



Curtin University



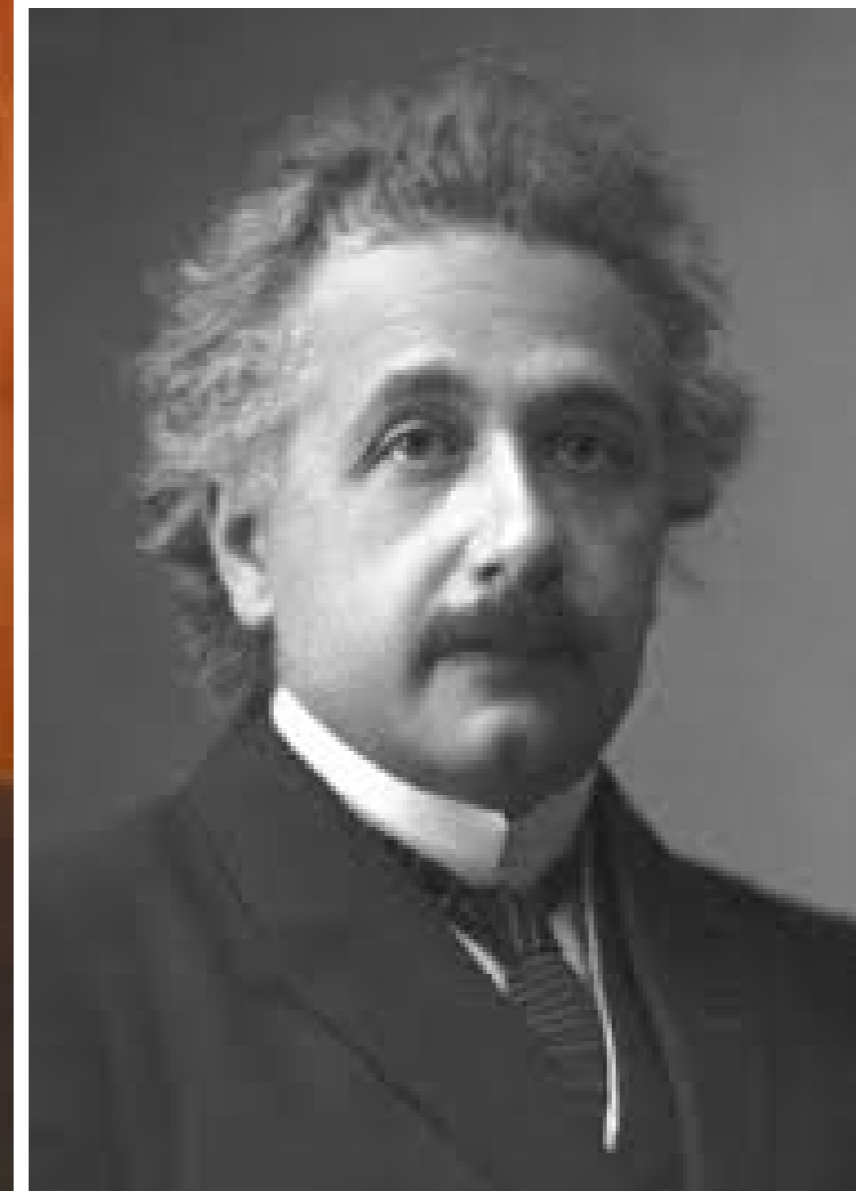
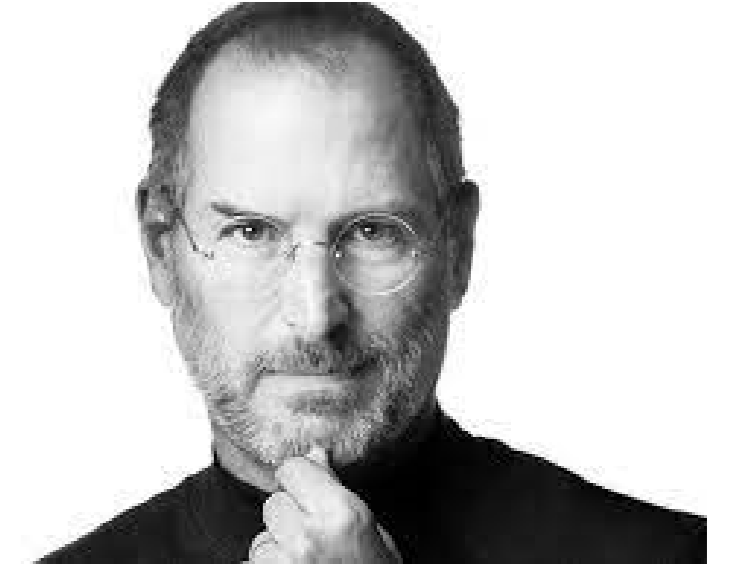
The Autism Academy *Advancing Innovation through Neurodiversity*

Prof Tele Tan AM
Autism Academy for Software Quality
Assurance (AASQA)

Curtin University
Australia

World Trailblazers – Past and Present

What do they have in common?

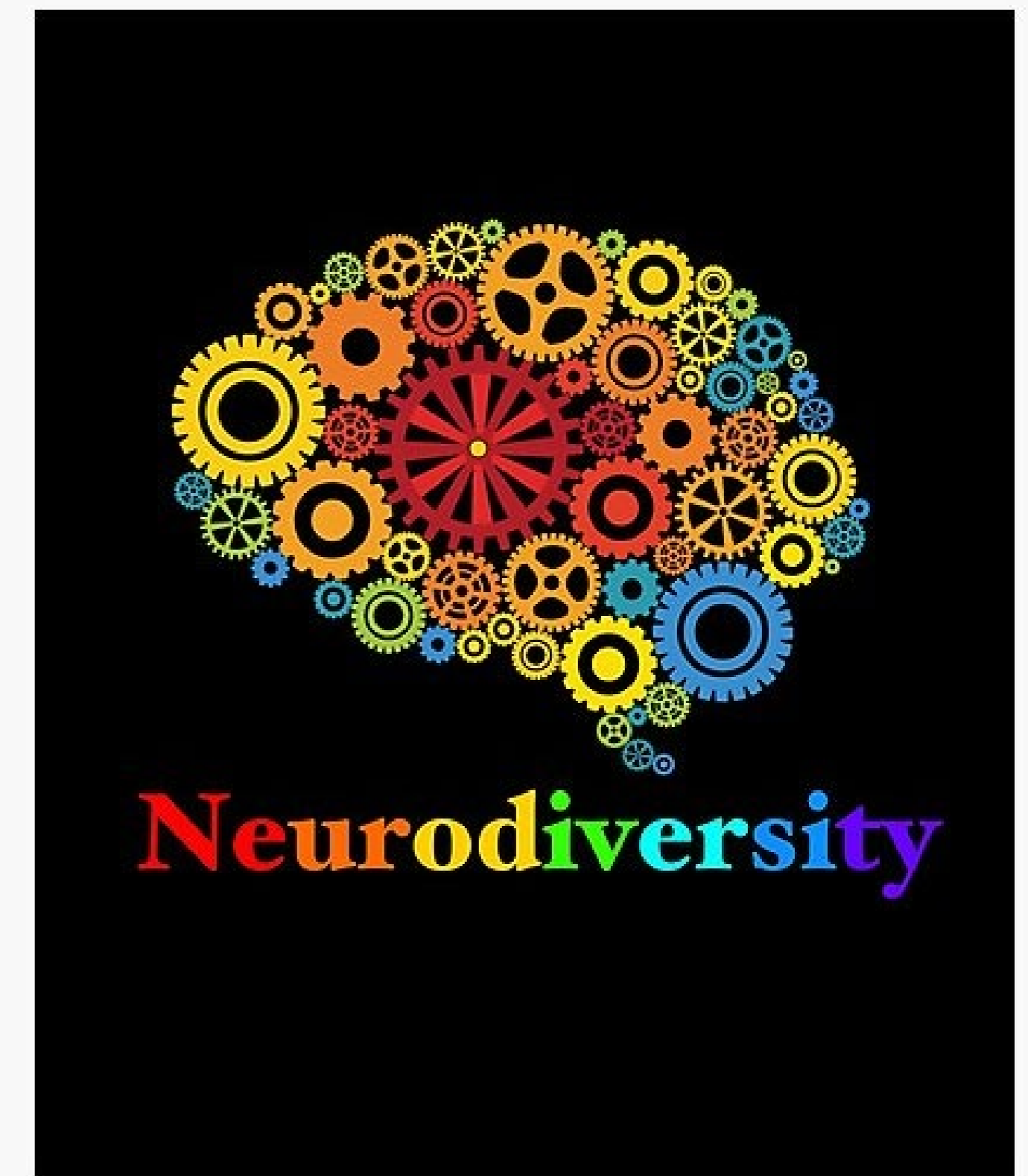




What is Neurodiversity



- Neurodiversity is a concept that recognises and celebrates the natural variation in human neurological development and functioning
- It encompasses a range of conditions including autism, ADHD, dyslexia, dyspraxia and Tourette's syndrome
- Neurodiversity is a natural part of human diversity which recognises the individuals with diverse neurological conditions have unique strengths and talents to contribute to society



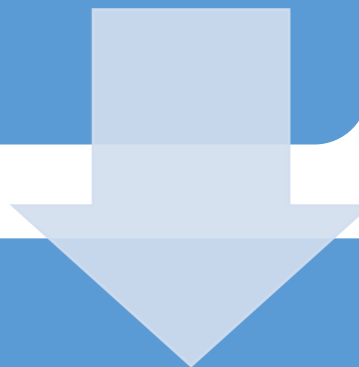
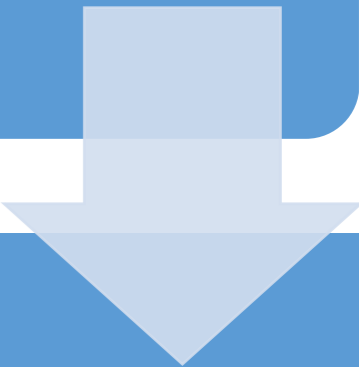


