Cybersecurity Careers for Autistic People

October 18 , 2017

CyberBlue™: Leveraging the Strengths of Autistic People to Solve our Cybersecurity Crisis

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WASHINGTON, DC

WIRED Proposal

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KEVIN PELPHREY   SCIENCE   11.25.16   7:00 AM

AUTISTIC PEOPLE CAN SOLVE OUR CYBERSECURITY CRISIS

Vital jobs in online security are going unfilled. And there are people in our midst, ideally suited to the work, who are unemployed. Connect the dots. 📷 GETTY IMAGES

MOST POPULAR

3

Autism Spectrum Disorder (DSM-5)

- Persistent problems in social interactions across multiple contexts
  - Reduced social reciprocity
  - Problems understanding & using nonverbal communication
  - Troubles maintaining relationships
- Restricted/repetitive behaviors or interests
  - Repetitive motor mannerisms
  - Insistence on sameness
  - Restricted interests
  - Over- or under- responsive to sensory stimuli

Levels of Cognitive Functioning

Below Average-Above Average ~95%

Intellectual
Disability ~2.5%

55	70	85	100	115	130	145
-3	-2	-1	0	1	2	3

MEAN = 100
*STANDARD DEVIATION = +/- 15*
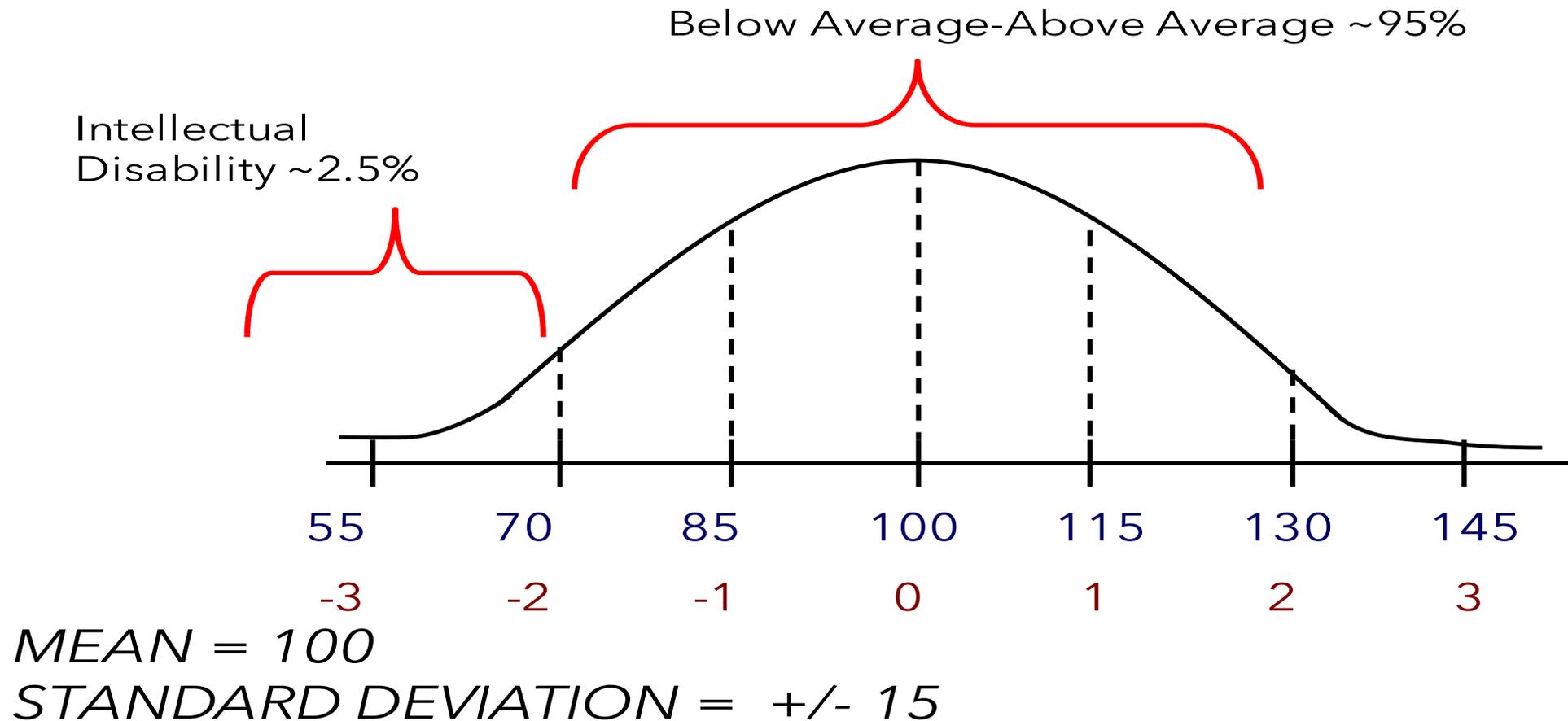
Structuring the Workforce

