

# Perspectives of Key Stakeholders on Employment of Autistic Adults across the United States, Australia, and Sweden

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Despite efforts to improve employment outcomes for autistic individuals, internationally their employment rates remain low. There is a need to better understand the factors influencing successful employment for autistic adults in the labor market from the perspectives of multiple key stakeholders. This study represents the second in a series of papers conducted as part of an International Society for Autism Research policy brief aimed at improving employment outcomes for autistic individuals. A community consultation methodology using focus groups, forums, and interviews was applied with autistic individuals ( $n = 19$ ), family members ( $n = 18$ ), service providers ( $n = 21$ ), employers ( $n = 11$ ), researchers ( $n = 5$ ), and advocacy group representatives ( $n = 5$ ) in Australia, Sweden, and the United States, aiming to identify the factors perceived to determine gaining and maintaining employment for autistic individuals. Directed content analysis, guided by the International Classification of Functioning, Disability and Health (ICF), was conducted to investigate the key factors influencing employment outcomes for autistic individuals. Meaningful verbal concepts, or units of text with common themes, were also derived from the qualitative data and then linked and compared to the ICF Autism Spectrum Disorder (ASD) Core-sets. Across countries, activity and participation and environmental factor categories of the ICF were the most associated with employment outcomes. Results suggest that removal of environmental barriers and enhancing environmental facilitators may assist to remediate ASD-related difficulties in the workplace. *Autism Res* 2019, 12: 1648–1662. © 2019 International Society for Autism Research, Wiley Periodicals, Inc.

**Lay Summary:** This study sought to understand the perspectives of autistic individuals and key stakeholders on factors influencing if autistic adults get and keep jobs. Across Australia, Sweden, and the United States, focus groups and interviews were conducted to understand international perspectives on what helps and hinders getting and keeping a job for autistic individuals. The environment, including supports, relationships, attitudes, and services, were perceived to be the most important for workplace success. Intervention targeting barriers and facilitators in the workplace environment may support autistic adults to be successful in the labor market.

**Keywords:** autism; cross-cultural; employment; ICF

## Introduction

While employment is essential for independent life and improving living standards, “having a job” is also an essential ingredient in achieving quality of life in adulthood. Being employed has been demonstrated to influence life satisfaction [Grun, Hauser, & Rhein, 2010] and positive mental health outcomes [Flint, Bartley, Shelton, & Sacker, 2013]. However, for many people, and particularly for those with disabilities, securing employment can be an

elusive goal. Internationally, employment rates for autistic adults fall well below that of the general population [Organisation for Economic Co-operation and Development, 2010], and the rates of employment for individuals with other disabilities. In Australia, 40.8% of autistic individuals aged between 15 and 64 years of age participate in the labor force [Australian Bureau of Statistics, 2017]. This is just under half the employment rate of the general population (83.2%) and is even under the rate for other disabilities (53.4%) [Australian Bureau of Statistics, 2017]. Similar

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trends are observed in the United States with the 2017 National Autism Indicators Report finding that only 38% of autistic individuals in the United States participated in paid work [Roux, Rast, Anderson, & Shattuck, 2017]. While Sweden has historically been associated with comparatively better employment outcomes for autistic individuals (56%), their employment even here remains below that of the general population (78%) and the average employment rates for people with other disabilities (62%) [Statistics Sweden, 2015].

Like the population in general, the majority of individuals diagnosed with Autism Spectrum Disorder (ASD) has a strong desire to engage in paid and productive employment [Autism Spectrum Australia [Aspect], 2013]. From the employers' perspective, aside from behavioral challenges, many autistic individuals have skills beneficial in the workplace, including particular cognitive strengths, interests, and personal characteristics, such as attention to detail, expertise in specific areas, scientific dispositions, and fairness [de Schipper et al., 2016; Kirchner, Ruch, & Dziobek, 2016]. At a societal level, the low employment rates of autistic individuals represent a significant economic burden through reduced productivity and reliance on government funding [Järbrink, McCrone, Fombonne, Zandén, & Knapp, 2007]. In contrast to common misconceptions, research shows that employing autistic individuals does not incur significantly increased costs compared to employing typically developing individuals at the same level of work complexity [Scott et al., 2017]. Despite the potential benefits of employing autistic individuals, employment outcomes for this population remain poor. Given the high rates of unemployment experienced by autistic individuals internationally, there is a need to better understand the hindering and facilitating factors impacting on successful employment outcomes of this group as perceived by key stakeholders.

A nomenclature to understand the functioning of individuals in their world, including employment, is the World Health Organization International Classification of Functioning Disability and Health (ICF). The ICF provides a biopsychosocial framework to describe and understand health-related functioning, offering a universal language to describe health internationally [World Health Organization, 2002]. Recently, ICF Core-sets were developed for ASD [Bölte et al., 2018], capturing the most salient factors influencing functioning in this specified population [Schiariti, Mahdi, & Bölte, 2018], and highlighting the importance of a contextualized understanding in appraising functioning and improving outcomes in ASD [Schiariti et al., 2018]. Thus, these ICF Core-sets for ASD are currently the most adequate to systematically describe and classify the factors affecting employment in ASD from a global perspective.

This study represents the second in a series of papers conducted in association with the International Society for

Autism Research with the aim of informing a policy brief focused on improving employment outcomes for autistic individuals, and is the result of collaborative efforts between the Curtin Autism Research Group (CARG) in Australia, the Karolinska Institutet for Neurodevelopmental Disorders (KIND) in Sweden, Stony Brook University as well as the Autism Science Foundation in the United States. The first study in this series, a systematic review [Scott et al., 2018] aimed to position this work in the current evidence base and examined existing literature on employment outcomes for autistic individuals. Using the ICF Core-sets for ASD [Bölte et al., 2018] to structure the review, it was found that although many factors influence employment outcomes for autistic individuals, environmental factors may play a particularly important role [Scott, Milbourn, et al., 2018]. While this review identified 36 employment intervention studies, few of these targeted contextual factors and none overtly addressed environmental factors as the target of intervention [Scott, Milbourn, et al., 2018]. It is likely that the paucity of studies addressing the role of contextual factors in supporting the employment outcomes of autistic individuals is at least partly related to a lack of understanding of the role they play.