Neurodiversity and Digital Technologies

Increasing demand for superior technologists, analysts and scientists to work in teams to solve difficult problems

Individuals who are neurodivergent and have exceptional abilities in memory, pattern recognition, and mathematics are most suited in software innovation and testing, data analytics and cyber security

Likewise, Artificial Intelligence and Machine Learning testings requires extreme level of attention and sustained concentration where neurodiverse individuals will outperform their neurotypical counterparts

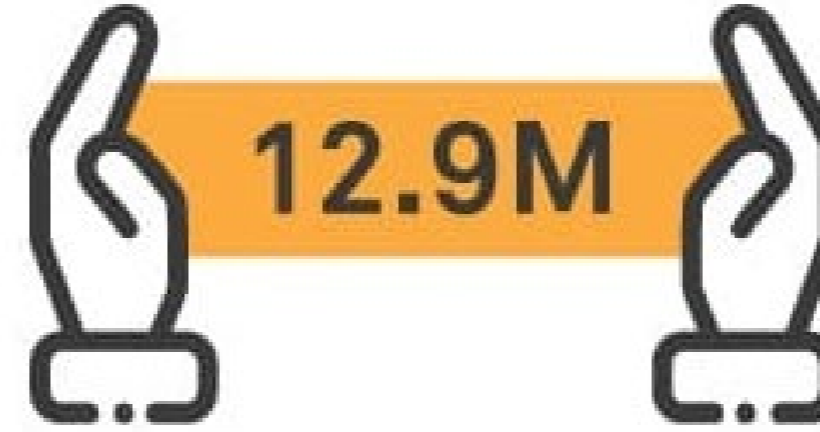




205,200 estimated Australians are diagnosed on the autism spectrum



An estimated 1 in 100 Australians are on the autism spectrum



12,900,000 estimated parents/carers, siblings, grandchildren touched by autism daily

Autism in Australia



1 out of 4 Australians with autism are female



More than 3/4 of Australians with autism are young (between the ages of 5-24)



29% of people on the autism spectrum have skills that are considered exceptional



70% of people with autism also have one co-occurring condition, 40% have two or more



38 % of Australians with autism participate in the workforce (compared with 83.2% people with no reported disability)

Article 23

1. Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.
2. Everyone, without any discrimination, has the right to equal pay for equal work.
3. Everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection.
4. Everyone has the right to form and to join trade unions for the protection of his interests.

▶ Everyone has the right to choose the job they want and get equal pay.



Spectrum of Challenges



Under-resourced services

Lack of autism-specific services and programs

Lack of autism awareness and support in school and workplace environments



Common autistic strengths



PASSIONATE INTERESTS



INTENSE FOCUS



ATTENTION TO DETAIL



MEMORY



CURIOSITY



INTEGRITY



FAIRNESS



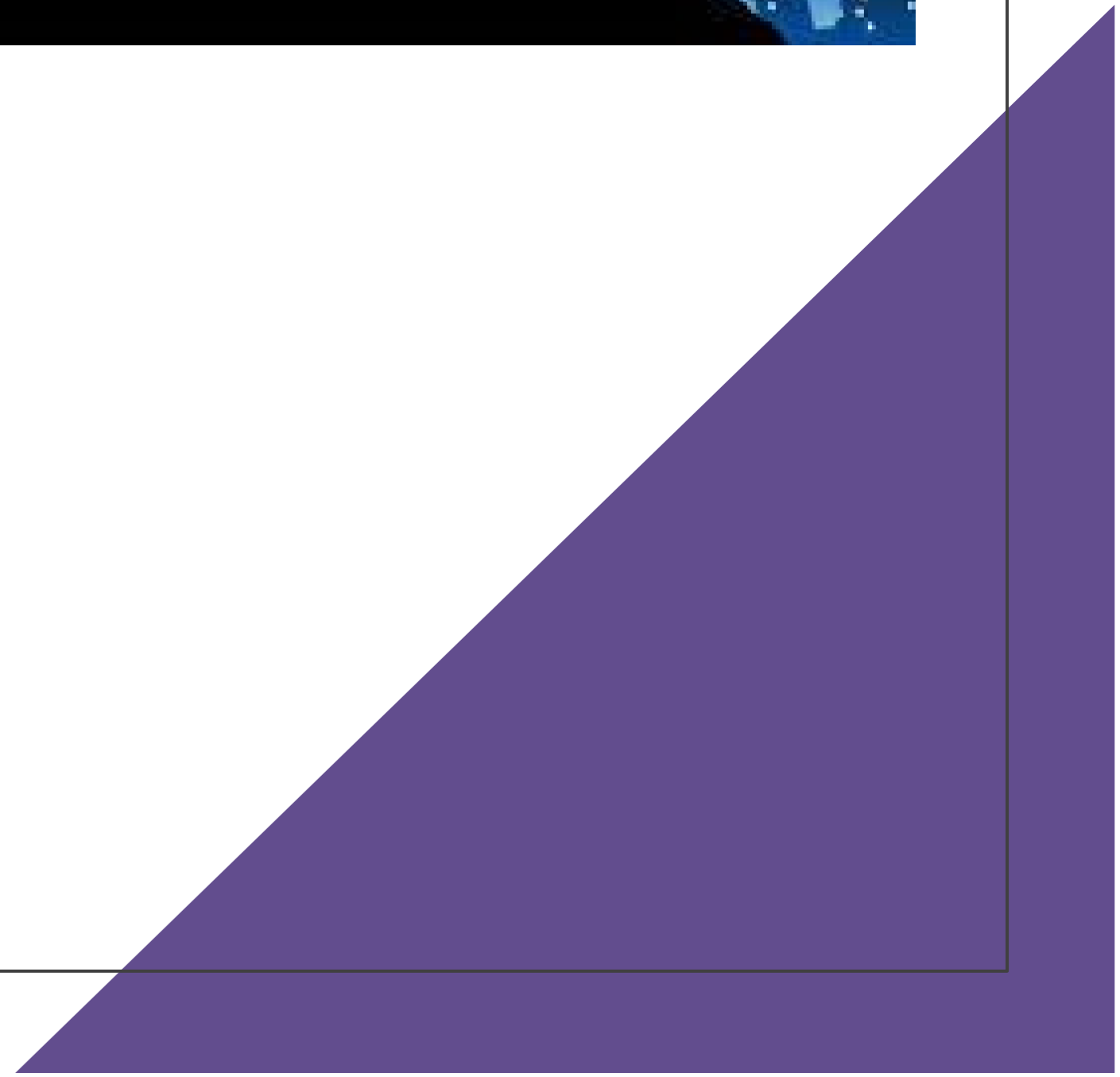
SINCERITY



LOYALTY



HELPFULNESS





Employment Focus

Since 2004 social impact and for profit organisations have emerged, around ICT, improving the employment outcomes





Mission of AASQA

We believe in the awesome potential of neurodiverse people and their ability to flourish when empowered with the right skills and opportunities to succeed

Advancing innovation through neurodiversity





Autism Academy for Software Quality Assurance (AASQA)



