program until Wave 5)	Secondary data analysis NLTS2 (Wave 5)	N/A	Job search: length of search, paid position or not and who helped the search; Correlates in analysis were demographic factors: age, gender, race, annual household income	Individuals with ASD faced more challenges in job search compared to other 4 disability types; General barriers include income, gender, education, age, communication skills	**Services, systems and policies**: Education and training services, systems and policies (Facilitator)	**Gender** (Facilitator/Barrier), **Social Background** (Facilitator/Barrier), **Overall Behaviour Pattern** (Facilitator), **Education** (Facilitator), **Age** (Facilitator)
Lindstrom, L., Hirano, K. A., McCarthy, C., & Alverson, C. Y. (2014). "Just having a job": Career advancement for low-wage workers with intellectual and developmental disabilities. Career Development and Transition for Exceptional Individuals, 37(1), 40–49. https://doi.org/10.1177/2165143414522092	United States	To examine career development and early employment experiences of young adults with ID/DD	ID/DD, 4 participants (2 males, 2 females) who received special education services, and working in integrated employment for 3-5, aged 25-30	Qualitative Methods: Multiple-method, multiple case-study, longitudinal design (4 years) -- Data sources included school	N/A	Individual characteristics, personal attributes, family supports/expectations, high school and post-school services/supports, workplace experiences, other post school training/education --	All participants gained competitive employment after transitioning from school	**Support and Relationships**: Immediate family (Facilitator), People in positions of authority (Facilitator) **Services, systems and policies**: Education and training services, systems and policies	**Past and Current Experiences** (Facilitator)

				and rehabilitation records, job observations and interviews -- Post positive paradigm		included family background questionnaire, job history form, and file review of special education and vocational rehabilitation records		(Facilitator), Labour and employment services, systems and policies (Facilitator)	
Kirby, A. V. (2016). Parent expectations mediate outcomes for young adults with autism spectrum disorder. Journal of Autism and Developmental Disorders, 46(5), 1643–1655. https://doi.org/10.1007/s10803-015-2691-3	United States	(1) To confirm predictive relationships of family background and functional performance variables to adult outcomes (employment), (2) To test hypothesis that parent expectations were a mediator	ASD, 1170 individuals, aged 13-25	Secondary Data Analysis: NLTS-2 (Wave 1-5), Structural Equation Modelling (SEM)	N/A	Latent variables: (1) family background (Race/ethnicity, household income, mother's education), (2) functional level (academic performance, social skills, and self-care skills), (3) parent expectations (expectation youth will have paid employment)	Increased adult outcome associated with family background and functional performance -- Parent expectation had significant direct relationship with adult outcome -- Parents expectations mediate relationships from family	**Attitudes**: Individual attitudes of immediate family members (Facilitator/Barrier)	**Ethnicity** (Facilitator), **Social Background** (Facilitator), **Overall Behaviour Pattern** (Facilitator)

		of predictive relationships from family background and functional performance to adult outcomes (employment)				, (4) young adult outcome (employment)	background and functional performance to young adult outcomes		
Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. Pediatrics, 129(6), 1042–1049. https://doi.org/10.1542/peds.2011-2864	United States	To examine the prevalence and correlates of postsecondary education and employment of youth with ASD	ASD, 680 individuals, aged 19-23, Comparison groups: Speech/language Impairment (SLI) 470, Learning disability (LD) 460, Mental retardation (MR) 430	Secondary data analysis: NLTS-2 (Wave 4)	N/A	Participation in paid employment, Demographic variables: Gender, age, ethnicity, race, parent's household income	Lowest rates of participation in employment and highest rates of no participation compared to other disability categories -- Higher income and functional ability associated with higher odds of participation	N/A	**Social Background** (Barrier); **Ethnicity** (Barrier); **Age** (Barrier)