The present study sought to address this gap in understanding, and expand and extend the findings of the review, employing the ICF framework and the recently published Core-sets for ASD to identify multiple and cross-cultural perceptions of the facilitators and barriers to the employment of autistic individuals. For this purpose, the perspectives of autistic individuals, their families, and other key stakeholders, such as service providers and particularly employers, were captured and compared between Australia, Sweden, and the United States.

## Method

### *Design*

Given that this study more broadly formed part of an effort to generate a policy brief, aiming to provide recommendations to policymakers, input from key stakeholders, including autistic individuals and the autistic community were sought. In order to promote the active involvement of autistic individuals, an international community consultation approach using principles of participatory action research [Kendon, Pain, & Kesby, 2007] was undertaken, focusing on employment outcomes for autistic adults and the autistic community. Participatory action research acknowledges that many key stakeholders will hold knowledge regarding particular subjects and emphasizes the collaboration between both researchers and the participants, or community to examine and address issues faced by that community, aiming to change practices and social structure [Kendon et al., 2007]. Community consultation is recognized as one method through which participatory action

may be achieved [Kindon et al., 2007]. Community consultation methodology allows the strengths, resources, and knowledge of various stakeholders to be captured and utilized [Goodare, 1999; Israel, Schultz, Parker, & Becker, 1998] and has been demonstrated to improve the relevance of research to the target population, empower the community and strengthen research quality [Goodare, 1999; Israel et al., 1998]. This study was led by the three study sites in Australia, Sweden, and the United States. Figure 1 demonstrates the structure of this study. Though not discussed here, as part of the creation of the international policy brief, another study in the form of an international survey was also conducted.

### Participants

In Australia, Sweden, and the United States, autistic individuals and their families, service providers and employers with autistic staff were invited to participate. Service providers consisted of individuals working with autistic individuals including occupational therapists, psychologists, social workers, physiotherapists, consultants, and speech pathologists. In Australia, recruitment of eligible participants was undertaken by CARG through social media and research mailing lists with assistance from the Autism Association of Western Australia. In Sweden, participants were recruited by KIND via interest organizations (i.e., Autism and Asperger Association, National Society Attention, and Organized Aspergians), the Swedish Public Employment Service as well as the research center's own network and mailing lists using snowball-sampling methods. In the United States, participant recruitment was undertaken by the Autism Science Foundation in collaboration with Stony Brook University via social media, referrals from advisory boards of interest organizations (e.g., Autism Speaks, Asperger Syndrome and High-Functioning Autism Association), and contacts from the Stony Brook Social Competence and Treatment Lab. While there was some overlap between their affiliations (i.e., parents and employers, parents and representatives of advocacy groups), a total of 79 participants, including 19 autistic individuals, 18 family members, 21 service providers, 11 employers,

five researchers, and five advocacy group representatives were included in the community consultation across the three countries. Table 1 provides details on the participant groups examined.

### Ethics Considerations

Ethical approval in Australia was obtained by Curtin University Human Research Ethics Committee (HREC: HR141/2014), in Sweden by the Local Ethical Vetting Board Stockholm (2017/1251-31/5), and in the United States approval was obtained from the Stony Brook Institutional Review Board (CORIHS#: 2017-4108-F). This study complied with the Helsinki Declaration [World Medical Association, 2013].

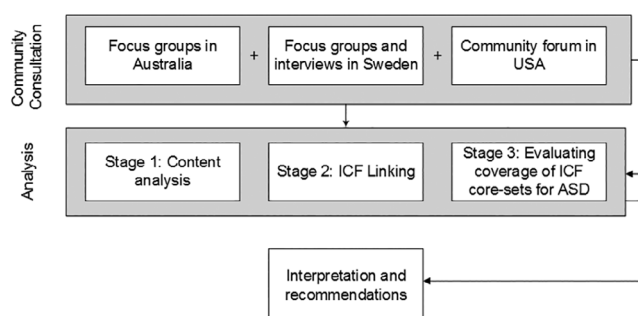
### Data Collection Instruments

**Interview and focus group data.** Interviews, focus groups, and community forums were conducted in Australia, Sweden, and the United States, in order to examine the perspectives of autistic individuals, the autistic community, and key stakeholders regarding factors influencing getting and maintaining employment for autistic individuals. Focus groups, interviews, and community forums were guided by six questions aiming to facilitate discussion regarding the factors impacting employment outcomes for autistic individuals (Table 2). While questions varied slightly across countries, they were centered on understanding the facilitators and barriers for preparing for employment, gaining employment, and maintaining employment, as well as the potentially overlooked strengths and benefits of having autistic people in the workplace.

**ICF Core-sets for ASD.** The ICF and the Comprehensive Core-sets for ASD [Bölte et al., 2018] guided data analysis. The ICF is a biopsychosocial framework consisting of components including body functions (physiological functions), body structures (anatomical body parts and structures), activities (execution of a task or action) and participation (involvement in a life situation), and environmental barriers and facilitators (physical and social factors). The ICF broadly acknowledges the role of contextual factors in determining an individual's capacity to participate in activities such as occupation [World Health Organization, 2002]. The ICF provides a hierarchical classification system where aspects related to functioning are coded to increasing levels of detail. For example:

- d Activities and participation (domain level)
- d8 Major life areas (chapter level)
- d845 Acquiring, keeping, and terminating a job (second level)
- d8450 Seeking employment (third level)

The ICF Core-sets for ASD are designed to contain codes from the ICF that are required to fully describe the



**Figure 1.** Study overview.

**Table 1. Number of Participants Examined in Australia, Sweden, and the United States**

	Australia	Sweden	United States
Autistic individuals	9	6	4
Age years, M (SD)	25.5 (6.8)	38.0 (7.0)	–
Sex			
Male	4	3	1
Female	5	3	3
Other	0	0	0
Family members	9	7	2
Service providers	15	6	–
Employers	–	5	6
Researchers			5
Advocacy group representatives	–	–	5
Total participants	33	24	22

functioning of autistic individuals. The development of Core-sets aims to increase the applicability and practicality of using the ICF coding system within clinical, educational, and other societal settings where individuals diagnosed with certain conditions frequent occur. These Core-sets place a particular emphasis on the environment and activity and participation components. The ICF Core-sets for ASD contains a total of 111 second-level categories from the full ICF classification system, composing of one body structure, 20 body functions, 59 activities and participation, and 31 environmental factor codes.

