Opening Doors for Individuals with Autism to Build the Cybersecurity Workforce

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Discussion Agenda

- Context & Motivation
- CyberBlue
  - Overview: Components and objectives
  - Initial approach
- Collaborative Opportunities

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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

Cybersecurity Workforce Context

- Cybersecurity workforce shortages are growing – recent projections suggest a 1.8 million person shortfall by 2022 *(up from previous estimates)*

- Workforce initiatives target both general and traditionally underrepresented populations

- Programs focus on increasing yield by expanding the pool
  - Strengthen STEM entry pipeline
  - Target traditionally underrepresented demographics: women, specific racial groups, veterans

Current approach: Cast a **wider** net.
Future approach: Cast a **targeted** net.

What's the Target?

Structuring the Cybersecurity Workforce

- National Cybersecurity Workforce Framework (NCWF) identifies 7 categories, 33 specialty areas, and 50 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**
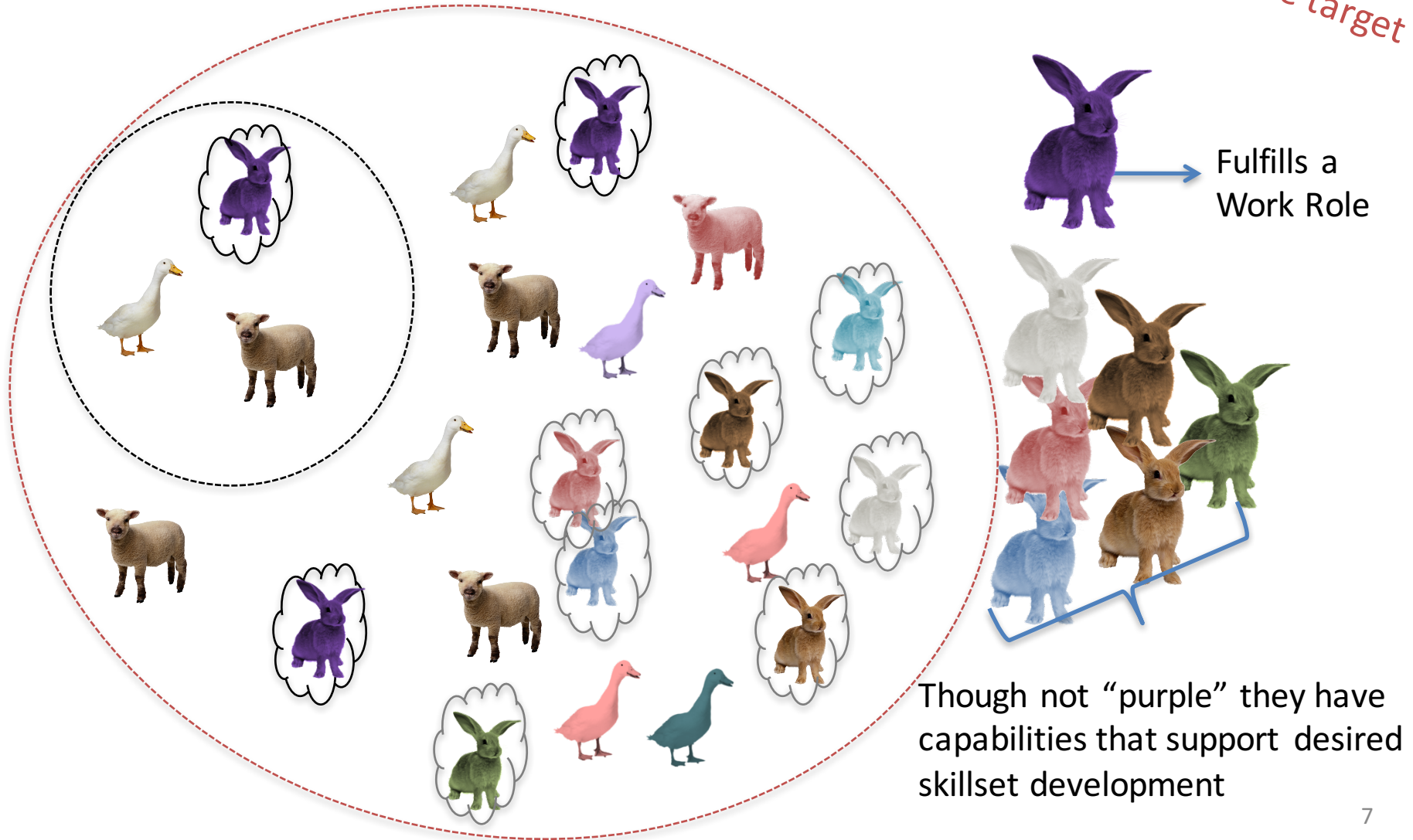
Future Target

Current Target

… Beyond Purple Rabbits

Fulfills a Work Role

… Beyond Purple Rabbits

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 adults with autism 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 adults with autism 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 CRA

Using one social challenge to solve another

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.

Approach to Education Objectives

- For students: Organize educational teams with cross-disciplinary expertise in special education, autism, and cybersecurity to **design and deliver** new content-rich clinical training and educational activities

- For employers: Convene human resource development teams to **identify and develop** organizational learning opportunities to facilitate the needed organizational adjustments

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.