STEM club for autistic teens

K7-K9



Industry aligned skills development

K10 – Early Tertiary



Work integrated learning and internships in the ICT sector

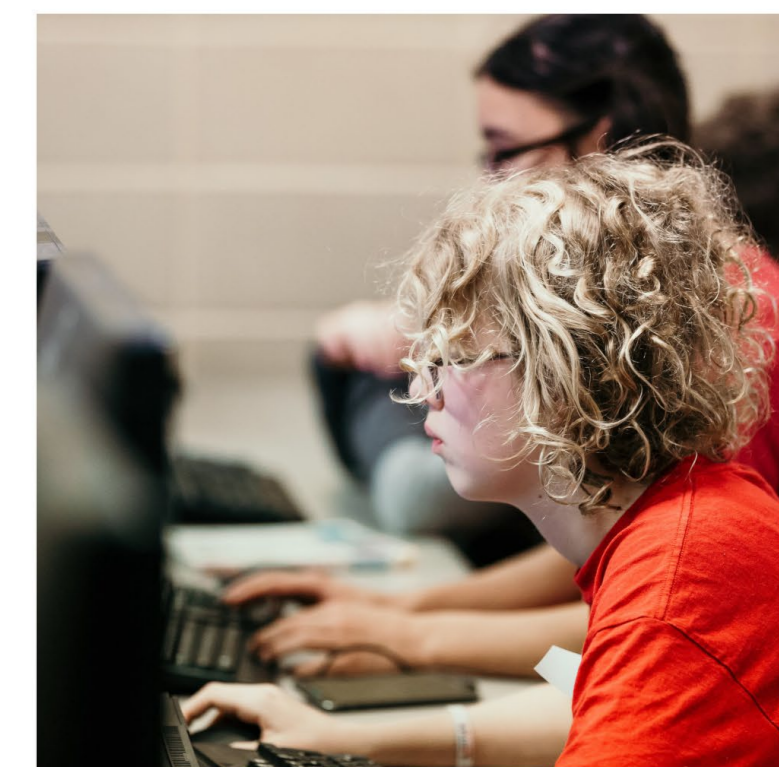
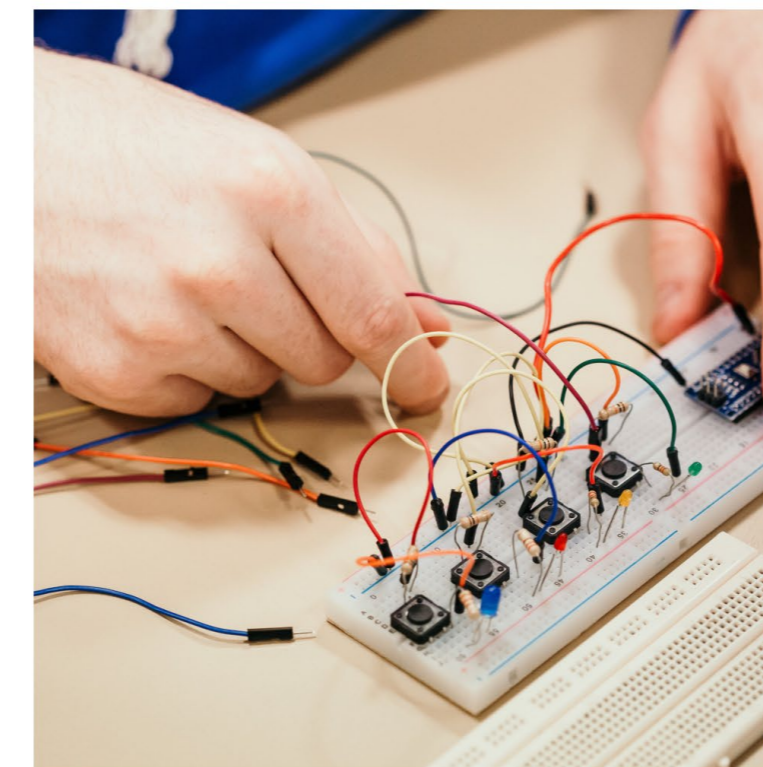
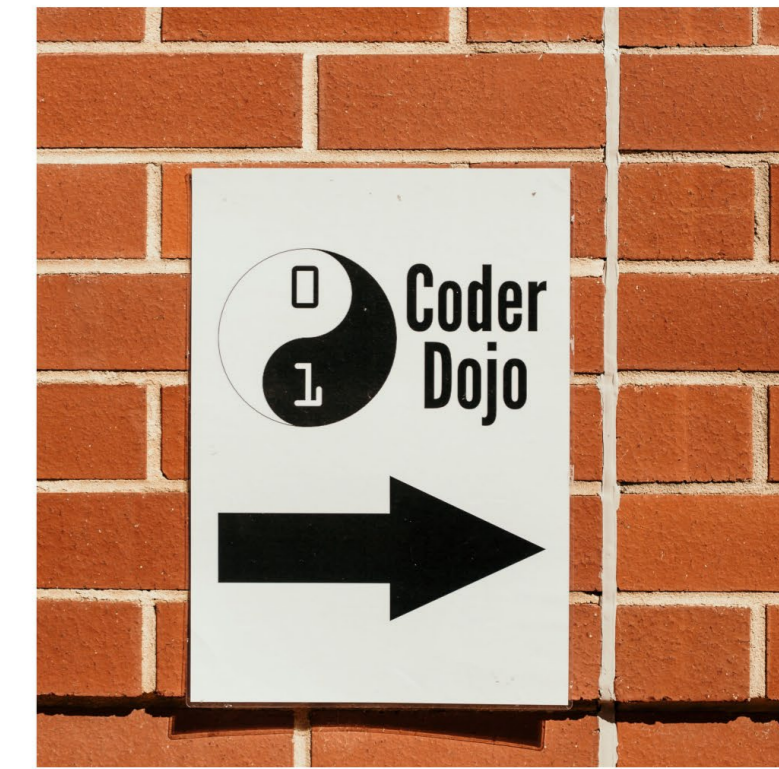
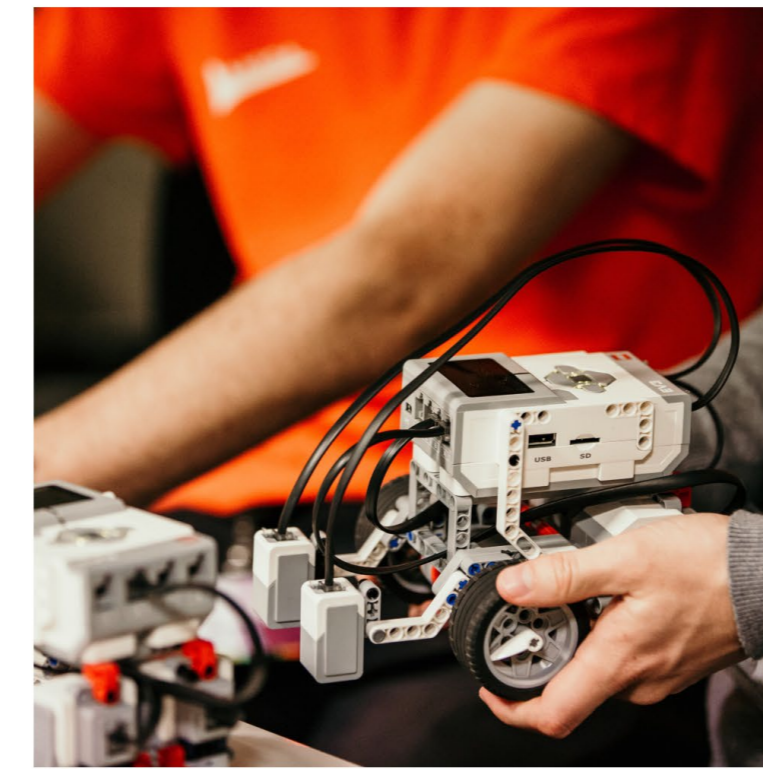
Tertiary level





STEM Outreach

- Adopted the CoderDojo (www.coderdojo.com) network of free, fun and social coding club
- Special Interest Groups (SIGs) in coding, robotics, internet of things, mobile app development supported by a Maths enrichment class
- Assisted by volunteer mentors in computing, engineering, occupational therapy, psychology and education
- 400+ students supported since 2016 across four sites in Western Australia





Activities

- Incorporating
- Skill development
 - Career g

Environment

- Everyone has autism
 - Acceptance
- Overcrowding and noise

Facilitators

- Shared interests
- Expert facilitators
- and collaborative approach

A STRENGTH-BASED PROGRAM





for adolescents with autism

Matthew Jones, Marita Falkmer, Ben Milbourn, Tele Tan, Louise Sheehy, Sven Bölte and Sonya Girdler





Identifying the Essential Components of Strength-based Technology Clubs for Adolescents with Autism Spectrum Disorder

Matthew Jones ^a, Marita Falkmer^{a, b}, Ben Milbourn ^a, Tele Tan^c, Sven Bölte ^{a, d, e}, and Sonya Girdler ^{a, d, e}

^a School of Occupational Therapy, Social Work and Speech Pathology, Curtin Autism Research Group, Curtin University, Perth, Australia ^b School of Education and Communication, Swedish Institute for Disability Research, Jönköping University, Gjuterigatan, Sweden ^c School of Mechanical Engineering, Faculty of Science and Engineering, Curtin University, Perth, Australia ^d Centre of Neurodevelopmental Disorders (KIND), Centre for Psychiatry Research; Department of Women's and Children's Health, Karolinska Institutet & Stockholm Health Care Services, Stockholm, Sweden ^e Child and Adolescent Psychiatry, Stockholm Health Care Services, Stockholm, Sweden

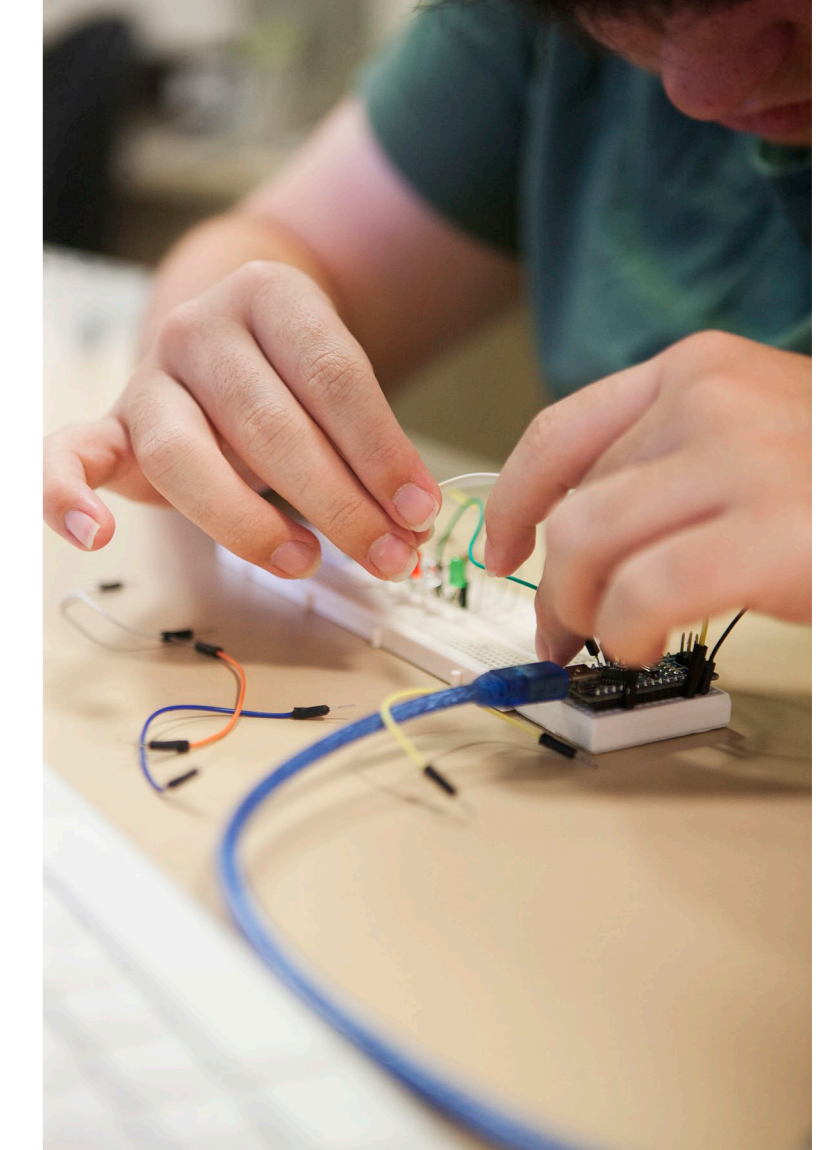
ABSTRACT

Background: Strength-based technology clubs for adolescents with autism spectrum disorder (ASD) have become increasingly popular; however, they remain poorly described in the literature. Before the impact and benefit of strength-based technology clubs can be measured, consistency in their design and delivery must be established. This study aimed to identify the essential components of strength-based technology clubs by exploring context, mechanisms, and outcomes of existing strength-based technology clubs.