### Procedure

Due to the community consultation methodology, data collection methods were tailored according to what best suited the various contexts. For this reason, data collection procedures varied between countries (Table 2). Focus groups in Australia were conducted by CARG in association with the Autism Association of Western Australia, facilitated by researchers experienced with ASD and employment. Two focus groups were conducted with autistic individuals and their families and one focus group was conducted with autism service providers. Each focus group was approximately 1.5 hr. An all-day community forum with key stakeholders was conducted in the United States by Stony Brook University and the Autism Science Foundation. In addition to presentations on topics relevant to employment, participants split into two separate working groups and met for 3 hr. In Sweden, focus groups and individual interviews were conducted by KIND, with one focus group held with family members and one with service providers, in addition, interviews were conducted with six autistic individuals, one family member, and five employers. The focus groups and interviews varied in length and were between 1 and 1.5 hr. All interviews and focus groups were conducted by researchers and professionals with experience in ASD and these methods. Data from Sweden were analyzed in

**Table 2. Data Collection Procedures**

	Australia	Sweden	United States
Data collection method;	Focus groups ( $k^a = 3$ )	Interviews ( $k = 12$ ) and focus groups ( $k = 2$ )	Community forum ( $k = 1$ )
Guiding questions	<ol style="list-style-type: none"> <li>1. What is most important in preparing people with Autism for the workplace?</li> <li>2. What is most important in helping people with Autism successfully gain employment?</li> <li>3. What are the difficulties/challenges that people with Autism experience in gaining employment?</li> <li>4. What is most important in helping people with Autism maintain employment?</li> <li>5. In your experience what are the difficulties/challenges that people with Autism experience in maintaining employment?</li> <li>6. What are the benefits of having people with Autism in the workplace?</li> </ol>	<ol style="list-style-type: none"> <li>1. What are the important factors for individuals with ASD who are seeking employment/are already employed?</li> <li>2. What are the advantages of employing individuals with ASD?</li> <li>3. How can the environment create barriers for individuals with ASD who are seeking employment/are already employed?</li> <li>4. How can the environment support individuals with ASD who are seeking employment/are already employed?</li> <li>5. How can individual strengths and abilities be utilized by employers or other types of stakeholders?</li> <li>6. What can individuals with ASD do to improve their employment situation?</li> </ol>	<ol style="list-style-type: none"> <li>1. Preparation for the workplace</li> <li>2. Successfully gaining employment</li> <li>3. Difficulties and challenges in gaining employment</li> <li>4. Successfully maintaining employment</li> <li>5. Difficulties and challenges to maintaining employment</li> <li>6. Benefits of having individuals with ASD in the workplace</li> <li>7. What does employment mean to you? (autistic individuals only)</li> </ol>
Data obtained	Key points were written by facilitators during the focus groups and supplemented by data obtained from audio recordings	Data transcribed verbatim in Swedish and transcribed to English for purposes of analysis and result presentation	Key points and pertinent quotes during discussions were transcribed

<sup>a</sup>Denotes number of focus groups, interviews, or forums conducted.



Swedish and subsequently translated into English for the purposes of cross-cultural comparisons and presentation.

### *Data Analysis*

Three stages of data analysis were undertaken; (a) directed content analysis, (b) linking of verbal material to ICF categories, and (c) evaluation of coverage of linked ICF categories by the ICF Core-sets for ASD. Data from Australia, Sweden, and the United States were analyzed separately to enable cross-cultural comparisons.

**Stage one.** A directed content approach [Hsieh & Shannon, 2005] identified overarching themes relating to key stakeholder perspectives on the factors influencing employment for autistic individuals. In line with this approach, participants' responses were identified and categorized into emerging themes [Van Manen, 1990]. Themes were further examined in regard to facilitators/strengths and barriers/challenges to successfully gaining and maintaining employment. For the purposes of thematic analysis, data were not analyzed according to country. Analysis was undertaken by two Swedish based and one Australian based researcher. Discussions were held between researchers to reach consensus regarding themes and to reduce the potential for investigator bias [Guba, 1981; Nowell, Norris, White, & Moules, 2017]. A combined sample of 79 participants was deemed appropriate to meet saturation [Saunders et al., 2018].

**Stage two.** Following the thematic analysis, data were linked to the ICF to investigate the specific components of the ICF influencing the employment outcomes of autistic individuals. This linking was undertaken separately for each country to enable comparisons. In linking data to the ICF, meaningful units were first extracted from the raw data based on their meaning, with text divided when a shift of meaning occurs, rather than on the basis of grammatical or linguistic rules, for example, "it is important to have a support worker advocating to help employers." Meaningful concepts were then developed based on these units whereby meaningful concepts refer to the intended meaning of the meaningful units, for example, "having a good relationship with employer." Extracted concepts were then linked to the ICF ASD Core-sets [Bölte et al., 2018] at the first and second levels using the linking rules outlined by Cieza et al. [2005]. Concepts relevant to the ICF but without sufficient information to support linkage were labeled as not definable, while codes not covered by the ICF were labeled as not covered.

Personal factors, such as gender, age, personality traits, education, and life habits are not included as codes in the ICF [Grotkamp, Cibis, & Seger, 2012; World Health Organization, 2002] given their large cultural variability. However, it was anticipated that personal factors were significantly influencing the employment of autistic adults. For this

reason, personal factors were linked to a classification system that has been proposed by Grotkamp et al. [2012].

To improve trustworthiness and dependability [Krefting, 1991] of the linking process, ICF linking was undertaken by five researchers. One researcher (S.M.), who had received linking training from the ICF research branch ([www.icf-research-branch.org](http://www.icf-research-branch.org)) and has extensive ICF experience, provided guidance to the linking researchers prior to the ICF linking. In order to conduct linking, all researchers were required to be experienced with the ICF. Australian data were linked to the ICF by three Australia based researchers, whereas Swedish data were linked by two Swedish and one Australian based researcher to establish intra- and inter-country consensus. US data were linked by one Swedish and one Australian based researcher. For each study site, data were linked independently by each researcher and consensus meetings were held to discuss incongruity in linking and reach agreement regarding linking. Agreement in linking at the Australian site prior to consensus meetings was 37.1% with Fleiss' Kappa, indicating fair agreement ( $r_{\kappa} = 0.31$ ). For US data, 51.7% agreement was attained prior to consensus with Cohen's Kappa, indicating moderate agreement ( $r_{\kappa} = 0.48$ ) between linkers. The inter-rater agreement for Swedish data was 86.0% with Cohen's Kappa showing good to excellent agreement ( $r_{\kappa} = 0.86$ ). Saturation analysis showed that 83% of unique codes were identified by the Swedish site. Australia contributed a further 15% of codes, with US data contributing 2%. Cumulatively, this indicates that data collected were sufficient to reach saturation [Saunders et al., 2018].