Roux, A. M., Shattuck, P. T., Cooper, B. P., Anderson, K. A., Wagner, M., & Narendorf, S. C. (2013). Postsecondary employment experiences among young adults with an autism spectrum disorder. Journal of the American Academy of Child and Adolescent Psychiatry, 52(9), 931–939. https://doi.org/10.1016/j.jaac.2013.05.019	United States	To explore employment experiences for individuals with ASD post special education services, and compare with other developmental disorders (MR, LD, Emotional Disturbance [ED], SLI)	ASD, 620 adults, aged 21-25 who received special education services	Secondary Data Analysis: NLTS-2 (Wave 5)	N/A	Survey questions on employment, health status and functional skills; Demographic variables: age, sex, race, ethnicity, household income	Increased employment associated with higher household income, age, and functional skills	N/A	**Social Background** (Facilitator/Barrier), **Age** (Facilitator), **Overall Behaviour Pattern** (Facilitator)
Gonzalez R., Rosenthal D.A., & Kim J.H. (2011). Predicting vocational rehabilitation outcomes of young adults with specific learning disabilities: Transitioning from school to work. Journal of Vocational Rehabilitation, 34(3), 163–172. https://doi.org/10.3233/JVR-2011-0544	United States	To identify demographic characteristics predicting successful and unsuccessful employment outcomes	LD, 30,265 individuals, aged 16-24 that received VR	Secondary Data Analysis: RSA-911 (year 2007)	N/A	VR outcome (competitively employed); Predictor variables: gender, race, ethnicity, disability type, age, education, public support	Increased employment for individuals without public support -- Increased employment for males and European Americans	**Services, Systems, and Policies**: Social security services (Barrier)	**Gender** (Facilitator/Barrier), **Race** (Facilitator/Barrier), **Social Background** (Barrier)

		for individuals with SLD after VR							
Migliore, A., Timmons, J., Butterworth, J., & Lugas, J. (2012). Predictors of employment and postsecondary education of youth with autism. Rehabilitation Counseling Bulletin, 55(3), 176–184. https://doi.org/10.1177/0034355212438943	United States	To understand and predict transition outcomes for youth with autism	Autism, 2,913 youth, aged 16-26 (at application)	Secondary Data Analysis: RSA-911 (2008): Logistic regressions and multiple regressions to test relationships	N/A	Outcome variables: Integrated employment; Predictor variables: gender, race, ethnicity, age, receiving public support, postsecondary participation, specific VR services	The provision of job placement services was most influential variable toward integrated employment procurement, being male and having postsecondary education also increased chance of procurement	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator), Education and training services, systems and policies (Facilitator), Social security services (Barrier)	**Gender** (Facilitator), **Education** (Facilitator), **Social Background** (Barrier)

Kaehne, A. (2016). Project SEARCH UK - Evaluating its employment outcomes. Journal of Applied Research in Intellectual Disabilities: JARID, 29(6), 519–530. https://doi.org/10.1111/jar.12207	United Kingdom	To investigate the rate PS provided employment opportunities and assess employment outcomes	ID, 315 individuals (120 females, 195 males) (moderate, mild, severe, and profound) across 16 PS sites, aged 16-27	Secondary Data Analysis of PS data	N/A	Employment outcomes across site cohorts, and globally each year for PS; Associations between demographic variables and employment outcomes	PS has an average employment rate of 50% (lower than target of 60% but considered successful)	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator); **Support and Relationships**: People in positions of authority (Facilitator)	**Age** (Facilitator), **Education** (Facilitator)
Christensen J.J., & Richardson K. (2017). Project SEARCH workshop to work: Participant reflections on the journey through career discovery. Journal of Vocational Rehabilitation, 46(3), 341–354. https://doi.org/10.3233/JVR-170871	United States	To document growth of PS participants and self-perceived readiness for employment	ID, 10 individuals in sheltered workshops, aged 25-51	Qualitative: Semi-structured Interviews	Pilot project using PS for transition from sheltered employment to competitive employment	Semi-structured interviews about motivations, readiness, growth, and satisfaction with program and future employment -- at baseline and after internships --	63% transitioned into community-based employment	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator), Education and training services, systems, and	**Overall Behaviour Pattern** (Barrier)