- NICE Cybersecurity Workforce Framework identifies 7 categories, 33 specialty areas, and 52 work roles

- Workforce development targets

  - Past/Current: Individually defined **work roles** with defined combination of KSAs

  - Future: Team-based, flexible, dynamic assemblies of **capabilities or skillsets**

Future Target

Current Target

Fulfills a Work Role

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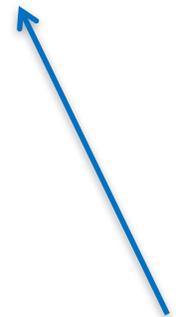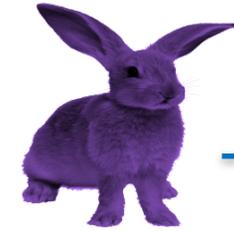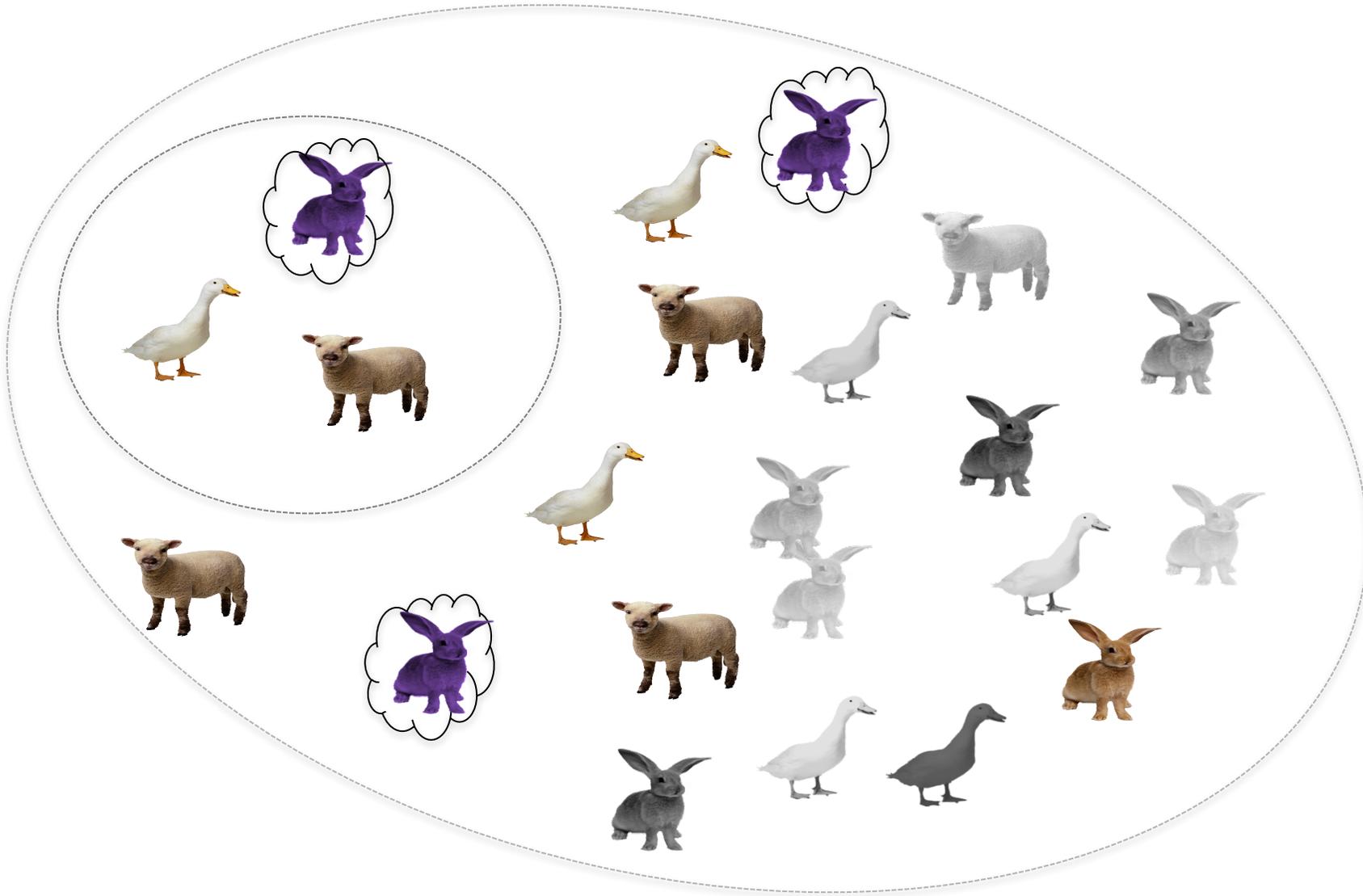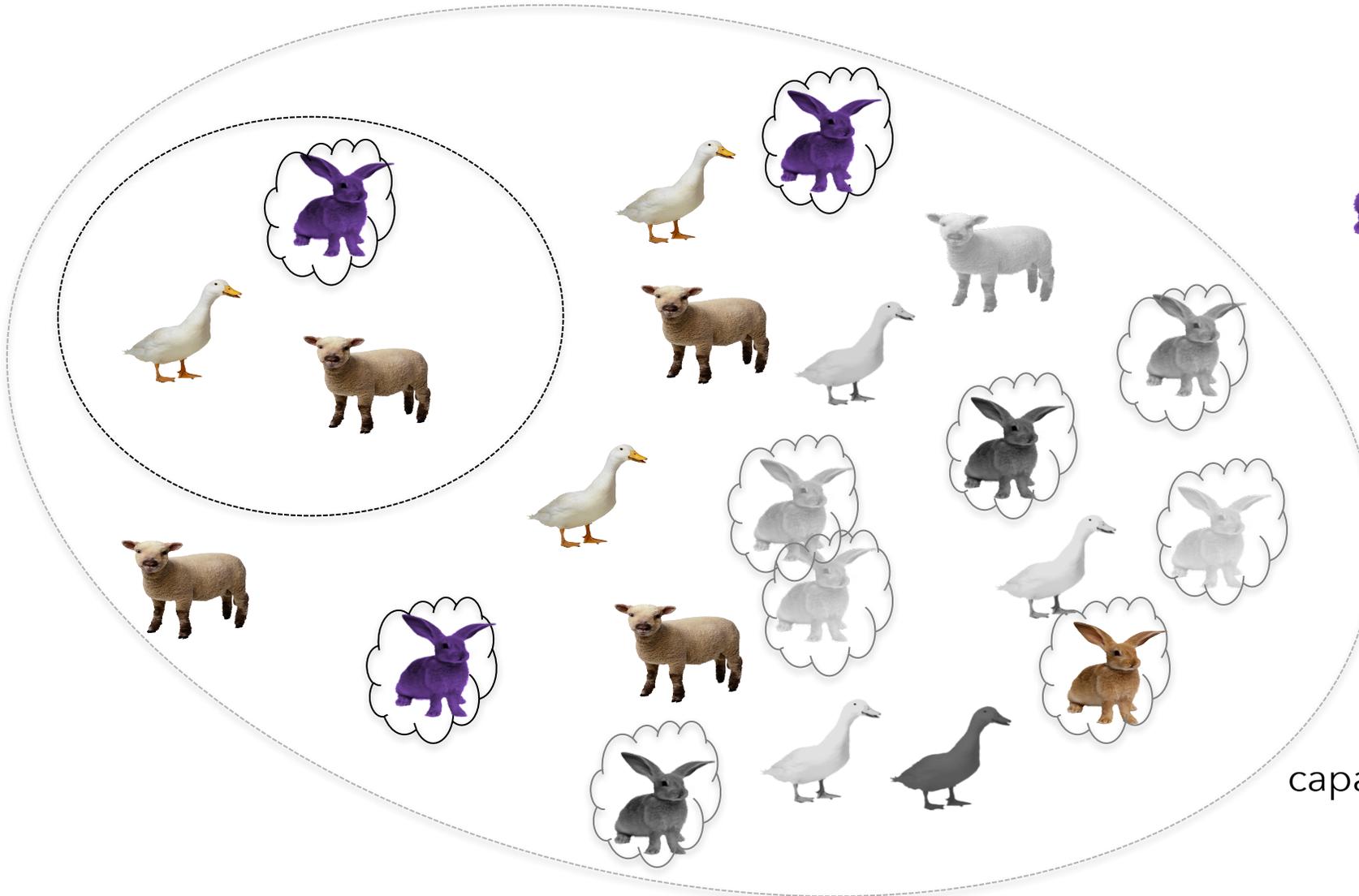
Adjusting the target