## **Results**

### *Content Analysis*

Fourteen themes relating to factors significant for successful employment of autistic individuals were derived from the data across the three countries and four respondent groups.

**Body functions.** One body functions theme was identified through the content analysis, namely the understanding of an individual's "Unique strengths and impairment profile" (Table 3).

**Activity and participation.** Five themes emerged in the activity and participation domain (Table 4). These were regarded as both strengths and limitations/restrictions to autistic individuals and included "Communication," "Navigating social demands and relationships," "Understanding and managing workplace expectations," "Preparation for, and seeking employment," and "Handling responsibilities and stress."

**Environmental factors.** Themes associated with environmental factors included "Support team for employees,

**Table 3. Body Function Themes**

Theme	Operational definition	Associated facilitators/supports	Associated barriers/challenges	Example quotes
Unique strengths and impairment profile	Unique strengths and limitations in body function profile were noted as a relevant factor in employment outcomes. By understanding and acknowledging these limitations and strengths, skills could be harnessed, ensuring a person-job match in the workplace, while difficulties/challenges can be addressed through environmental modifications	<ul style="list-style-type: none"> <li>Cognitive skills (attention, endurance, orientation to detail, visually strong, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Cognitive impairment (orientation to time, emotion regulation, executive functions, insight)</li> <li>Movement-related impairments fine hand use)</li> <li>Sensory impairment (sensitivity to temperature, sound, and light)</li> </ul>	<p>"I can make things easier for myself. I problem solve in a different way, 'think outside the box.'" (Autistic individual, AUS<sup>a</sup>)</p> <p>"If you move a person into something that invokes their best... If you can do math and physics, you can do math and physics." (Parent and employer, United States<sup>b</sup>)</p>

<sup>a</sup>Australia.<sup>b</sup>United States.

employers, and coworkers," "Workplace adjustments," "Attitudes, understanding and knowledge," "Employment policies and systems," and "Physical environment considerations" (Table 5).

**Personal factors.** Three personal factor themes including "Meaning of employment," "Expert knowledge and special interests," and "Personality traits" were found to positively influence success in the workplace for autistic individuals. These are presented in Table 6.

#### ICF Linking

In total, 2,381 meaningful concepts were derived from the data across the three countries. Of these concepts, 2,069 (87%) could be linked to ICF categories and personal factors codes, generating 119 unique codes, of which 96 were ICF categories and 23 personal factors. The distribution of ICF codes across countries is shown in Figure 2 and Table 7.

**Body functions and structures.** Body functions and structures of autistic individuals represented both strengths and limitations in the workplace. Two of the seven body functions and one of the eight body structure chapters were covered. Linking revealed that mental functions accounted for the majority of body function codes in all countries (Table 8) and were primarily associated with autistic-related strengths in the workplace, including skills related to attention (b140), memory (b144), higher-level cognitive functions (b164), and intellectual functions (b117). General disposition (b125) such as persistence, and temperament functions (b126), such

as agreeableness, were also frequently seen as autistic-related strengths in the workplace.

Sleeping patterns (b134) and energy (b130), specifically difficulty waking up in the morning and managing mental energy during the workday, were identified as key limitations for autistic individuals in employment. Sensory difficulties, such as reacting to noise (b230) or visual stimuli (b210) in the workplace, were identified as potential areas of challenge for autistic individuals along with factors, such as insight (b164) and global psychosocial functions (b122), including theory of mind (b122), reflecting difficulties autistic individuals may have in understanding their unique strengths and limitations and the perspectives of others in the workplace. Chapters b3–b7 were not represented in the linking.

**Activities and participation.** Data were linked to all nine activity and participation chapters (Table 9). Primary difficulties within this domain for autistic individuals related to social factors, such as communication (d3) and interpersonal interactions and relationships (d7), including understanding basic (d710) and complex (d720) interpersonal interactions and developing and maintaining formal (d740) and informal (d750) relationships with colleagues and employers.

Functions associated with learning and applying knowledge were frequently observed in Australia and Sweden and were associated with both strengths and limitations in the workplace for autistic individuals. Problem-solving abilities (d175), focusing attention (d160), and directing attention (d161) were all key strengths for autistic individuals, while coping with general task demands (d2), including managing daily routine