Method: Twenty-three adolescents with ASD (mean age 12.96 years, SD = 1.86, range = 10–18 years), 25 parents (mean age 46.08 years, SD = 8.27, range = 33–69 years), and 20 facilitators (mean age 27.93 years, SD = 6.55, range = 20–46 years) were purposively sampled from three established strength-based technology clubs. Data were obtained via ethnographic methods, including participant observations, interviews, and focus groups. Data analysis was underpinned by a realist evaluation, which provided the context-mechanism-outcome framework.

Results: Data analysis revealed that strength-based technology clubs had four context themes (personal factors of adolescents, personal factors of facilitators, personal factors of parents, institution), three mechanism themes (activity design, strengths and abilities, environment), and three outcome themes (skill building, connection with others, emotion).

Conclusion: The results highlighted the importance of understanding the personal context of adolescents, providing an individualized approach, leveraging individual interests, and modifying the environment to suit the individual. The findings contributed to defining a strength-based approach within ASD, and have demonstrated that positive outcomes can be achieved by focusing on strengths rather than deficits. Future ASD services can use the results as a framework for applying a strength-based approach. The efficacy of newly designed strength-based programs can then be tested.



Training

- Work experience (K10 to K12)
- Software Testing Hackathons
- International Software Testing Qualifications Board Certifications
- Vocational Training Scholarships in IT, software development and cybersecurity



Willeton's, Liam Picen is an autistic high-school student who recently became one of the youngest people to pass an international software exam. Picture: Ross Swanborough

WA News

Autistic Perth schoolboy passes worldwide computing exam



CyberSET (2023-25)

- Funded by Department of Industry, Science and Resources
- Provides industry-leading cybersecurity training, simulations, and work experience programs, incorporating industry requirements and best practices
- Improves the diversity and quality of the cybersecurity workforce by strengthening the participation of women and integrating a strengths-based neurodivergent cybersecurity talent development strategy



Partners



Teen among youngest in a global exam

July 8th, 2019, 10:54AM | Written by Carmelle Wilkinson

Canning
Times
Community



bankwest



Curtin University

Deloitte.

Jacobs

RioTinto

BHP



HEXAGON
MINING



woodside



Department of **Transport**



Internships

- Paid Work Integrated Learning scholarships with autism employment support
- Duration of between 3 and 12 months
- 95 scholarships created since 2016
- AUD\$1.5m of scholarships fund raised so far



Autistic workers surpass colleagues



Kim Macdonald | The West Australian
Monday, 2 May 2016 5:00AM



The West Australian



Alexandra Flannigan, Cameron Smith and Dex Ezekiel with Kieran McCluskey. Picture: Danella Bova

Neurodiversity
the key at BHP

MEILIN CHEW

When you meet Alexandra Flannigan, the first thing you notice is how she speaks with confidence.

But the 29 year old, who has Ehlers-Danlos syndrome and autism, never thought she would be working anywhere, let alone as a full-time specialist quality engineer at BHP.

"I always knew there was something different about me," she said.

"I didn't know how to cope with the world and the world didn't know how to cope with me."

While her degenerative condition limits her physically, Alexandra possesses a unique skill set, including being able to absorb an entire computer system, that means she has flourished in her role.

Her nuances may have caused her to be overlooked for jobs elsewhere, but at BHP they have been embraced.

The company's neuro-diverse internship program focuses on providing career pathways for employees with autism spectrum disorder. A

prospective employee with autism may face difficulty securing a job by not getting through the initial job interview but BHP's program breaks down those barriers by changing the conventional job application process.

"The idea is to almost flip the interview, so instead of sitting someone down and asking them about themselves, we get the hiring managers to sell what they do and then drive that into a conversation in a relaxed environment," Kieran

McCluskey, who manages the internship program, said.

The program's success since its launch just last year has led to five recruits being employed permanently and another three having fixed-term roles.

Perth-based Flannigan, who completed the internship last year, works alongside Dex Ezekiel, another former neuro-diverse intern, who has Asperger's syndrome.

"I think very out of the box, and link things that are completely different that most people couldn't see a connec-

tion between . . . I learnt that you needed to be confident, so I just made myself confident, I just had to be," Dex said.

Former intern Cameron Smith, who now works as a BHP specialist automation engineer, says his challenge was overcoming a speech impediment. "For me it's a shame that if you don't think and act a certain way then you're an outcast," the 23-year-old says.

A further nine students will join the program, which is run in partnership with Curtin University, in the new year.

Partners

Industry



Philanthropy and Foundation



Government Department



Community



Research





Curtin University



Thank You



References

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Curtin University

AUTISM RESEARCH
GROUP (CARG)

***"Tapping the Talent:
Improving Employment outcomes
for Autistic Australians"***

Sonya Girdler

Professor of Occupational Therapy
Director Curtin Autism Research Group
'Living with Autism' Cooperative Research Centre
Centre of Neurodevelopmental Disorders
at Karolinska Institutet (KIND)

Employment

Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.

- Article 23 of the Universal Declaration of Human Rights

8 DECENT WORK AND ECONOMIC GROWTH



PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH,
FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL



Unemployment of Autistic Australians

The ABS reported from its 2018 data that:

- The labour force participation rate was 40.8% among the 75,200 autistic individuals people of working age (15-64 years).

Not much had changed ...

- In 2009, the labour force participation rate for people with autism was 34%.
- 7% improvement in a decade!
- Autistic people have skills that may be beneficial to the workforce
- They have a desire to work (Aspect, 2013)

International Policy Brief

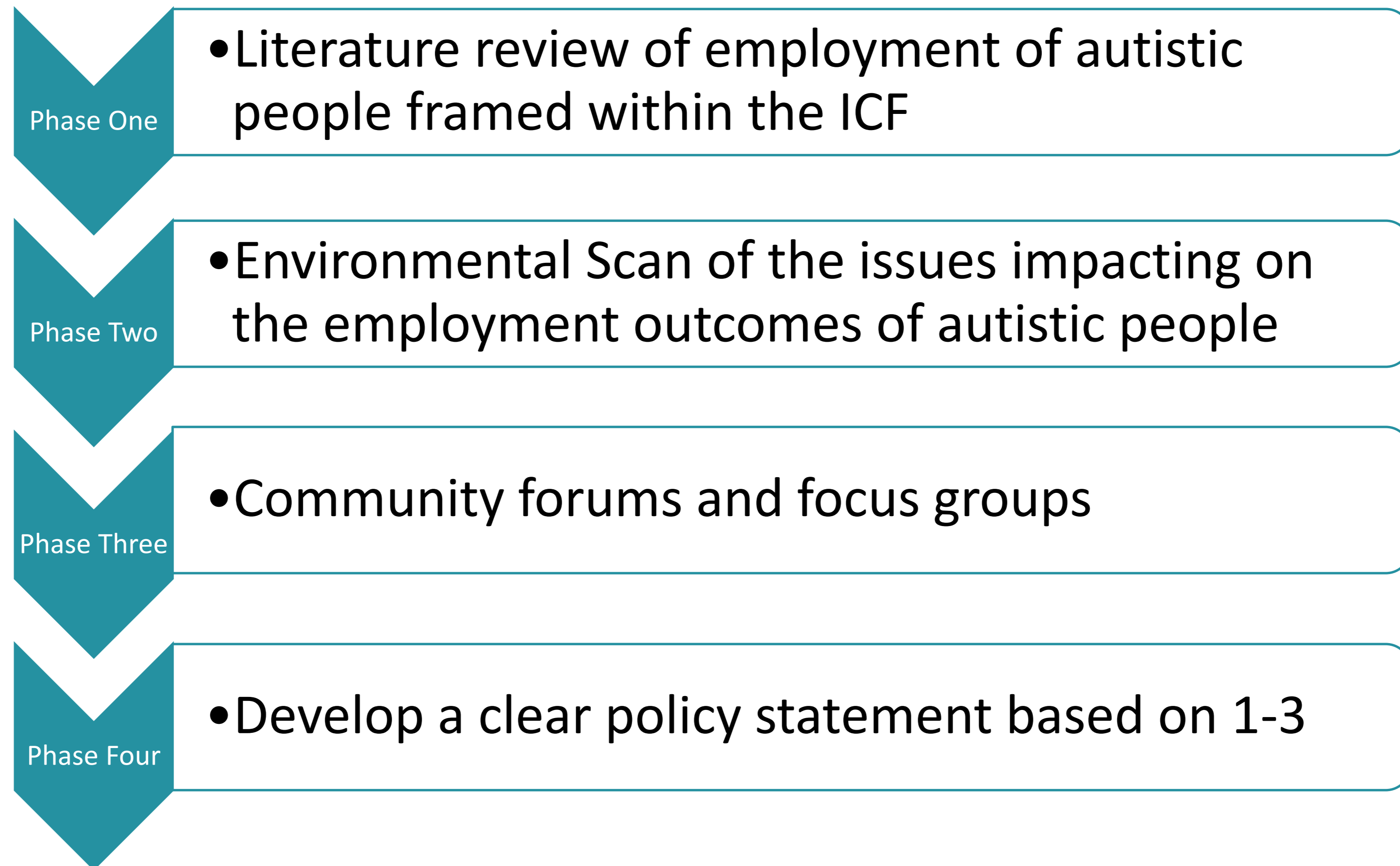


- International collaboration between Australia, Sweden and the US
- Examine issues related to the employment of autistic people by:
 - Defining the current situation internationally
 - Examining options for intervention and supports
 - Considering the autism spectrum
 - Providing recommendations and directions for future policy and research