Fulfills a Work Role
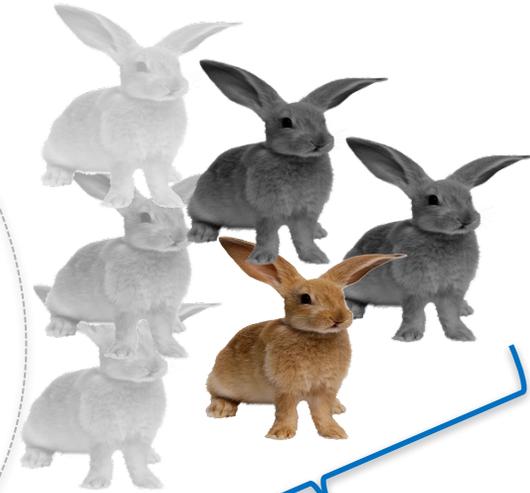
Though not "purple" they have capabilities that support desired skillset development

People Living with Autism

- Over 70 million people worldwide
- By 2020, the number of autistic adults will exceed 3 million in the US alone.
- Less than 1% of autism funding is currently allocated for research on workforce transitions.
- Efforts to employ autistic adults focus on their social deficiencies, rather than **leveraging their cognitive strengths**…

Cognitively Able

- Critical thinking
- Rapid pattern recognition
- Efficient quantitative analysis of data
- Precision focus

Profile of many cognitively able individuals with autism matches many of the cybersecurity workforce needs

A connection – newly released (April 2017) CRA research shows that ASD are the most common disability among UG computing students

Project Components

- Education
- Research
- Policy
- Workforce Development

Interrelated project components designed to provide ongoing formative insight and to expedite the transition of research to practice

Education Objectives

- To build new programs to engage **students** with autism, developing their expertise in cybersecurity concepts and skills as well as workplace social proficiencies and independent living skills.

- To develop new resources for potential **employers** to better understand how to optimally integrate employees with autism.