**Table 4. Activity and Participation Themes**

Theme	Operational definition	Associated skill/supports	Associated limitations/restrictions	Example quotes
Communication	Understanding and using verbal and nonverbal communication in the workplace was a key factor influencing successful employment for autistic adults. While autistic adults had difficulty with communication, communication could be facilitated through adaptive strategies	<ul style="list-style-type: none"> <li>Clearly and honestly communicating strengths and difficulties with employer</li> <li>Providing communication tips or alternative forms of communication (using email)</li> </ul>	<ul style="list-style-type: none"> <li>Disclosing and discussing diagnosis with employer</li> <li>Communicating needs and strengths</li> <li>Asking for help</li> <li>Difficulty understanding verbal task instructions</li> </ul>	"If I think about my son, I would want him to say what he is good at and interested in, but how would you get him to say that? I do not know. I do not think he would say that by himself." (Family, SWE <sup>a</sup> )
Navigating social demands and relationships	Similar to communication, coping with and understanding social demands and requirements in the workplace and building relationships with coworkers and employers was an important factor in determining success in employment	<ul style="list-style-type: none"> <li>Support to feel socially included</li> <li>Assistance in developing social and communication skills prior to involvement</li> <li>Mentor to facilitate social interaction</li> </ul>	<ul style="list-style-type: none"> <li>Inappropriate body language</li> <li>Physical contact with other people</li> <li>Understanding and reacting to social cues in interactions</li> <li>Managing small talks</li> <li>Trusting other people</li> <li>Unstructured social events</li> <li>Understanding social rules (e.g., gossip, banter)</li> </ul>	<p>"My colleagues talk about their kids, and then they ask if I have any children. They talk about these things during breaks and it develops into small talk, which I find to be [extremely] boring. That is how it is, you just have to manage it. Once you get home, you can meet your friends and talk about things that you are interested in."</p> <p>(Autistic individual, SWE)</p> <p>"There should be ongoing training on workplace etiquette and rules, including cursing, personal space, social aspects, and conflict resolution." (Autistic individual, United States<sup>b</sup>)</p>
Understanding and managing workplace requirements and expectations	Having an adequate understanding of the workplace and the requirements and expectations was key in ensuring the successful employment of autistic individuals. These factors included concepts of self-care and undertaking tasks and assignments, as well as workplace specific knowledge. An understanding of these factors assisted to reduce anxiety and ensure a comfortable transition into the workplace	<ul style="list-style-type: none"> <li>Work productivity (carrying out tasks, efficient, good work camaraderie, high job attendance, contributes to work environment)</li> <li>Work experience to support an understanding of the workplace</li> <li>A clear outline of expectations and balance between employee and employer expectations</li> <li>Multiple site visits prior to beginning work</li> </ul>	<ul style="list-style-type: none"> <li>Knowing the job description and completing accordingly</li> <li>Managing personal hygiene</li> <li>Following directions from supervisors</li> <li>Managing unexpected changes in job tasks</li> </ul>	<p>"One advantage with doing things step by step is....and I can see that with myself and my colleagues that we get easily distracted when we are working on many different things at the same time. Then it is very easy to forget something."</p> <p>However, [our autistic staff member] helps us to structure our work and clarify things that we really should be doing. And putting time and activity plans in place, partly for [our autistic staff], but also for everyone. It has led us to become better at structuring our daily work."</p> <p>(Employer, SWE)</p>
Preparation for, and seeking employment	Adequate preparation was highlighted as a key factor influencing an autistic individual's chances of successfully gaining and maintaining employment. This included understanding social and communication skills and ensuring an adequate understanding of skills, difficulties, needs and wants in the workplace	<ul style="list-style-type: none"> <li>Work experience</li> <li>Knowledge of how to write a resume</li> <li>Knowledge on how to present oneself during an interview with an employer</li> <li>Focusing on transitioning to employment early in schooling.</li> <li>Interview training</li> <li>Providing alternatives to job interviews or modifying interview approaches</li> <li>Job readiness programs</li> </ul>	<ul style="list-style-type: none"> <li>The interview process</li> <li>Lack of work experience opportunities</li> <li>Anxiety and stress related to the interview and job search process</li> <li>Feelings of "pressure" or high expectations</li> <li>Difficulty understanding the "employer mindset"—what employers are looking for</li> </ul>	<p>"Support from someone to help go through the job search process, write a resume, pound the pavement." (Employer, United States)</p> <p>"[I feel] pressured to get a job right out of school, expectations are like a worry on their own and builds up anxiety."</p> <p>(Autistic individual, AUS<sup>c</sup>)</p>

(Continues)

Table 4. Continued

Theme	Operational definition	Associated skill/supports	Associated limitations/restrictions	Example quotes
Handling responsibilities and stress	Coping with handling stress, responsibility, and mental energy was a key factor noted by key stakeholders influencing an individual's success in the workplace. Key stakeholders reported that it was essential that autistic individuals were able to recognize and manage their mental energy and make accommodations supported by their employer and service providers. Key stakeholders also noted that the stress of balancing home-life and work-life was often difficult for adults with ASD	<ul style="list-style-type: none"> <li>• Break assignments into smaller steps</li> <li>• Use fantasy as a way to handle stressors</li> <li>• Having a place to "escape" or tea breaks</li> <li>• Products and technology for stress management (e.g., stimming—self-stimulatory or stereotyped behavior)</li> </ul>	<ul style="list-style-type: none"> <li>• Handling stress</li> <li>• Handling domestic life issues</li> <li>• Managing "meltdowns" and the mental energy they consume</li> </ul>	"To live independently, and also work...that was too much for me. If I had someone who could cook, take care of me, wash my clothes and clean the house...then I might be able to go and work somewhere." (Autistic individual, SWE)

<sup>a</sup>Sweden.<sup>b</sup>United States.<sup>c</sup>Australia.

(d230) and handling psychological demands and stress (d240) were notable difficulties. Autistic individuals performed better at undertaking single (d210) compared to multiple tasks (d220). Factors associated with self-care in the workplace were perceived as difficult, such as understanding expectations in areas including washing oneself (d510) and dressing appropriately (d540). Other noted difficulties included looking after one's health (d570), such as remembering to eat lunch.

**Environment.** Data were linked to all five environment chapters (Table 10). Services, systems, and policies (e5) were the most frequently observed codes in Swedish and US data. Services, systems, and policies primarily referred to labor and employment services (e590), which involved those who provide support for individuals seeking employment. Furthermore, supports and relationships in the workplace (e3) and attitudes (e4) of employers (e430) and colleagues (e425) were found to influence success in the workplace for autistic adults. Indeed, employers (e330) discussed providing support to autistic employees in helping them to identify strategies to manage both the task and social demands of work environments. Other facilitators included using products and technology for employment (e135) to assist with scheduling and communication. Physical elements, such as noise (e250) in the workplace, were mentioned by autistic individuals to be an important factor to account for, in order to improve employment outcome.

**Personal factors.** Table 11 presents the distribution of personal factors linked according to the Grotkamp et al. [2012] classification system. Reflecting the range of personal strengths recognized as common in autistic individuals, personal factors included strong methodological, cognitive (i355), and intellectual skills (i350). A number of desirable personality traits were also reported, including reliability and loyalty (i320).

**ASD ICF Core-sets coverage.** Of the 96 total unique ICF codes identified across the three countries, 85 (89%) are included in the ASD Core-sets. ICF codes not covered in the ASD Core-sets are shown in Table 12.

Coverage of the ASD ICF Core-sets remained high when considering each country separately. Within the Australian data, 96% of codes were included in the ASD Core-sets with the remaining 4% linked to environmental factors included in the full ICF manual. Analysis of Swedish data revealed 87% of codes were encompassed in the ASD Core-sets with coverage varying across domains, with 65% of body functions codes, 97% of activity and participation codes, 90% of environmental factor codes, and 100% of body structure codes represented. Regarding the US data, 100% of codes were included in the ASD Core-sets.



