

Resting-state functional connectivity in youth with autism spectrum disorder and psychotic-like symptoms

Amandeep Jutla, MD

Postdoctoral Fellow

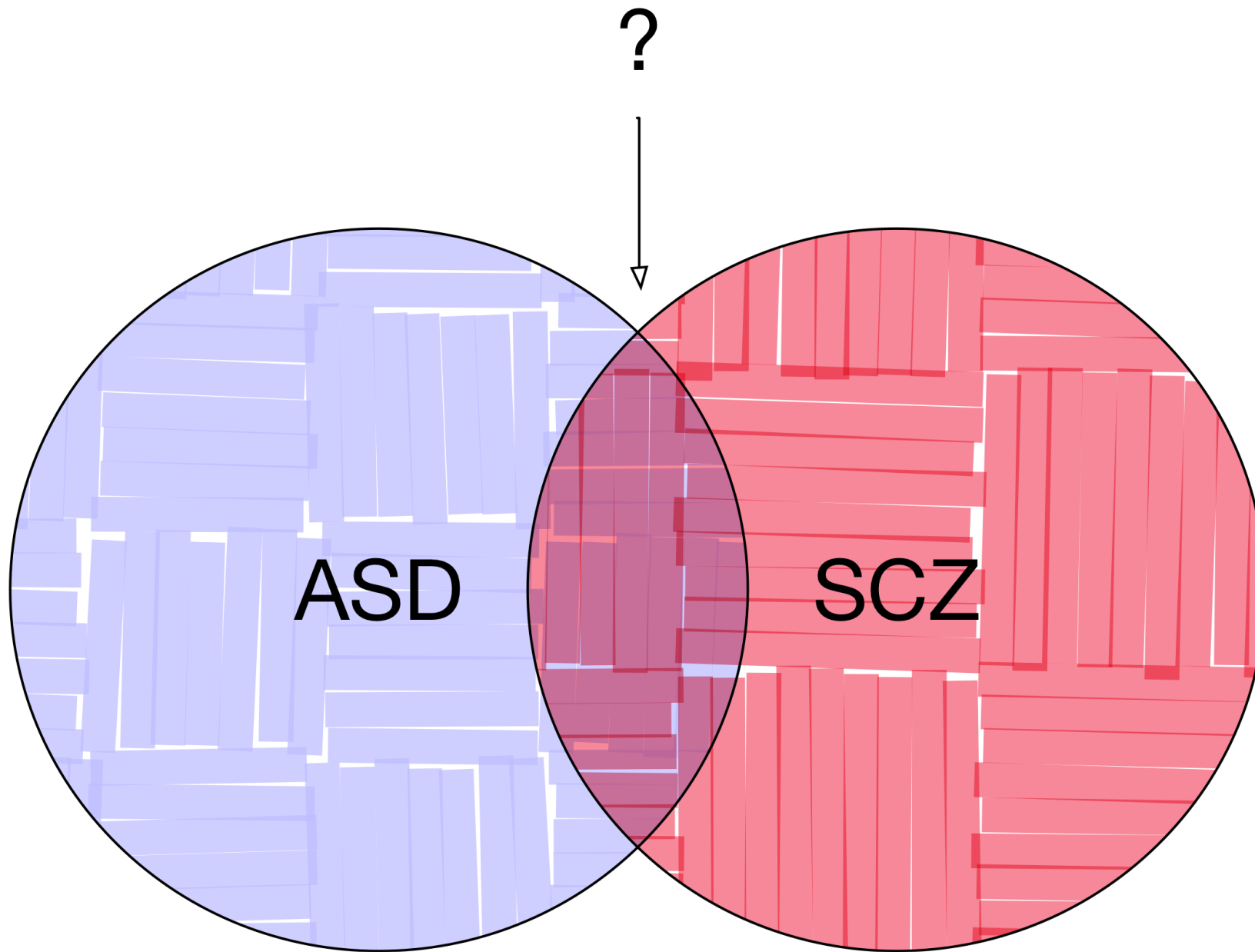
Whitaker Scholars in Developmental Neuropsychiatry Program