Research Objectives

- To **conduct and disseminate**
  - Disciplinary research that advances understanding in each area
  - Integrated research studies that transcend levels and disciplinary silos (e.g. genes, brain, behavior, workplace context, cybersecurity education, and public policy)
- To provide **formative assessments** to the educational and other components that will continuously inform program development.
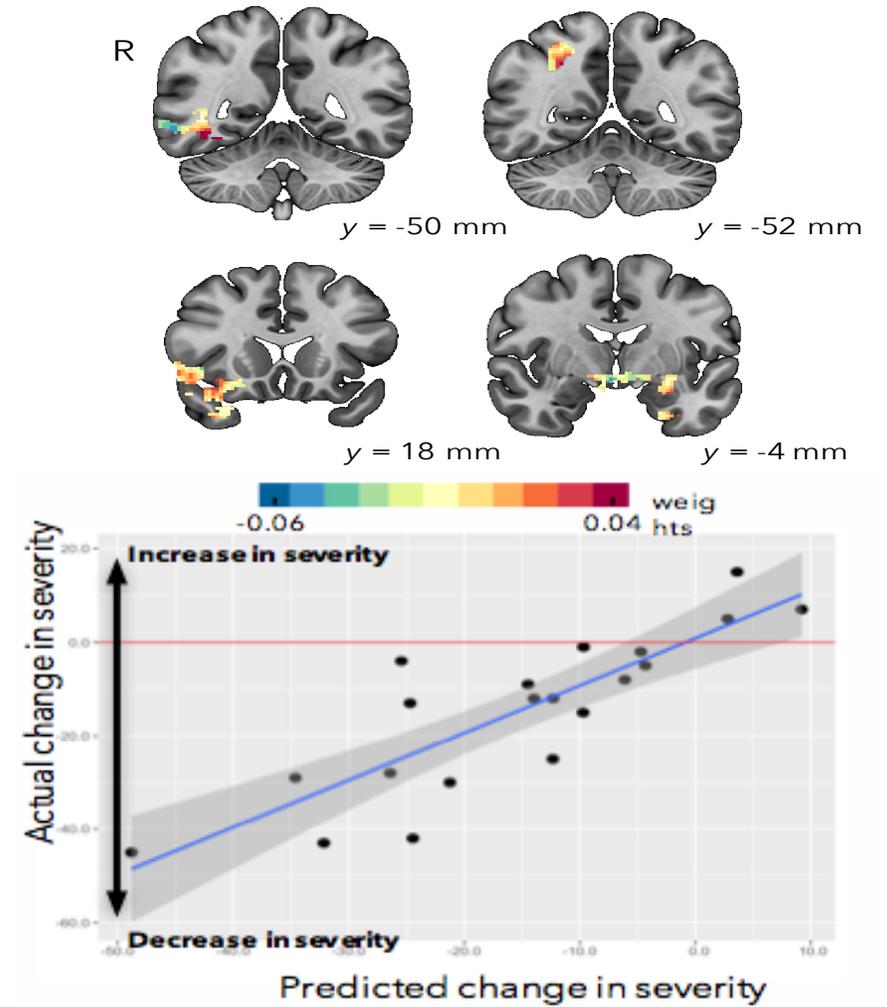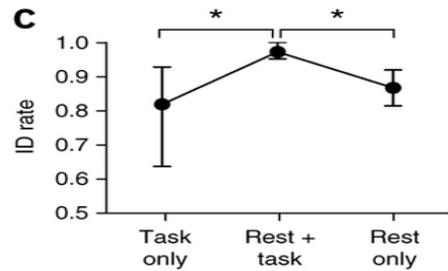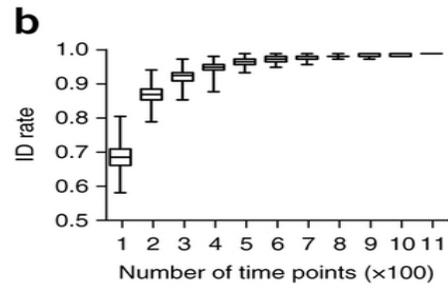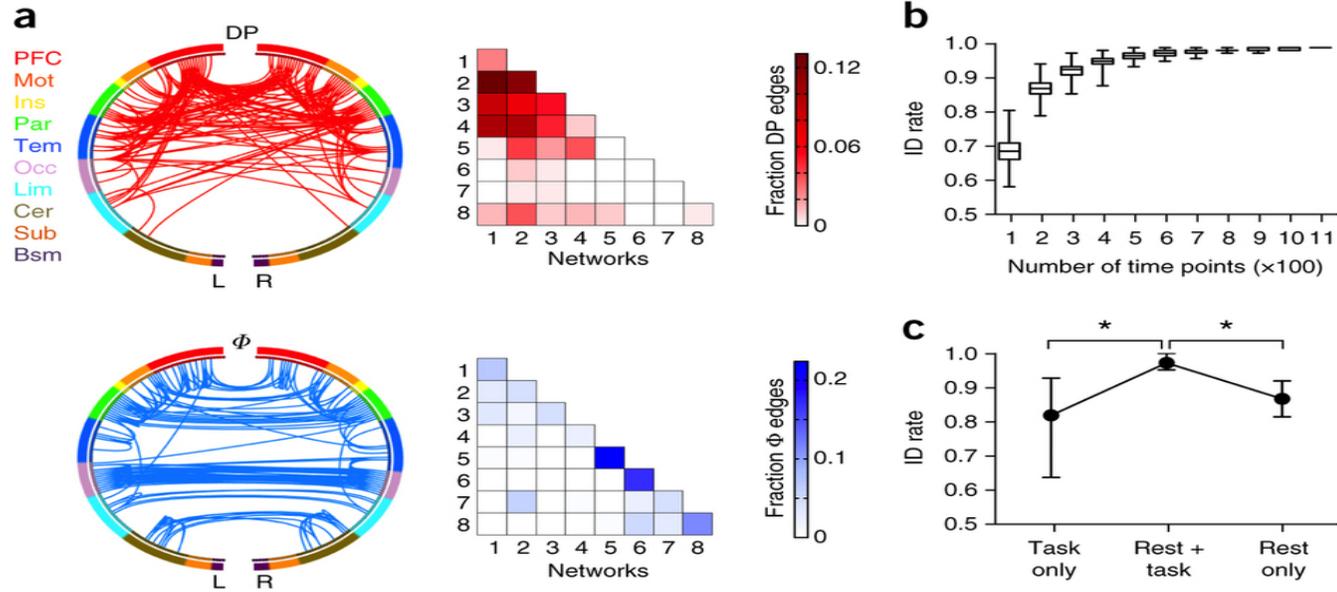
Finn et al. (2015) *Nature Neuroscience*