						Employment outcomes were reviewed and analyzed		policies (Facilitator)	
Dreaver J., Thompson C., Girdler S., Adolfsson M., Black M.H., & Falkmer M. (2019). Success factors enabling employment for adults on the autism spectrum from employers' perspective. *Journal of Autism and Developmental Disorders*. Advance online publication. doi: 10.1007/s10803-019-03923-3	Australia, and Sweden	To explore organizational and individual factors facilitating successful employment of individuals with ASD	ASD, perspective of 4-line managers and 16 disability support directors in both Sweden and Australia	Inductive qualitative research method: Semi-structured interviews	N/A	Thematic analysis of interviews	Three themes facilitating successful employment: (1) knowledge and understanding of ASD (2) work environment (3) job match; Job match leading to success in attaining employment	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator)	N/A

Wehman, P., Lau, S., Molinelli, A., Brooke, V., Thompson, K., Moore, C., & West, M. (2012). Supported employment for young adults with autism spectrum disorder: Preliminary data. Research and Practice for Persons with Severe Disabilities, 37(3), 160–169. https://doi.org/10.2511/027494812804153606	United States	To examine the effects of supported employment in securing and maintaining competitive employment	ASD, 33 individuals in supported employment, aged 19-59	Prospective study (23-month period)	Supported Employment: (1) job seeker profile, (2) job development and career search, (3) job site training, (4) long-term supports	Competitive employment obtained	Competitive employment obtained by 27 of 33 individuals (82%)	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator)	N/A
Cimera R.E. (2012). The outcomes achieved by previously placed supported employees with intellectual disabilities: Second verse same as the first? Journal of Vocational Rehabilitation, 36(1), 65–71. https://doi.org/10.3233/JVR-2012-0582	United States	To understand if individuals with past supported employment achieve better vocational outcomes than those without supported employe	ID, 12,767 individuals competitively employed within previous 36 months (re-placed cohort) (average age: 35.92 yrs.), 12,767	Secondary data analysis of RSA-911	N/A	Percent of individuals employed (competitively) and cost of services received	Individuals in the re-placement cohort were more likely to be employed	**Services, systems and policies**: Labour and employment services, systems and policies (Facilitator)	**Past and Current Experiences** (Facilitator)

		nt background	individuals with ID not previously employment (Initial placement cohort) (average age: 32.60 yrs.)						
Dell'Armo, K. A., & Tasse, M. J. (2019). The role of adaptive behavior and parent expectations in predicting post-school outcomes for young adults with intellectual disability. Journal of Autism and Developmental Disorders, 49(4), 1638–1651. https://doi.org/10.1007/s10803-018-3857-6	United States	To determine relationship of SES/demographic factors, adaptive behaviour, and parent expectations in post-school outcomes (including employment)	ID, 1270 individuals (660 mild, and 610 moderate/severe) -- 690 individuals had follow-up data at wave 5 -- 400 participants in final analysis	Secondary data analysis of NLTS-2 Waves 1 and 2 -- Structural equation modelling (SEM) -- Latent variable framework	N/A	Demographic factors: race, family income, parent education level; adaptive behaviours (social skills, self-care skills, academic performance), parent expectations, post-school outcomes (employment)	Adaptive behaviour is important in predicting post-school outcomes (including employment)	N/A	**Overall Behaviour Pattern** (Facilitator), **Character** (Facilitator)