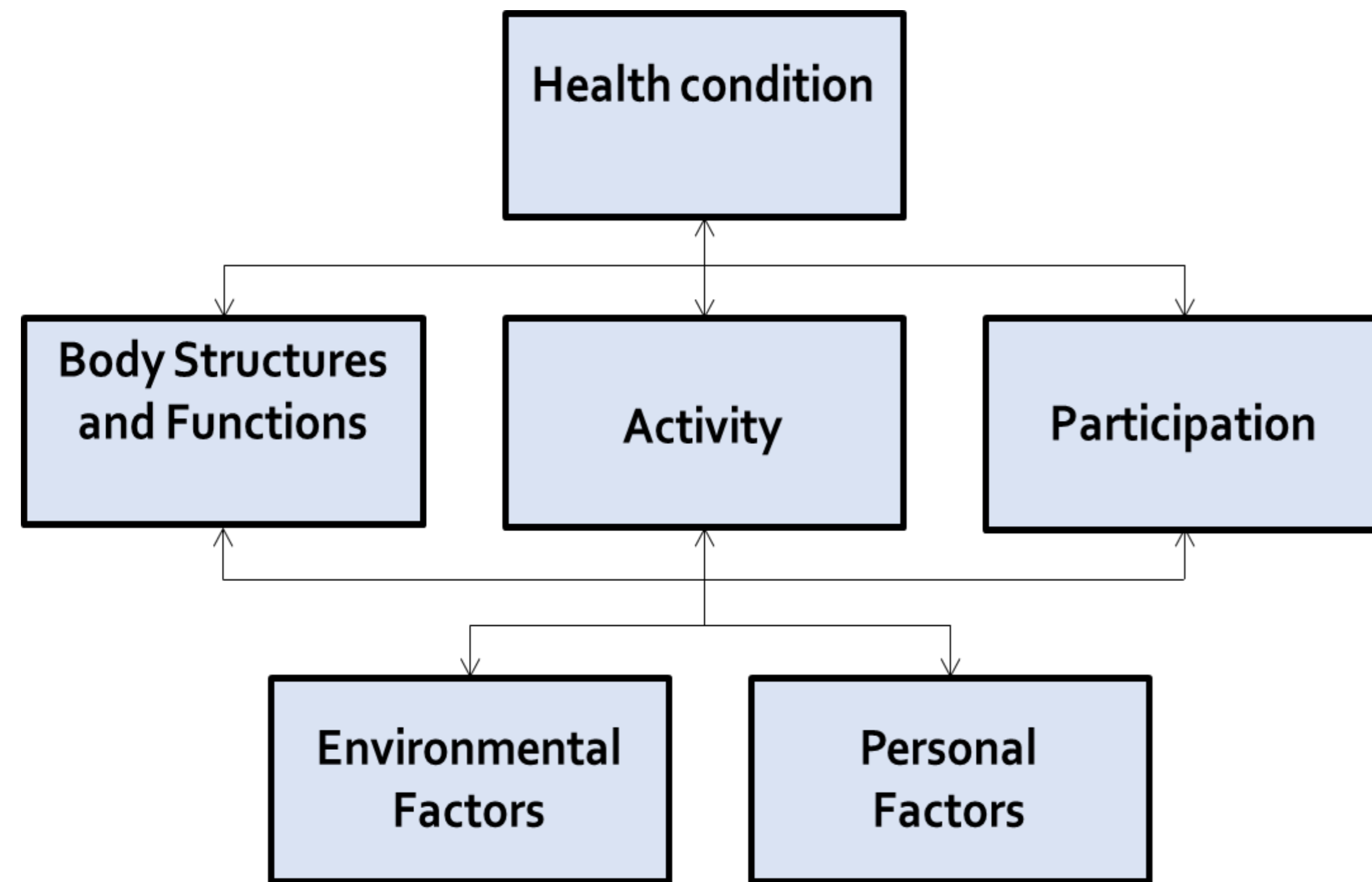
International policy brief

Overview



A holistic view of functioning

The World Health Organization




Phase One

Factors Impacting Employment of Autistic People: A Scoping Review

Melissa Scott, Ben Milbourn, Marita Falkmer, Melissa Black, Sven Bölte,
Alycia Halladay, Matthew Lerner, Julie Lounds Taylor & Sonya Girdler

Factors impacting employment for people with autism spectrum disorder: A scoping review

Autism
1–33
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sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1362361318787789
journals.sagepub.com/home/aut
The SAGE logo consists of a circular emblem containing a stylized 'S' followed by the word 'SAGE' in a bold, uppercase, sans-serif font.

Melissa Scott^{1,2}, Ben Milbourn¹, Marita Falkmer^{1,2,3},
Melissa Black^{1,2}, Sven Bölte^{4,5}, Alycia Halladay^{6,7},
Matthew Lerner⁸, Julie Lounds Taylor^{9,10,11} and Sonya Girdler^{1,2}

Abstract

The aim of this study is to holistically synthesise the extent and range of literature relating to the employment of individuals with autism spectrum disorder. Database searches of Medline, CINAHL, PsychINFO, Scopus, ERIC, Web of Science and EMBASE were conducted. Studies describing adults with autism spectrum disorder employed in competitive, supported or sheltered employment were included. Content analysis was used to identify the strengths and abilities in the workplace of employees with autism spectrum disorder. Finally, meaningful concepts relating to employment interventions were extracted and linked to the International Classification of Functioning, Disability and Health Core Sets for autism spectrum disorder. The search identified 134 studies for inclusion with methodological quality ranging from limited to strong. Of these studies, only 36 evaluated employment interventions that were coded and linked to the International Classification of Functioning, Disability and Health, primarily focusing on modifying autism spectrum disorder characteristics for improved job performance, with little consideration of the impact of contextual factors on work participation. The International Classification of Functioning, Disability and Health Core Sets for autism spectrum disorder are a useful tool in holistically examining the employment literature for individuals with autism spectrum disorder. This review highlighted the key role that environmental factors play as barriers and facilitators in the employment of people with autism spectrum disorder and the critical need for interventions which target contextual factors if employment outcomes are to be improved.

Keywords

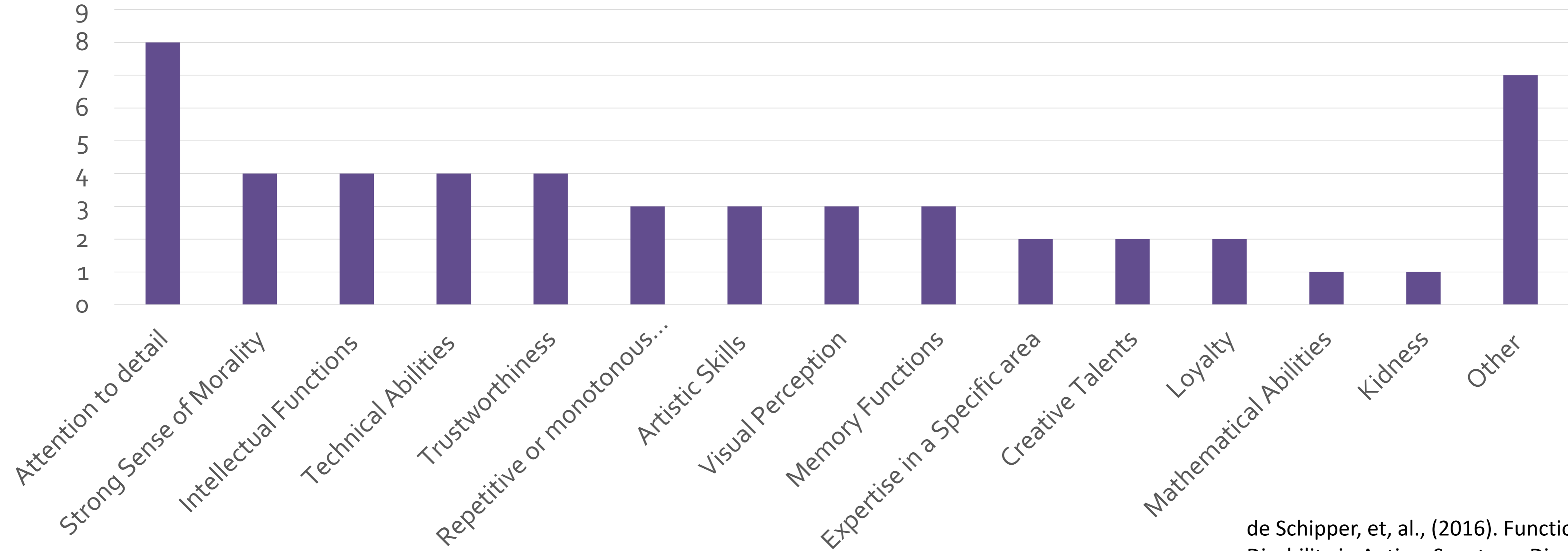
adult, intervention, strengths-based, vocational rehabilitation, work environment