Workforce Development Objectives

- Develop **transformative workforce initiatives** to train and place a cadre of autistic individuals in the cybersecurity workforce.

Q & A

Cybersecurity Careers for Autistic People

National Initiative on Cybersecurity Education

National Institute of Standards and Technology

U.S. Department of Commerce

Jennifer Sheehy
Deputy Assistant Secretary
Office of Disability Employment Policy
U.S. Department of Labor

October 18, 2017

Driving Change ★ *Creating Opportunity*

ODEP
Office of Disability
Employment Policy

ODEP's Vision and Mission

- Only non-regulatory federal agency that promotes policies and coordinates with employers and all levels of government to increase workplace success for people with disabilities
  - **Mission**: Develop and influence policies that increase the number and quality of employment opportunities for people with disabilities
  - **Vision**: A world in which people with disabilities have unlimited employment opportunities

Driving Change ★ *Creating Opportunity*

National Disability Employment Awareness Month 2017

Neurodiversity: Benefit to Employers

- 2017 Australian study (survey) of 59 employers regarding their employees on the autism spectrum:
  - Above average performance: attention to detail, work quality and work ethic
  - 32% of employers report new creative and different skills brought to the workplace
  - 56% of employers report positive adaptations in work culture
  - No significant additional costs to employers

Cybersecurity & Neurodiversity

- CREST report on "Autism and the Technical Security Industry" (2017, UK) recommendations
  - Virtual work placements for people on the autism spectrum
  - Need for career guide(s) and films highlighting talents
  - Mentoring and interview workshops

Security Agencies Tapping Neurodiverse Talents

- GCHQ (Government Communications Headquarters) – UK security agency

- UK Defence Academy - 2017 event: "Neuro Diversity: Autism Spectrum Condition into Cyber"

- Israeli Defense Forces Unit 9900

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Apprenticeship

- Alternative post-high school career pathway
- High interest by cybersecurity employers
  - Transmosis – Silicon Valley
  - Programs in Virginia and Maryland launched in 2016
- 2017 Presidential Executive Order on Expanding Apprenticeships in America
- #ApprenticeshipWorks Video Series & Guides: www.dol.gov/odep/apprenticeship

Workforce Recruitment Program (WRP)

- Connects college students and recent graduates with disabilities to full-time jobs or internships at federal and private employers
  - www.WRP.gov: federal agency employers
  - www.WRP.jobs: private-sector employers
- Schedule A-eligible, full-time college students enrolled in two-year schools, four-year schools, and graduate school

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Schedule A

- Affirmative action hiring authority for federal agencies to hire employees with disabilities

- Eligibility: Intellectual disability, severe physical disability or psychiatric disability

- Autism is an eligible disability under Schedule A

- ODEP infobrief on Schedule A: https://www.dol.gov/odep/pdf/20160129-ScheduleA.pdf

OFFICE OF DISABILITY EMPLOYMENT POLICY
UNITED STATES DEPARTMENT OF LABOR

Schedule A Hiring Authority: Your Fast Track to Disability Inclusion!

An Inclusive Federal Government workforce representative of the diverse citizenry it serves is one of our nation's greatest assets. But, the length of the federal hiring process may dissuade some qualified candidates from even applying—not to mention frustrate federal hiring managers charged with filling vacant positions.

Schedule A can help cut through the lengthy process.