Approach to Research Objectives

- Establish **disciplinary R&D teams**
  - Cybersecurity researchers will explore alignment of evolving threat vectors, cybersecurity tools and techniques, and workforce requirements.
  - Organizational scientists will investigate cultural and management changes necessary to integrate individuals with autism.
  - Cognitive neuroscientists will work to develop optimal ways to identify the ability to learn new skills, and model the science of learning.
- Establish a **multi-disciplinary R&D board** (disciplinary team leads) to aid in the cross-walk of research across the project objectives

Neuro-Prediction
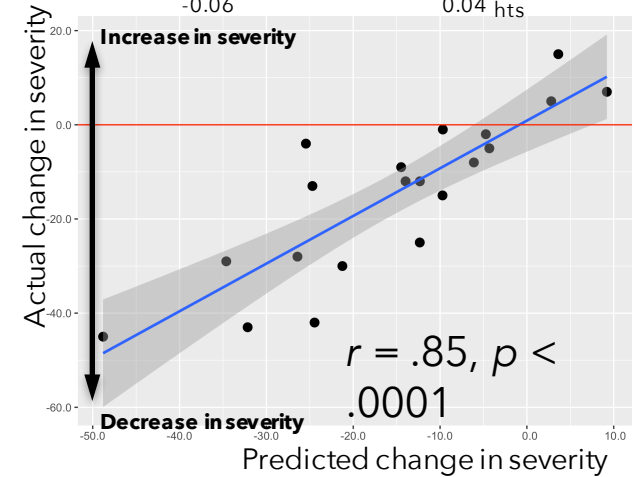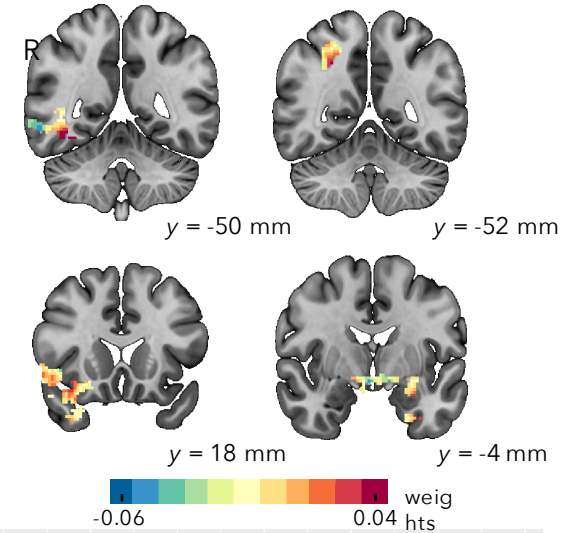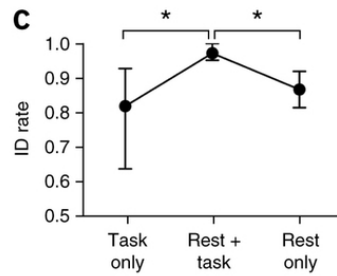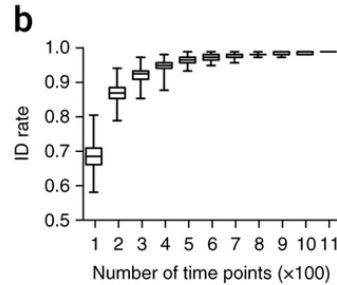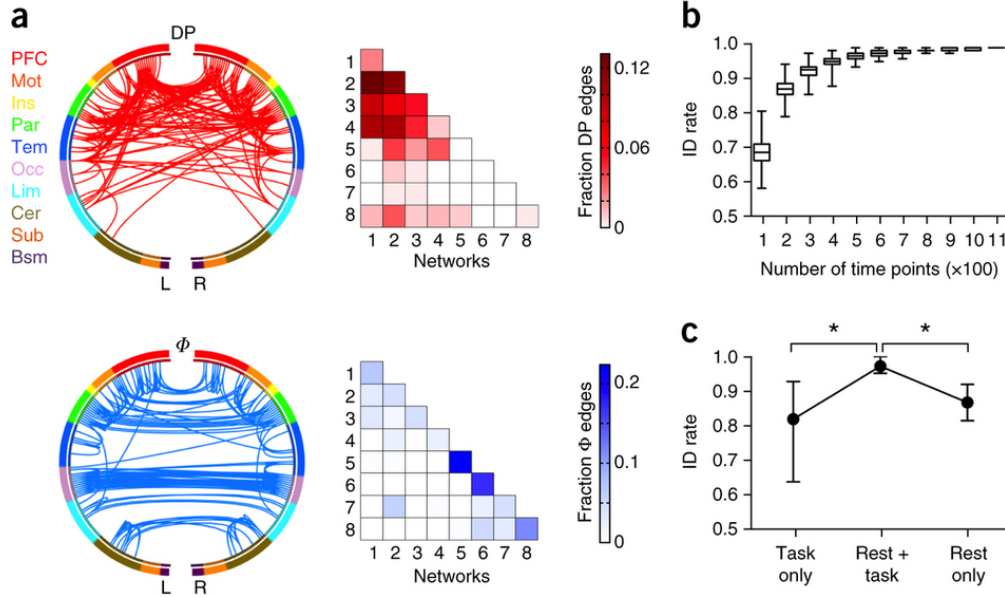
Finn et al. (2015)
Nature Neuroscience

$r = .85, p < .0001$

Yang et al. (2016)
Translational Psychiatry

Policy Objectives

- **Develop policy recommendations** that advance awareness of and approaches to broadening workforce participation for people with autism

- **Inform policy discussions** at the state and federal level on cybersecurity workforce development

Approach to Policy Objectives

- **Collaborate with advocacy groups** like Autism Speaks and the National Initiative for Cybersecurity Education to inform and develop actionable policy recommendations.

Workforce Development Objectives

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

Approach to Workforce Development Objectives

- **Leverage and expand existing programs** like Unstuck and On Target, an executive function intervention for people with autism & the PEERS Social Skills Training Intervention

- **Establish relationships** with programs like the Easter Seals-Goodwill Peer Connections that will provide models for transitioning educational programs into new workforce development initiatives