**Table 5. Environment Themes**

Theme	Operational definition	Associated facilitators	Associated barriers	Example quotes
Support team for employees, employers, and coworkers	A “support team” including support from external services (e.g., employment agencies, social support services, housing, school, and education) was essential in facilitating successful employment. As part of this “support team,” it was important that there was clear communication between the employee, employee’s family, employer and support worker. Support workers assisted both employers and autistic individuals with tackling problems	<ul style="list-style-type: none"> <li>• Services provided by the labor and employment agencies (mentorship and guidance, job-matching, education, vocational training, and internships, etc.)</li> <li>• Services provided by the general social support agencies (housing, hygiene issues)</li> <li>• Continuity and coordination across different services</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate support from labor and employment agencies</li> <li>• Inadequate support from general social support services</li> <li>• Lack of continuity and coordination across different services</li> </ul>	“It is important to have a support worker advocating [to] help employers understand how they can help” (Service provider, AUS <sup>a</sup> )
Workplace adjustments	Workplace adjustments to the workplace by employers, coworkers, and support workers with the goal of facilitating successful employment. These included ensuring a person job match, developing routine and structure (balance routine and flexibility and task format) and other adjustments made to the workplace	<ul style="list-style-type: none"> <li>• Flexibility in the workplace (flexible working hours, variation in job assignments, providing breaks when needed, providing a longer time to process things, flexibility in work location, etc.)</li> <li>• Clear communication, routine, and structure (providing reminders and written instructions, clear routine and plan of action, organizing workload, etc.)</li> <li>• Matching skills with job assignments</li> <li>• Physical adjustments in the workplace (adjusting the room, including lighting, providing private office space)</li> <li>• Providing feedback, appraisal, and validation</li> <li>• Supervision and mentorship</li> <li>• Induction to the workplace</li> <li>• Products and technology to support communication</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of consistency</li> <li>• Lack of flexibility and employer understanding</li> </ul>	<p>“My son with ASD needs it to be very specific, the way information is provided has to be clear. It has to be specific, you may have to break the information down.” (Parent, AUS)</p> <p>“I get to work from home quite often and I do not need to show up for work at 9 a.m. He [the employer] told me that it does not matter when I show up for work, as long as I do my job, which I think is the right way to go.” (Autistic individual, SWE<sup>b</sup>)</p>
Attitudes, understanding, and knowledge	The attitudes, understanding, knowledge, and beliefs of employers and coworkers influenced all stages of employment from gaining employment to maintenance	<ul style="list-style-type: none"> <li>• Nuanced knowledge and understanding of autism (viewing autism as a variation in functioning, emphasizing the individual rather than the diagnosis, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Negative attitudes and expectations toward autism (expectations to be social and flexible, patronizing attitude and approach)</li> <li>• Stereotypes and insufficient knowledge of autism (stereotyped portrayal of autism in media and society, lack of knowledge about autism, preconceived notions of autism, etc.)</li> </ul>	“I wonder if the employers really understand autism. A lot of people do not understand autism—all individuals do not understand that you cannot give them too many tasks.” (Adult with ASD, AUS)

(Continues)

**Table 5. Continued**

Theme	Operational definition	Associated facilitators	Associated barriers	Example quotes
	Within this theme, the attitudes, beliefs, understanding, and knowledge of employers were particularly crucial in determining success	<ul style="list-style-type: none"> <li>• Positive attitudes toward autism (emphasizing individual strengths and resources, openness, acceptance, and understanding, etc.)</li> <li>• Training for employers and coworkers</li> </ul>		
Employment policies and systems	Laws, regulation, and structure of the welfare system pertaining to employment were all important factors influencing employment outcomes for autistic individuals	<ul style="list-style-type: none"> <li>• Laws and regulations pertaining to labor and employment (the availability of internships, engaging part in work trials, flexibility concerning the duration of internships)</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate or inappropriate access to funding or supports</li> </ul>	<p>"I think internships or vocational training are important for getting a job, as you will be able to try different things and see what this person is able to accomplish." (Employer, SWE)</p> <p>"The system may inhibit the growth of job skills. People with autism do not want to just do well, they want to succeed. But then support is taken away and it is impossible" (Autistic individual, United States<sup>c</sup>)</p>
Physical environment considerations	Physical factors within the work environment were highlighted by stakeholders as factors influencing the employment for autistic adults, this included aspects relating to noise, physical spaces, and lighting	<ul style="list-style-type: none"> <li>• Opportunity to use workspaces away from others</li> <li>• Products and technology to accommodate barriers in the environment (such as headphones to reduce noise)</li> </ul>	<ul style="list-style-type: none"> <li>• Sensory stimuli in the environment (sound, light)</li> <li>• Open and crowded workspaces</li> </ul>	<p>"But we could work just as good as any neurotypical person, even though you sometimes need to adjust the environment a bit, like for example turning the lights off or turn the volume down." (Autistic individual, SWE)</p> <p>"Given the right environment—a happy work environment, my son cannot work in a noisy environment—he has meltdowns!" (Parent, AUS)</p>

<sup>a</sup>Australia.

<sup>b</sup>Sweden.

<sup>c</sup>United States.

**Table 6. Personal Factor Themes**

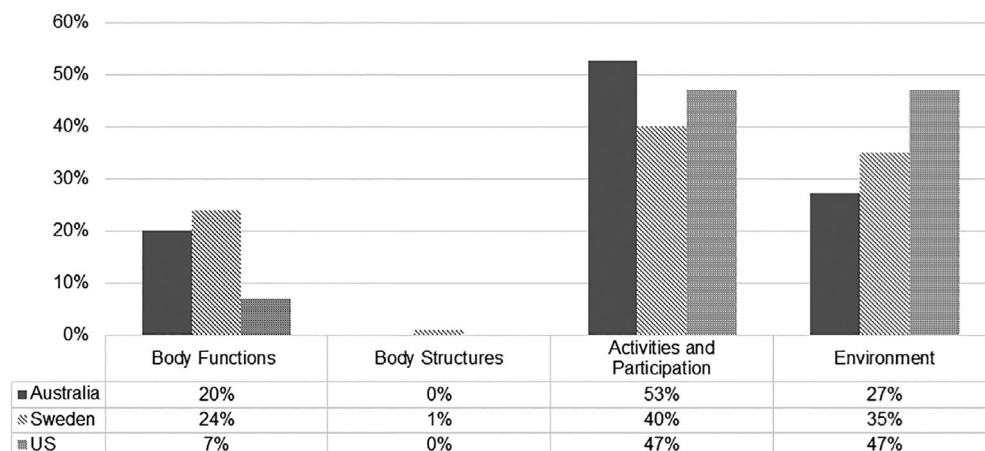
Theme	Operational definition	Associated skills/facilitators	Example quotes
Meaning of employment	Employment has a strong personal meaning for autistic individuals and their parents	<ul style="list-style-type: none"> <li>• The opportunity to contribute something meaningful</li> <li>• Health benefits (mental health)</li> <li>• Social benefits (opportunities for socialization)</li> <li>• Independence (financial)</li> <li>• Reduced parental worry and stress</li> </ul>	"My daughter having employment means I will not worry what would happen if I am not around." (Parent, AUS <sup>a</sup> )
Expert knowledge and special interests	Key stakeholders noted that autistic individuals often possess special skills, interests, or knowledge beneficial in the workplace	<ul style="list-style-type: none"> <li>• Expertise in a specific topic</li> <li>• Interest in a specific subject</li> </ul>	"I think it is more exciting for someone who has a passion for something. And often [autistic] people immerse themselves in their interests, which shows that there is a passion for something." (Professional, SWE <sup>b</sup> )
Personality traits	Autistic individuals often display personality traits beneficial to the workplace, which can act as a facilitator to employment	<ul style="list-style-type: none"> <li>• Recognizing that each individual is unique</li> <li>• Personality traits including loyalty, reliability</li> </ul>	<p>"They bring happiness, they have a great work ethic and are hard workers. There is also lower turnover for jobs with relatively higher turnover." (Employer, United States<sup>c</sup>)</p> <p>"The next person may not want to do the task or not able to so be flexible. Autistics are different people—individuals with different learning styles." (Autistic individual, AUS)</p>