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ODEP
Office of Disability
Employment Policy

Job Accommodation Network (JAN)

- ODEP-funded technical assistance center supporting employers, employees with disabilities and others

- www.askjan.org; 800-526-7234

- Autism resources: askjan.org/media/autism.htm

  – Interviewing tips for job seekers

  – Accommodations and best practices for supports

  – Executive functioning-related information

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Rehabilitation Act – Section 501

- Requires federal agencies to take affirmative action to recruit, hire, retain and advance people with disabilities

- Prohibits discrimination on basis of disability

- Sets two key goals for workforce representation:
  - 12% representation for people with disabilities
  - 2% representation for people with targeted disabilities

- FAQs: www.eeoc.gov/laws/regulations/qanda-ada-disabilities-final-rule.cfm

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Computer/Electronic Accommodations Program (CAP)

- Centrally funded program for multiple federal agencies

- Provides assistive technology, devices and support services, including online trainings

- Housed at U.S. Department of Defense

- 833-227-3272; cap@mail.mil

Federal Agency Best Practices

- Centralized Accommodation Funds (CAFs)
- Shared info and resources on disability focuses, such as via affinity groups for federal employees with disabilities
- Innovation, including mentoring for federal employees with disabilities
- Federal Exchange on Employment and Disability (FEED)

Rehabilitation Act – Section 503

- Requires federal contractors to take affirmative action to hire, place and advance people with disabilities
  - Utilization goal of 7%
  - Contractors with 50+ employees and contracts of $50,000+
- Prohibits federal contractors from discriminating on the basis of disability
  - Federal contractors with contracts of $10,000+
- OFCCP's FAQ on Section 503: www.dol.gov/ofccp/regs/compliance/faqs/503_faq.htm

Self-Disclosure

- Challenges with self-disclosing "hidden" cognitive disabilities like autism in the workplace

- 411 on Disability Disclosure: A Workbook for Youth with Disabilities: www.ncwd-youth.info/411-on-disability-disclosure

- JAN resources on self-disclosure in the workplace: askjan.org/topics/discl.htm

Thank You!

- Q&A
- www.dol.gov/odep

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Q & A

The Dandelion Program

Establishing careers for people on the spectrum

Cyber security

Michael Fieldhouse
Director – Emerging Businesses & Cyber security, DXC Technology
Adjunct Professor of Cyber security at La Trobe University

https://www.linkedin.com/in/michaelfieldhouse/

The Journey

- The Dandelion Program was established 4 years ago by DXC, formally HPE in partnership with Australian Department of Human Services

- When we initially started the program there was very little evidence based information around employing people with autism. Our due diligence investigations with other organisations showed that where tried, failure of sustainment was the greatest challenge. They were correct.

- The key is that it is more than just providing a job… It is about giving the individuals the tools, skills and proper work experience to define and build a career.

- Approximately 12 months into the program we realised there was a lot more complexity involved to create sustainability. Areas to tackle were identified as:
  - Mental health issues; something we did not know until later is that 80% of people on the spectrum have at least one comorbidity (anxiety, depression, sleeping disorders) and they are nine times higher to have suicidal thoughts
  - Managers being fearful of having performance management discussions
  - Executive functioning problems
  - Lack of life (adaptive) skills
  - Continuous education of the work environment about autism and mental health issues

- We realised we needed more help to develop a programmatic approach to dealing with all these issues if we are truly going to change participation rates for people on the spectrum. We identified and involved a variety of partners in the program to assist including Cornell University, Harvard Business School, Ivey Business School, La Trobe University, University of Queensland, Autism CRC, University of Haifa and Ono Academic College (Israel)

The Dandelion Program

- The vision was to create a <u>sustainable</u> program that would increase the workforce participation rate of people on the Autism Spectrum

- The Dandelion Program consists of two streams – internships and employment

- The Dandelion employment program is a three year program focussed on building careers and the skills of people on the spectrum; similar to a graduate program

- The Dandelion Program now has 58 people and 14 work experience participants working in the areas of cybersecurity, data analytics and software testing for the Australian Federal Government Department of Human Services, Department of Defence and Department of Border Protection and we have shared our experiences with the autism community by open sourcing the learnings with La Trobe and Cornell University

- Longitudinal study running underneath the program through La Trobe University

- Currently working on implementation with ANZ Bank

- Have been providing a large amount advisory work to a number of local and international organisations "This program is unique because it attacks the problem of employment for people with an ASD, not simply by pushing harder the peg into the square hole, but instead by addressing the supports needed on both ends…"

Professor Cheryl Dissanayake, Director, Olga Tennison Autism Research Centre

Benefits

- Unique skills sets that team members bring to the workforce such as attention to detail, out of box thinking and the ability to do repetitive tasks accurately

- Productivity is very high

- Identification of defects and issues that no one else has identified

- Increased team morale of the staff around the Dandelion team members

- Manager and team leader have become better managers and leaders

- A positive impact on the families of the people on the spectrum. A sense of relief that there is opportunity and a career based future for their family member