SCAN ME

Autistic related strengths

Number of studies describing each strength
14 studies overall

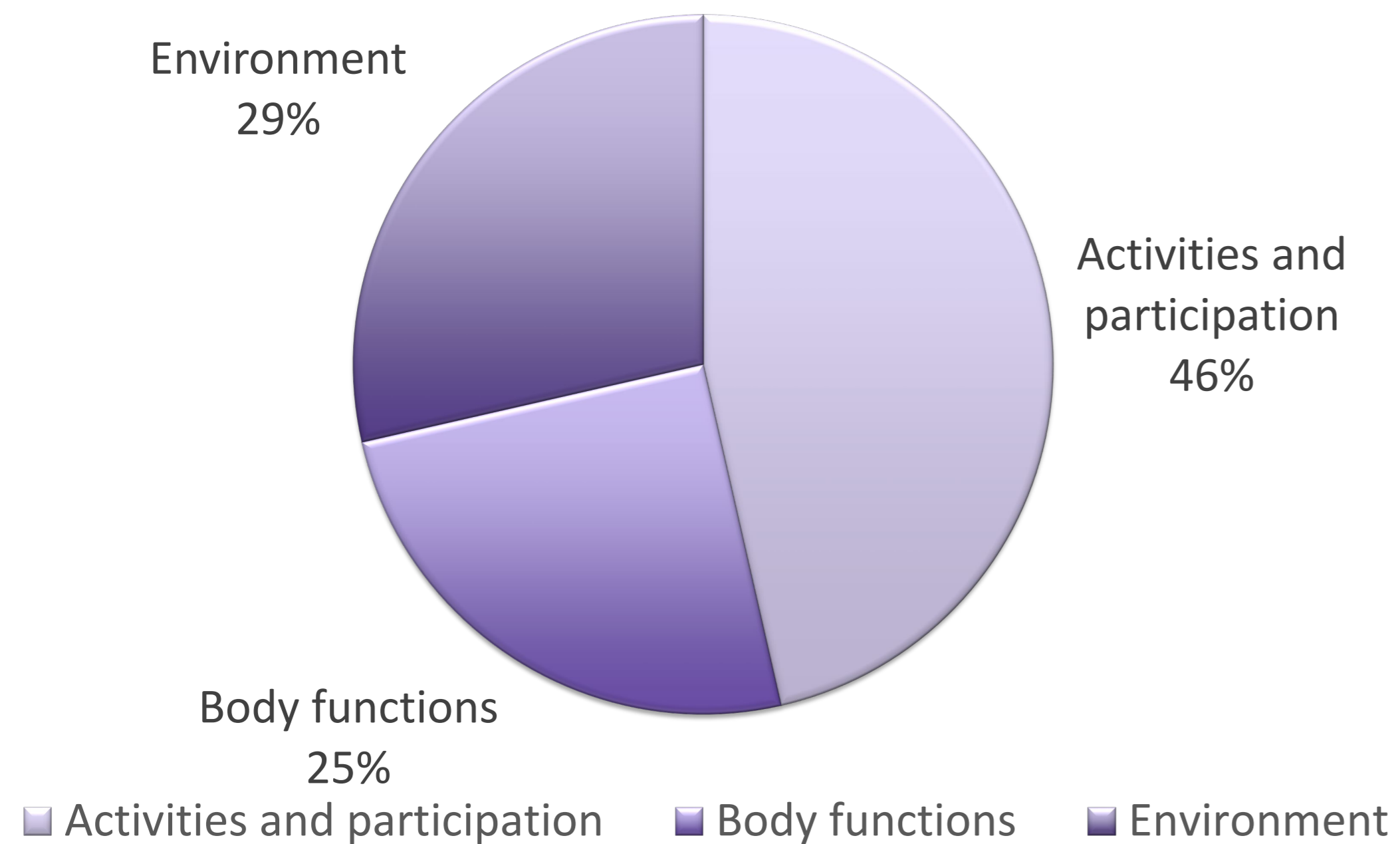


de Schipper, et, al., (2016). Functioning and Disability in Autism Spectrum Disorder: A Worldwide Survey of Experts. *Autism Research*, 9, 959-969

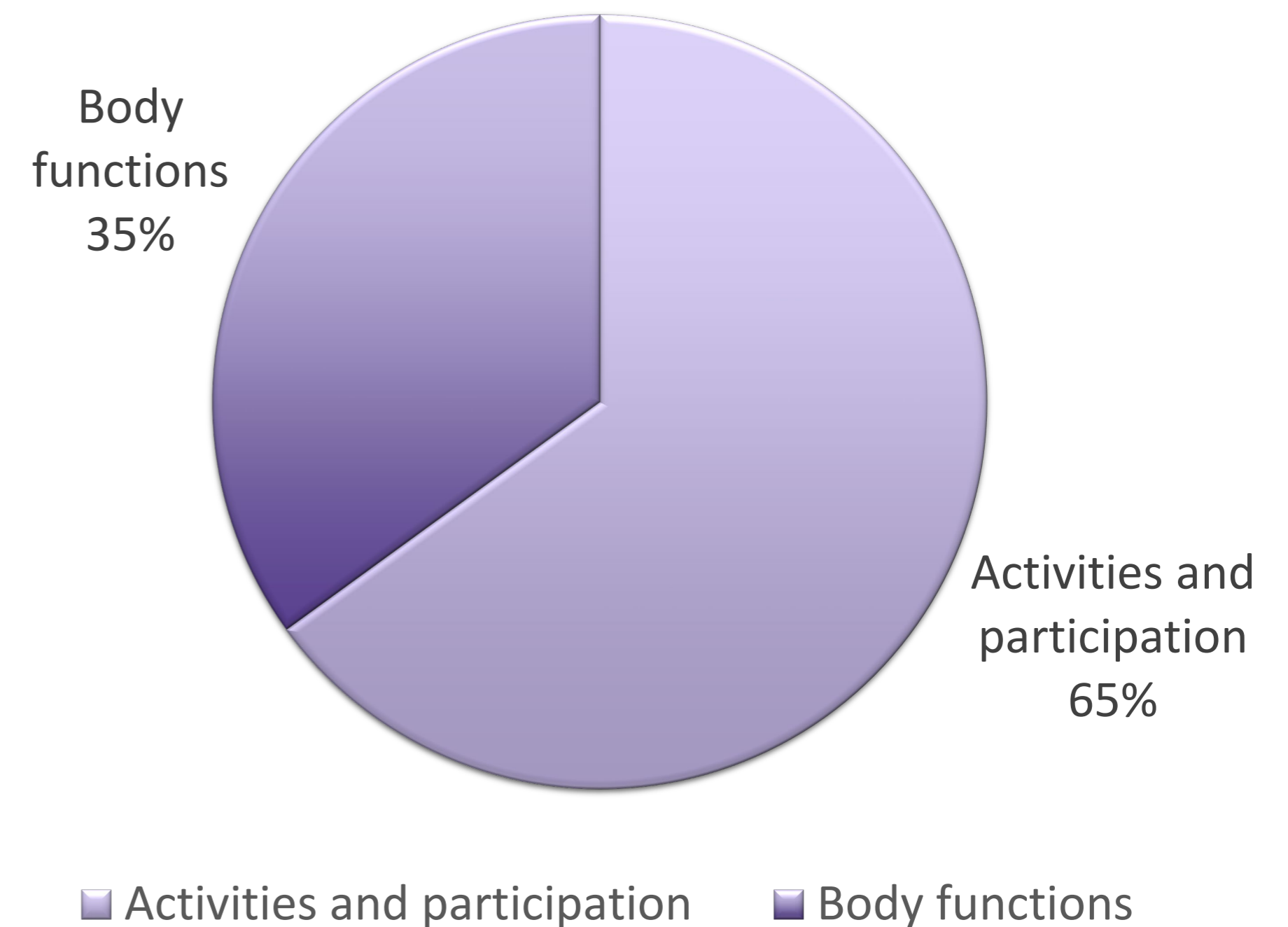
ICF linking results for intervention studies

Distribution of unique codes by ICF chapter
For intervention studies (k=36)

All Linking



Distribution of unique codes by ICF chapter
For targets of Interventions only







Results summary

- **Only a quarter of employment studies were intervention based.**
 - Focus on autistic impairments
 - Target characteristics that make finding and obtaining a job challenging (activity and participation components e.g., communication)
 - Not strengths-based
 - None targeted the environment
 - Environmental factors were used only as a means of delivering the intervention.



RESEARCH ARTICLE





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

Melissa H. Black , Soheil Mahdi , Benjamin Milbourn, Craig Thompson, Axel D'Angelo, Eva Ström, Marita Falkmer, Torbjörn Falkmer, Matthew Lerner , Alycia Halladay, Alan Gerber, Christopher Esposito, Sonya Girdler, and Sven Bölte 



RESEARCH ARTICLE

Multi-informant International Perspectives on the Facilitators and Barriers to Employment for Autistic Adults

Melissa H. Black , Soheil Mahdi, Benjamin Milbourn, Melissa Scott, Alan Gerber , Christopher Esposito, Marita Falkmer, Matthew D. Lerner , Alycia Halladay, Eva Ström, Axel D'Angelo, Torbjörn Falkmer, Sven Bölte , and Sonya Girdler



Original article



Factors impacting employment for people with autism spectrum disorder: A scoping review

Melissa Scott^{1,2} , Ben Milbourn¹, Marita Falkmer^{1,2,3},
Melissa Black^{1,2}, Sven Bölte^{4,5}, Alycia Halladay^{6,7},
Matthew Lerner⁸ , Julie Lounds Taylor^{9,10,11} and Sonya Girdler^{1,2}

Autism
1–33
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DOI: 10.1177/1362361318787789
journals.sagepub.com/home/aut




Employment outcomes can be improved now!