<sup>a</sup>Australia.<sup>b</sup>Sweden.<sup>c</sup>United States.

## Discussion

Content analysis and linking to the ICF ASD Core-sets revealed that employment outcomes for autistic individuals are influenced by a complex interaction of factors related to autistic individuals, their work involvement and activities, and the environment within which they are situated.

Unsurprisingly, certain aspects of social interaction and communication were limited among autistic individuals, contributing to core difficulties in the workplace. More importantly, other key difficulties faced by autistic adults included aspects of understanding workplace demands and expectations, undertaking multiple tasks and routine. These findings are similar to that of a number of previous studies investigating employment outcomes for

**Figure 2.** Distribution of ICF codes by country.

**Table 7. Concepts Linked to the ICF by Country**

Country	Total concepts	Total concepts linked to the ICF and personal codes	Total number of unique ICF codes	Total number of unique personal factor codes
Australia	343	303 (88%)	55	15
Sweden	1,981	1,720 (87%)	84	15
United States	57	46 (81%)	15	5

**Table 8. Distribution of Body Function and Structure Codes Across Chapters**

Code	Chapter	Australia (%)	Sweden (%)	United States (%)
b1	Mental functions	91	75	100
b2	Sensory functions and pain	9	25	0
s1	Structures of the brain	0	100	0

**Table 9. Distribution of Activity and Participation Codes Across Chapters**

Code	Chapter	Australia (%)	Sweden (%)	United States (%)
d1	Learning and applying knowledge	17	24	0
d2	General tasks and demands	17	15	14
d3	Communication	17	15	0
d4	Mobility	3	6	0
d5	Self-care	7	9	29
d6	Domestic life	3	6	14
d7	Interpersonal interactions and relationships	21	15	29
d8	Major life areas	14	9	14
d9	Community, social, and civic life	0	3	0

autistic individuals [Baldwin, Costley, & Warren, 2014; Krieger, Kinebanian, Prodinger, & Heigl, 2012; Müller, Schuler, Burton, & Yates, 2003] and indeed, most work seeking to support autistic individuals in employment has focused on addressing these factors [Scott, Milbourn, et al., 2018]. However, despite these challenges, a number of core autistic-linked strengths were also identified. For example, autistic individuals had unique problem-solving abilities, along with desirable personality characteristics, consistent with a number of previous studies [de Schipper

**Table 10. Distribution of Environment Codes Across Chapters**

Code	Chapter	Australia (%)	Sweden (%)	United States (%)
e1	Products and technology	7	14	0
e2	Natural environment and human made changes to environment	7	7	0
e3	Support and relationships	27	24	29
e4	Attitudes	33	24	29
e5	Services, systems, and policies	27	31	43

**Table 11. Distribution of Unique Personal Factor Codes**

Personal factors	Australia (%)	Sweden (%)	United States (%)
General personal characteristics	0	7	0
Personality factors	33	20	20
Cognitive and mnesic factors	7	13	0
Attitudes	13	33	60
Basic skills	33	27	20
Immediate life situations	13	0	0

et al., 2016; Kirchner et al., 2016]. Understanding how to leverage the unique strengths and mitigate the challenges faced by autistic individuals by employing a strengths-based approach is, therefore, an essential strategy to improve employment outcomes for this population [Hatfield, Falkmer, Falkmer, & Ciccarelli, 2017].

Through examination of the core challenges faced by autistic individuals in the workplace, we argue, however, that environmental factors may appear to have the greatest impact on the successful employment for autistic individuals. These findings are consistent with recent research investigating the employment outcomes of autistic individuals. A Q-methodology approach, with autistic individuals and employers, revealed that environmental factors, such as modification to the workplace were considered important in ensuring the successful employment for the autistic population [Scott, Falkmer, Girdler, & Falkmer, 2015]. Similar conclusions regarding the central role of the environment in supporting autistic individuals have also been drawn in a recent scoping review investigating interventions seeking to support employment for adults with ASD [Scott, Milbourn, et al., 2018]. Critically, however, the latter review identified that the environment is neglected when considering interventions aimed at improving employment outcomes for autistic adults, with the vast majority of interventions

**Table 12. ICF Codes Not Included in the ICF ASD Core-Sets**

Chapter	Code	Code name
Body functions	b163	Basic cognitive functions
	b172	Calculation functions
	b180	Experience of self and time functions
	b210	Seeing functions
	b230	Hearing functions
	b235	Vestibular functions
	b280	Sensation of pain
	d440	Fine hand use
Activity and participation	e135	Products and technology for employment
	e425	Individual attitudes of acquaintances, peers, colleagues, neighbors, and community members
	e555	Associations and organizational services, systems, and policies

targeting a reduction in ASD-related impairment in diagnosed individuals [Scott, Milbourn, et al., 2018]. It is possible that many difficulties experienced by autistic individuals in the workplace, such as difficulty handling multiple tasks simultaneously, could be mitigated by adequate support from employers and service providers. Similarly, changing attitudes of employers and colleagues regarding workplace norms and increasing understanding of ASD may lessen the interpersonal and communication difficulties experienced by autistic workers.