"Our main objective is to enhance capability"

Australian Department of Defence, Rear Admiral Peter Quinn
Head Joint Capability Management and Integration

Challenges of employing people with Autism

- Mental health issues e.g. anxiety, depression, sleep disorders

- Managing more than one disability

- Executive functioning skills

- Self Advocacy of the individuals

- Life / adaptive skills such as financial awareness, nutrition

- Managers did not have enough management skills and the fear of performance management

- Regular management training for the co-workers and managers due to organisation change

Cyber security role being provided by autistic people

- Reverse engineering of malware

- Event management

- Software development

- System Administration

- Hunt activities

- Forensics

People on the spectrum are also creative

Dandelion Program Structure

Year 1
Job Awareness

The staff member is trained in the environment and job processes and commences work activities. Technical and social development is tracked and staff integration into the workforce commences

Year 2
Self Advocacy

Involves the individual improving their work profile and taking note of their key strengths and support that may be required. Introducing the staff member to networking opportunities and focus on certifications

Year 3
Transition

The individual is setup for transition at the end of the program and to provide all opportunities for employment. The recruitment of a new team on the Autism Spectrum

Workplace education

Dandelion Employment Program Overview

Assessment Program	On-boarding	Skill & Experience Building	Job or Career Transition

Outcomes:

- Identify candidates
- Assess candidates
- Provide a recommendation and risk profile on candidates

Outcomes:

- Environmental concerns identified and addressed
- Build first phase of adaptive skills; e.g. traveling to work and arriving on time
- Build technical skills associated with the role
- Build social relationships

Outcomes:

- Develop technical skills
- Build experience & knowledge
- Improve executive function skills
- Build adaptive skills
  - Life skills such as cooking classes
  - Financial planning
  - Nutrition
  - Travel planning

Outcomes:

- Careers fair
- Matching individual interests to jobs
- New manager and team training
- Transition plans

Benefits of the model – La Trobe University

Personal

- ➢ Job retention is high when compared to other ASD employment programs; some transitioning out of the program early and into full time unsupported employment
- ➢ Recruitment process and support system considered critical to workplace success
- ➢ Participants:
  - – develop a "sense of purpose and meaning in life", previously unobtainable opportunities (e.g., purchasing a house)
  - – opportunities to socialise, feel "part of the wider workforce"
  - – better prepared to apply for unsupported jobs, build experience/work history necessary to be competitive in job market

Organisation

- ➢ Co-workers "proud" their organisation is involved in the Dandelion Employment Program, see diversity as important and relevant, program is a "go to" when talking about positive aspects of work
- ➢ Quality of work and performance of trainees reported to be excellent; new innovations transferable to broader workforce
- ➢ Managers learn new skills (e.g., improved communication) transferable to other work environments

Economic

- ➢ For every 100 individuals* participating in the 3-year Dandelion Employment Program, it is estimated that the program:
  - – generates $2,826,600 in tax benefits
  - – savings of $3,219,900 in welfare payments
  - – $600,000 reduction in employment service access
  - – resulting in **potential for over $6 million benefit to the government over 3 years****

*Assuming previously unemployed, receiving welfare or disability pensions.

**Figure does not factor in benefits from decreased health care costs, decreased use of other support services, nor general economic benefit from increased productivity and activating a previous unutilised section of the labour market

Key Learnings from the research & operations

What we have learnt from longitudinal research and input from leading experts at La Trobe University and Cornell University.

Key elements to the success:

• Organisational change and training for general workplace and co-workers

• Shared experience as part of recruitment and on boarding as it creates friendships thus decreases suicidal thoughts due to lower levels of loneliness

• Sustainment support for the individuals (people, process & tools)

Key learnings:

• Autism awareness training needs to be reinforced, due to staff turn over. Face-to-face training does not reach everyone

• Improved integration services – communication and executive education

• You are not only dealing with and managing autism but other mental health disorders at the same time

Q & A

Thank You for Joining Us!

Upcoming Webinar: A Path to Obtaining Cybersecurity Work Experience: Internships, Cooperative Education, and Apprenticeships

When: Wednesday, November 15, 2017 at 2:00pm EST

Register: https://nist-nice.adobeconnect.com/webinar-nov2017/event/registration.html

nist.gov/nice/webinars