- Person-centered, individualized approaches
- Environmental supports in the workplace
- Employers, service providers, families and autistic individuals working together
- Opportunities for on the job experience
- Increasing understanding of autism in the workplace
- Employment programs leveraging the strengths of autistic people
- Employers focusing on harnessing the strengths of autistic people and the contribution they can make in the workplace



Getting People with Autism to Work

An International Society for Autism Research Policy Brief

November 8, 2018



INSAR

International Society for Autism Research

Autism-Insar.org



ABOUT THE ISSUE



SCAN ME

Making change

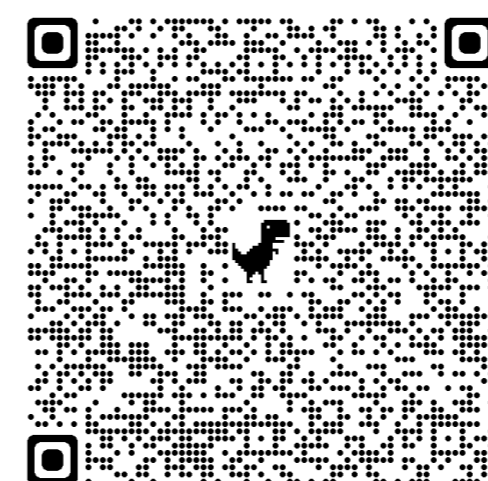
ICF core sets for Autism



Neurodiversity paradigm

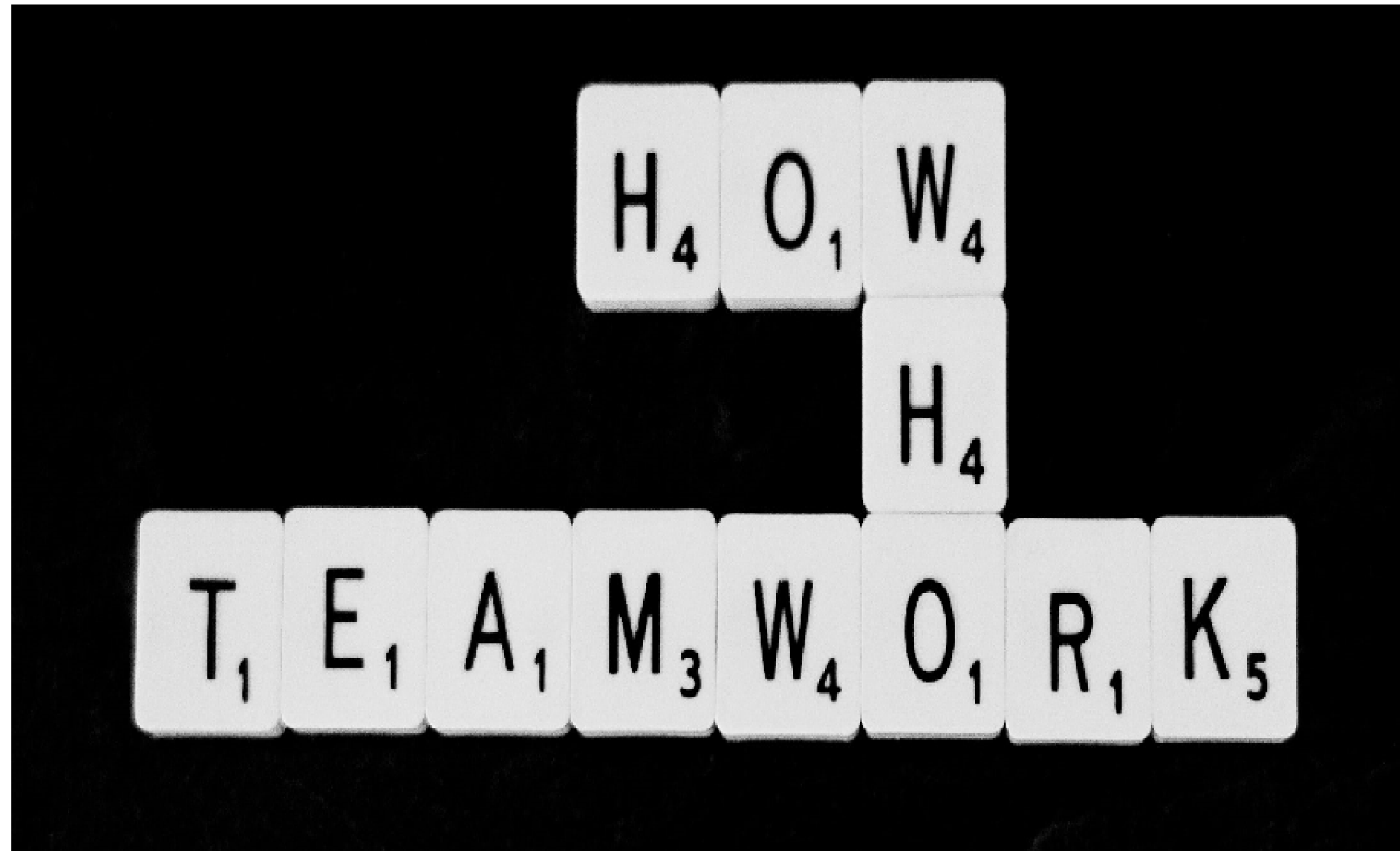


Strengths-based approaches



Sven Bölte, Wenn B. Lawson, Peter B. Marschik, Sonya Girdler (2021). Reconciling the seemingly irreconcilable: The WHO's ICF system integrates biological and psychosocial environmental determinants of autism and ADHD: The International Classification of Functioning (ICF) allows to model opposed biomedical and neurodiverse views of autism and ADHD within one framework. BioEssays

But how do we make this happen?





The Integrated Employment Success Tool (IEST)

An evidence-based guide for employers of autistic adults

Dr Melissa Scott, Dr Marita Falkmer, Prof Sonya Girdler,
Prof Torbjörn Falkmer and Prof Sylvia Rodger



The Integrated Employment Success Tool (IEST)

- An evidence-based guide for employers of autistic adults
- More than 100 employers involved in its development
- Efficacy tested in an Australia-wide randomised controlled trial
- Increased understanding and knowledge of autism
- More confident in supporting their autistic employees



The Integrated Employment Success Tool (IEST)

An evidence-based guide for employers of autistic adults



 Curtin University

 Australian Government
Department of Industry, Science,
Energy and Resources

 AusIndustry
Cooperative Research
Centres Program



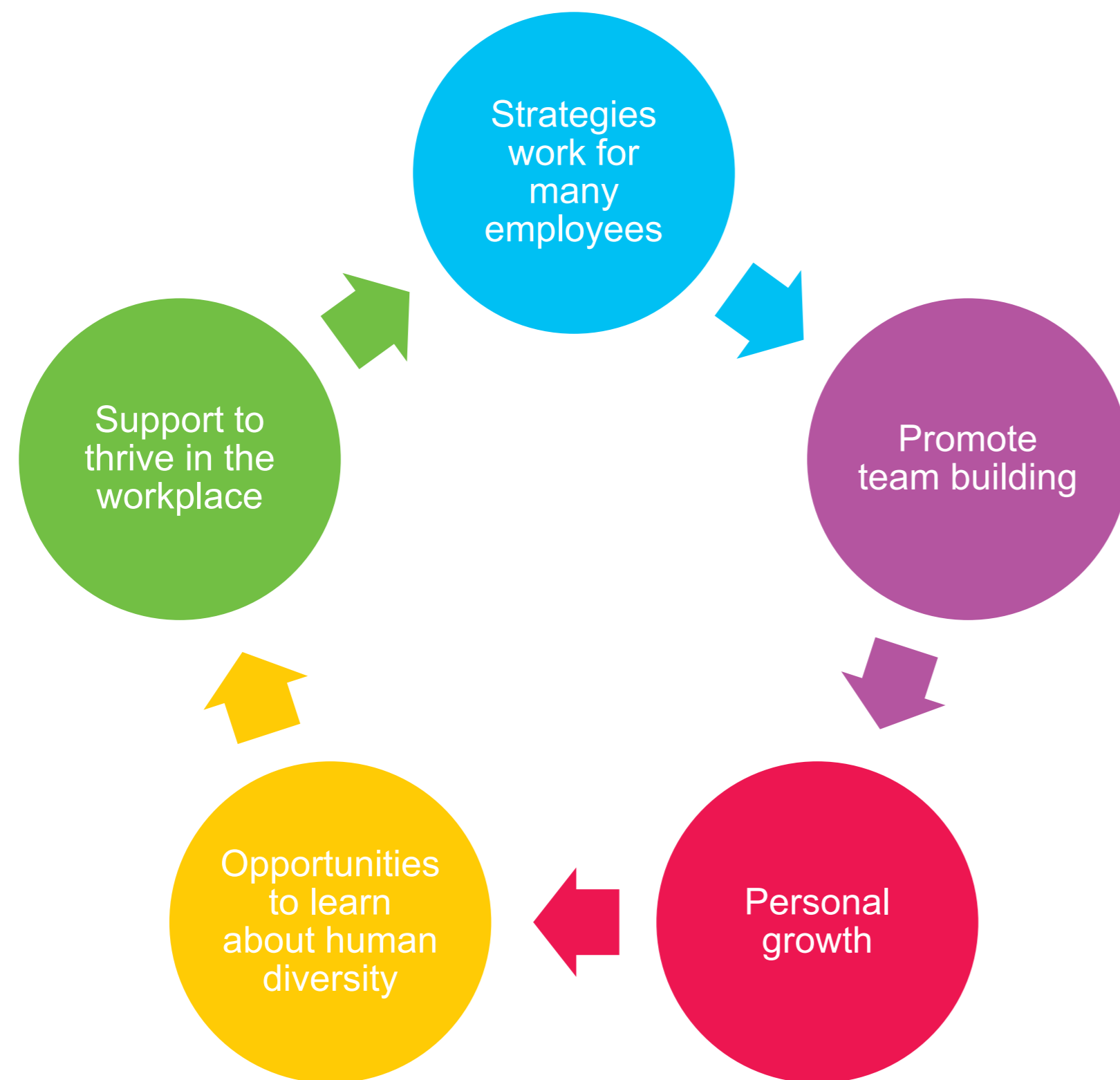
Dr Melissa Scott, Dr Marita Falkmer, Prof Sonya Girdler, Prof Torbjörn Falkmer and Prof Sylvia Rodger

The purpose of the IEST

1. Increase awareness of autism and highlight the strengths of autistic employees
2. Identify potential environmental workplace challenges for autistic employees
3. Actions or modifications required to resolve environmental workplace challenges
4. Foster beneficial relationships between employers and autistic employees (strengths and requirements)
5. Improve employee productivity, job retention and overall workplace success



IEST many potential benefits for all employees



How to use the IEST?