Gillan, D., & Coughlan, B. (2010). Transition from special education into postschool services for young adults with intellectual disability: Irish parents' experience. Journal of Policy and Practice in Intellectual Disabilities, 7(3), 196–203. https://doi.org/10.1111/j.1741-1130.2010.00265.x	Ireland	To explore parent perceptions regarding barriers and facilitators to the transition experience in the context of family systems, service system, and social and community systems	ID (mild), 12 parents (Parents: 42-65 yrs.) (Children: 19-24 yrs.) -- Children obtaining SE or VT	Qualitative grounded theory approach in semi-structured interviews	N/A	Thematic analysis divided into 3 categories: (1) the family system (2) the service system (3) the wider social system	Parental attitudes found to help children obtain employment but also hinder process due to lack of independence given -- Employers were noted as barriers due to negative attitudes -- social security a barrier due to regulations associated with funding	**Attitudes**: Individual attitudes of immediate family members (Barrier) People in positions of authority (Barrier); **Support and Relationships**: Immediate family (Facilitator); **Services, Systems and Policies**: Social security services, systems and policies (Barrier); Labour and employment services, systems, and policies (Barrier)	**Social Background** (Barrier)

Migliore, A., Butterworth, J., & Zalewska, A. (2014). Trends in vocational rehabilitation services and outcomes of youth with autism: 2006-2010. Rehabilitation Counseling Bulletin, 57(2), 80–89. https://doi.org/10.1177/0034355213493930	United States	To investigate the trend in VR services and employment outcomes for individuals with autism	Autism, 6,952 individuals compared to 28,127 individuals with ID and 146,703 individuals with other disabilities, aged 16-26	Secondary Data Analysis: RSA-911 (2006-2010)	N/A	Exited with integrated employment	In 2010 youth with autism had slightly greater rehabilitation rate (50%) compared to ID (44%) and other disabilities (46%) -- however rates are down from 2006	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Past and Current Experiences** (Barrier)
Chen, J. L., Sung, C., & Pi, S. (2015). Vocational Rehabilitation Service Patterns and Outcomes for Individuals with Autism of Different Ages. Journal of Autism and Developmental Disorders, 45(9), 3015–3029. https://doi.org/10.1007/s10803-015-2465-y	United States	To examine associations between VR services and competitive employment outcomes of individuals with ASD	Autism, 5,681 individuals, 3 subgroups: Transition youth 18 and younger (48%), Transition young adults 19-25 (38%), Adult group 26 and older (14%) --	Secondary data analysis: RSA-911 -- Hierarchical logistic regression	N/A	Dependent variables - VR outcomes at closure, employment status; Independent variables: gender, race/ethnicity, sources of referral, education level, work disincentives (Supplemental security income [SSI] benefits),	Transition youth had lowest competitive employment procurement (47%), transition young adults (55%), adults (61%); Work disincentives (SSI), duration of VR and cost of VR were predictors of unsuccessful	**Services, Systems, and Policies**: Social security services (Barrier); Labour and employment services, systems and policies (Facilitator), Education and training services, systems and policies (Facilitator)	**Age** (Facilitator/Barrier), **Social Background** (Barrier)

			received VR services			cost of services, duration of services, types of VR services	employment in all age groups; successful employment associated with counseling/guidance, job placement, on-the-job support		
Ditchman, N. M., Miller, J. L., & Easton, A. B. (2018). Vocational rehabilitation service patterns: An application of social network analysis to examine employment outcomes of transition-age individuals with autism. Rehabilitation Counseling Bulletin, 61(3), 143–153. https://doi.org/10.1177/0034355217709455	United States	To apply network methodology to examine structural regularities between VR services and young adults with ASD to predict employment status	ASD, 2,219 individuals (1,794 males and 335 females), aged 16-24, served by public vocational rehabilitation system	Secondary data analysis: RSA-911 -- Used social network analysis	N/A	Employment outcome (competitively employed at time of closure for 90 days) -- Density and degree of ties within network	SSI at application decreased employment odds, and six services influenced employment: job placement assistance, counseling, job search assistance, on-the-job support, transportation	**Services, Systems, and Policies**: Social security services (Barrier); Labour and employment services, systems and policies (Facilitator), Transportation services, systems, and policies (Facilitator/Barrier)	**Social Background** (Barrier)
Nye-Lengerman K. (2017). Vocational rehabilitation service usage and outcomes for individuals with Autism	United States	To examine the relationshi	Autism, 10,209 individuals who had	Secondary data analysis: RSA-	N/A	Dependent variables: integrated employment	Females and black/African Americans had lower	**Services, systems and policies**: Labour and	**Gender** (Barrier/Facilitator); **Ethnicity**