Collectively, the current findings support the need for a paradigm shift in improving the employment outcomes of autistic individuals, redirecting the focus of interventions from individual difficulties to the environment, particularly in the areas of support and relationships, attitudes, and services, systems and policies [World Health Organization, 2002]. Such a paradigm shift is in line with the social model of disability, whereby rather than disability being solely the resultant of individual impairments, the role of societal and contextual factors in enabling or disabling an individual are recognized [Oliver, 1996]. The social model of disability may, however, be critiqued. Despite influencing the development of the ICF, bridging the medical and social overlap when considering impairment and the environment appears to be a key challenge for this model [Shakespeare & Watson, 2001].

Environmental interventions such as peer mentoring have shown effectiveness in higher education settings [Siew, Mazzucchelli, Rooney, & Girdler, 2017]. A recently developed intervention, the Integrated Employment Success Tool, is the first intervention to target environmental factors in employment settings for autistic individuals. This intervention seeks to improve employer's attitudes, self-efficacy, and knowledge regarding workplace modifications for autistic individuals and has shown some promise in improving employment outcomes for autistic individuals [Scott, Falkmer, Falkmer, & Girdler, 2018].

Several recommendations for employers working with autistic individuals may be derived from the results of this research. For example, performance is likely maximized through harnessing an individual's unique strengths, modifying tasks and information provided (e.g., written instructions, step by step instructions) and ensuring clear, open and honest communication of expectations and requirements. In recognizing the importance of employers and colleagues in supporting autistic individuals, it must be acknowledged that a reciprocal relationship between the employer, service provider, and autistic individual was stressed. These results suggest that there is a need for autistic individuals, employers, and service providers to work together collaboratively to support the autistic individuals in the workplace.

Australia, Sweden, and the United States have many cultural similarities. All rank above the global average when considering income and wealth, health status, subjective

well-being, civic engagement, education and skills, environmental quality, housing, jobs, and earnings [Organisation for Economic Co-operation and Development, 2017]. Despite these similarities, clear cultural differences emerge. For example, disability policies in employment vary significantly between the United States, Australia, and Sweden. The OECD describes Sweden's disability policy as "social-democratic," characterized by strong employer obligations and employment and vocational rehabilitation programs, universal coverage and comprehensive and accessible benefits [Organisation for Economic Co-operation and Development, 2010]. In contrast, disability policy in Australia is described as a "liberal model." Incentives for employment are strong and benefits are generally universal and accessible, however, benefits are lower and thresholds are higher than Sweden [Organisation for Economic Co-operation and Development, 2010]. Finally, while the United States is also described as a "liberal-model," it is characterized as having lower benefits than other models, and more restrictions on eligibility [Organisation for Economic Co-operation and Development, 2010]. Impacts of these cross-cultural differences in culture and policy were apparent when considering the results of the current study. Services, systems, and policies (e5) were, not unexpectedly, shown to differ across the three countries, likely contributing to the disparity in key stakeholder responses. Employment rates in Sweden for individuals with disabilities are higher compared to both Australia and the United States. The comparatively high employment rates in Sweden may be due to the increased amount of government support for programs and organizations, which support people with disabilities to successfully gain and sustain employment. One such example is the supported introduction and follow-up (SIUS) program offered by the Swedish Public Employment Services, supporting individuals with functional impairments in obtaining and maintaining employment. Instrumentally, support from the SIUS service involves working with employers and coworkers to foster more in-depth understanding of the considerations and adjustments a person with a disability might require in the workplace, and mentoring new employees until they are able to perform tasks independently [Swedish Public Employment Service [Arbetsförmedlingen], 2012]. While the SIUS may provide an example of a "gold-standard" service, the implementation of similar models, which approach employing autistic individuals holistically, taking a biopsychosocial approach and considering aspects associated with the environment and personal strengths may contribute to improved outcomes.

The high level of ASD ICF Core-sets coverage observed across the three sites is indicative of the high content and ecological validity of the Core-sets, particularly in the activity and participation, and environment domains, demonstrating their potential utility within an employment context. The Core-sets for ASD could be instrumental in addressing employment issues in autistic individuals, serving to provide a standardized basis for functional assessment, identifying



targets for intervention, and enhancing communication between stakeholders. Such an approach would inherently extend the focus of interventions beyond individual limitations, restrictions, and impairments to consideration of personal strengths and environmental factors [Bölte et al., 2018].

### Limitations

A number of limitations must be considered. Given this study was conducted under the auspice of community consultation, limited sociodemographic and standardized diagnostic data on autistic participants were obtained, thus in the context of the current study, it is not possible to determine how the participants' previous experiences or background influenced their perceptions of employment and the outcomes of this study. In addition, this study focused primarily on employment for adults without intellectual impairment, future research should seek to understand how best to support individuals with ASD and comorbid intellectual disability in the employment setting. While the perspectives of a number of key stakeholders were obtained, other key stakeholders were not included in this study such as colleagues. As the results of this study indicate that perceptions, actions, and beliefs of colleagues have the capacity to influence success in the workplace, future research should also seek to determine the perspectives of these individuals on the employment of adults with ASD. Finally, as this study was an international collaboration between multiple sites, data collection methods and sample composition varied across countries. While measures were taken during data analysis to reduce the potential for these differences to impact results (such as inter-rater ICF linking between countries), it is possible that the results were influenced by these data collection methods. In particular, verbatim data were not used for Australian and United States sites, and differences in saturation of codes across the three countries differed, likely influencing the codes observed.

### Conclusions

Using an international community consultation methodology, it is shown that autistic individuals, the autistic community, and other key stakeholders largely agree that harnessing strengths and interests, modifying tasks and targeting environmental factors are important for facilitating success for autistic individuals in the workplace. The utility of the ASD ICF Core-sets in the employment setting is also demonstrated. Collectively, the findings have implications for the development of interventions, supports and policies to support the success of autistic individuals in employment.

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### Conflict of Interests

All authors declare no direct conflict of interest related to this article. Sven Bölte discloses that he has in the last 5 years acted as an author, consultant, or lecturer for Shire, Medice, Roche, Eli Lilly, Prima Psychiatry, GLGroup, System Analytic, Kompetento, Expo Medica, and Prophase. He receives royalties for text books and diagnostic tools from Huber/Hogrefe, Kohlhammer, and UTB.

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