- Information on workplace requirements
- Tips and advice
- Questions to consider
- Checklists
- Experiences of employers
- Research findings

Introduction

Purpose of the IEST

Autistic employees have diverse skills, strengths and interests that enable them to be successful in a variety of roles. Based on a review of factors for successful employment, the IEST is designed to help employers determine and implement effective workplace modifications best suited to the needs of autistic employees. More than 100 employers were involved in the research and development of the IEST, with the overall aim to improve employee productivity, job retention, employer confidence, and overall workplace success.

This workplace tool provides information about:

- Autism and the strengths of autistic employees
- The benefits of employing autistic individuals
- The employment process and important factors for successful employment
- Strategies to implement workplace modifications
- A range of resources, including editable checklists and proforma

Often, unless a person discloses that they are autistic, it can seem difficult to provide accommodations or modifications.

Research suggests that the strategies presented in the IEST will benefit more than just the people who disclose their autism, as there are people who may not wish to disclose, or who may not have a formal diagnosis, for whom these strategies will also work. These approaches can help promote team building, personal growth and opportunities to learn about human and developmental diversity. And in establishing customised guidelines, all individuals may have the support to thrive in the workplace.

Advertising your organisation as being supportive of diverse employees in your job advertisements will encourage people to feel comfortable about disclosure so that they can be supported for success in the workplace.

The IEST empowers employers with the skills and confidence to make changes in the workplace to make it inclusive, bringing benefits to all employees.

How to use the IEST

This tool is presented according to the phases of employment. The IEST initially describes the factors for successful employment, followed by the phases:



Advertising the job



Interviewing



Job commencement



Workplace modification



How to maintain ongoing support

Each phase includes information on specific workplace requirements, tips and advice, questions to consider, and checklists. Additional resources are available in the IEST if required. Throughout the document you will also find quotes from real employers, based on feedback and research conducted as part of the development of this tool.

You may notice that parts of the IEST are repeated in different sections. This is because this information is relevant to all of those sections. It means that if you only read a particular section that is relevant to your needs, you will

“The IEST provided good overall information ... we improved our recruitment and interview process for all employees”





Advertising the job



Interviewing



Job commencement



Workplace modification



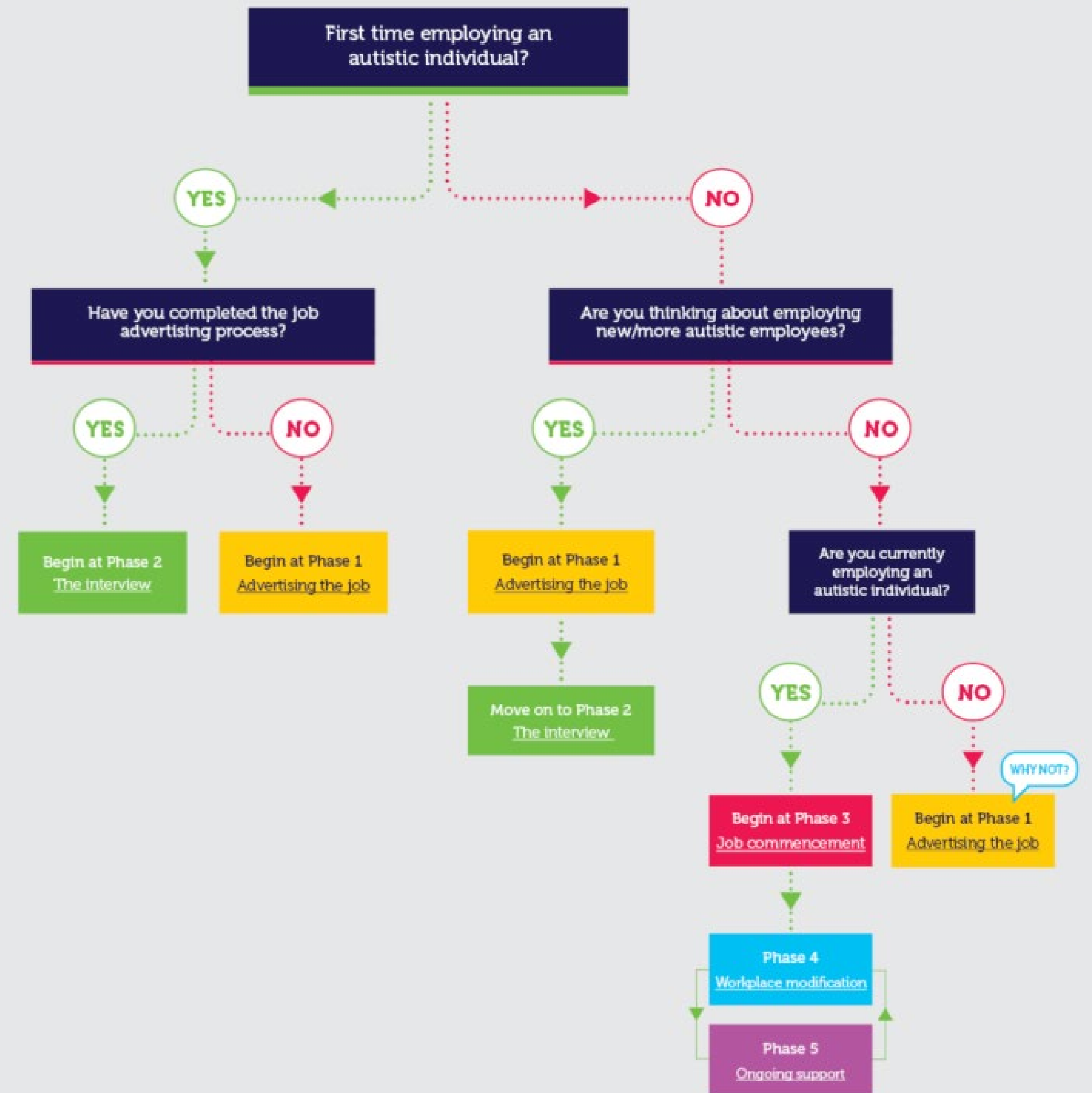
How to maintain ongoing support

Provides a decision tree to identify your stage in the employment process



AutismCRC

Employment process for employing autistic individuals





Understanding autism

Helpful tips



Developing employee strengths

- ▶ **Identify** employee's skills and interests
- ▶ **Match** job tasks to employee's skills and interests
- ▶ **Reward** good work with recognition

“It is important to talk about autism in a positive way, not to deny the difficulties, but to open a way forward so those difficulties can become less so. A positive outlook enthuses, creates, restores and breeds hope.”

Dr Wenn Lawson
Autistic author and researcher



AutismCRC

Phase 1: Advertising the job



PHASE 1

- Factors to consider when advertising a job
- Awareness of potential difficulties when advertising a job
- Strategies for advertising a job



Phase 2: The Interview



- What do you expect to get out of the interview?
- Is a formal interview necessary or required to assess the applicant's suitability?



Phase 3: Job commencement

- Factors to think about during job commencement
- Awareness of potential job commencement difficulties
- Strategies for job commencement



Job commencement

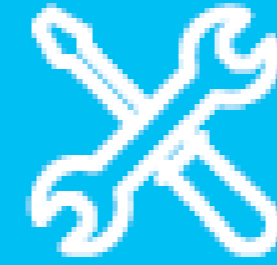
“I think it’s important to be clear that this is a professional environment, there are certain expectations, and to explain these. Maybe think about what things the employee should know before coming into the workplace and provide this information early.”

IEST Trial–Employer feedback

Summary checklist for job commencement

To-do	Strategies required	Person responsible	Task complete
Provide employee with necessary information prior to beginning their new job			<input type="checkbox"/>
Discuss job expectations and productivity requirements			<input type="checkbox"/>
Finalise and sign job contract			<input type="checkbox"/>
Choose a supervisor/mentor for the new employee			<input type="checkbox"/>
Assign supervisor/mentor to the new employee			<input type="checkbox"/>
Provide workplace orientation and training			<input type="checkbox"/>
Develop a support plan			<input type="checkbox"/>
Access external support from a Disability Employment Service provider (if required)			<input type="checkbox"/>
Apply for financial assistance (if required)			<input type="checkbox"/>

Phase 4: Workplace modification



PHASE 4

“I think it is a good thing to provide details about how the workplace usually works, and then ask if there are any aspects that we can adapt”

IEST Trial – Employer feedback



AutismCRC

Steps in the workplace modification process

Covers strategies in the areas of

- Sensory
- Social
- Communication
- Activity and task adjustment
- Physical environment



Phase 5: Ongoing support

- There is no end date to supporting autistic employees
- Providing regular feedback and supervision
- Reviewing their support plan and the effectiveness of support
- Ongoing implementation of workplace modifications



The costs and the benefits of hiring autistic individuals in open employment in Australia

- Employers do not incur additional costs
- Results challenge employer prevailing employer attitudes
- Many benefits to employing autistic adults
- Diversify the workplace and offer a competitive edge



"Play to your strengths."

"I haven't got any," said Harry, before he could stop himself.

"Excuse me," growled Moody, "you've got strengths if I say you've got them. Think now. What are you best at?"

J.K. Rowling, Harry Potter and the Goblet of Fire





Curtin University

AUTISM RESEARCH
GROUP (CARG)

***"Tapping the Talent:
Improving Employment outcome
for Autistic Australians"***

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