Spectrum Disorder. Research in Autism Spectrum Disorders, 41–42, 39–50. https://doi.org/10.1016/j.rasd.2017.08.003		ps between characteristics, service delivery, and employment outcomes for individuals with ASD in VR programs	VR services and cases closed in 2013	911 (2013) -- Binary logistic regression analysis		at closure, assessment, vocational rehabilitation counselling and guidance (VRCG), job search, job placement, on-the-job support; Independent variables: primary impairment, and service received; Control variables: state system, gender, race/ethnicity, age, integrated employment at application	rates of employment compared to rest of population -- VRCG, job search, job placement, and on-the-job supports increased employment procurement; assessment (administrative services) decreased chances of employment	employment services, systems and policies (Facilitator/Barrier)	(Barrier/Facilitator), **Past and Current Experiences** (Facilitator)

Alverson, C. Y., & Yamamoto, S. H. (2018). VR employment outcomes of individuals with autism spectrum disorders: A decade in the making. Journal of Autism and Developmental Disorders, 48(1), 151–162. https://doi.org/10.1007/s10803-017-3308-9	United States	To identify predictors of VR case closures for individuals with ASD and compare these over time and location	ASD, 47,312 individuals who have had VR services	Secondary data analysis: RSA-911 (2003-2012): hierarchical linear modeling analysis	N/A	Case-closure employment outcome - employed or not employed, Variables: total number of VR services, ethnicity, gender, education level, IEP	All variables found significant in one of more years except for IEP -- Differences occurred between predictors across time -- Location did not change results significantly	**Services, systems and policies**: Education and training services, systems and policies (Facilitator), Labour and employment services, systems and policies (Facilitator)	**Gender** (Barrier/Facilitator); **Ethnicity** (Facilitator/Barrier); **Education** (Facilitator)
Migliore, A., Grossi, T., Mank, D., & Rogan, P. (2008). Why do adults with intellectual disabilities work in sheltered workshops? *Journal of Vocational Rehabilitation, 28*(1), 29–40.	United States	To determine what factors, influence the choice between sheltered workshops and integrated employment for individuals with ID and their families	ID; 210 individuals, 185 families, 224 staff members in sheltered workshops	Qualitative: Surveys	N/A	(1) Long-term placement, (2) safety, (3) work skills, (4) social environment, (5) work hours, (6) transportation, (7) disability benefit, (8) agency support, (9) system services, (10) negative experiences	Retaining social security benefits, safety, transportation and skills all influenced employment outcomes	**Support and Relationships**: Immediate family (Barrier); People in positions of authority (Barrier); **Attitudes**: Individual attitudes of immediate family members (Barrier); Individual attitudes of people in	**Past and Current Experiences** (Barrier), **Social Background** (Barrier)

								positions of authority (Barrier) **Services, Systems and Policies**: Social security services, systems and policies (Barrier); Transportation services, systems and policies (Barrier)	
Carroll, C., & Dockrell, J. (2012). Enablers and challenges of post-16 education and employment outcomes: The perspectives of young adults with a history of SLI. International Journal of Language & Communication Disorders, 47(5), 567–577. https://doi.org/10.1111/j.1460-6984.2012.00166.x	England	To determine enablers and barriers to transition to further education and employment for individuals with SLI	SLI, 19 individuals with history of SLI (4 females, 15 males), aged 19-23	Qualitative: Semi-structured Interviews	N/A	Thematic analysis - based on enablers and barriers to further education and employment	Personal characteristics, parent contributions, professional advice/aid and education were main contributors toward employment	**Support and Relationships:** Immediate family (Facilitator); **Services, systems and policies:** Labour and employment services, systems and policies (Barrier); **Attitudes:** Individual attitudes or people in	**Character** (Facilitator), **Overall Behaviour Pattern** (Facilitator), **Education** (Barrier)

								positions of authority (Barrier)	