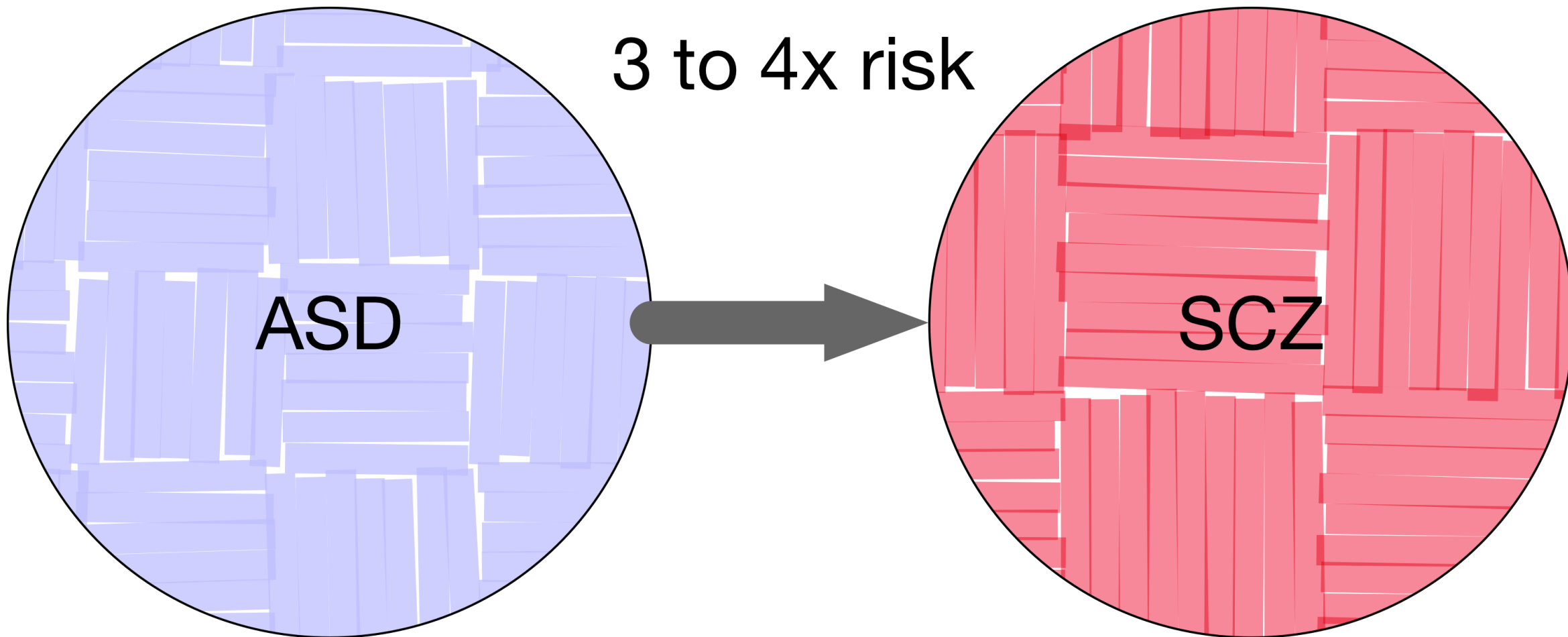
Division of Child & Adolescent Psychiatry

Columbia University & New York State Psychiatric Institute

Society of Biological Psychiatry, Virtual Presentation

May 22, 2020





- ASD predicts SCZ, but does ASD predict **prodromal psychosis**?
- Do ASD youth at risk have a **neural signature** that could facilitate early identification?

ABCD cohort

- 11,875 youth aged 9 to 11:
 - **ASD screen** (all but 39)
 - **PQ-BC score** (all but 15)

ABCD cohort

- 11,821 youth aged 9 to 11
 - 1) **ASD and psychotic-like** symptoms: n = 25
 - 2) **ASD** but no psychotic-like symptoms: n = 176
 - 3) **Psychotic-like symptoms** but not ASD: n = 573

Jutla A, Donohue MR, Veenstra-VanderWeele J, Foss-Feig JH. In submission.

ABCD cohort

- 6,419 youth aged 9 to 11 with complete Siemens data
 - 1) **ASD and psychotic-like** symptoms: $n = 6$
 - 2) **ASD** but no psychotic-like symptoms: $n = 81$
 - 3) **Psychotic-like symptoms** but not ASD: $n = 259$

Data-driven, atheoretical approach

- Correlation among these resting-state networks:
 - **Default mode**
 - **Saliience**
 - **Dorsal attention**
 - **Ventral attention**
 - **Auditory**
 - **Visual**
 - **Cingulo-parietal**
 - **Cingulo-opercular**
 - **Retrosplenial temporal**
 - **Sensorimotor hand**
 - **Sensorimotor mouth**

Additional variables:

- **Sex**
- **Age at time of interview**
- **Mean motion**

Random forest models

- Synthetic minority oversampling to address class imbalance
- Out-of-bag error scores to assess performance
- Gini scores to calculate global feature importance

Psychosis, no ASD (n = 259)

- Five most important features:
 - Sex
 - Mean motion
 - Sensorimotor hand to sensorimotor mouth connectivity
 - Interview age
 - Ventral tegmental area to default mode connectivity

ASD, no psychosis (n = 81)

- Five most important features:
 - Sex
 - Within-network frontoparietal connectivity
 - Within-network sensorimotor hand connectivity
 - Cingulo-opercular to “none” network
 - Dorsal attention to salience network

ASD and psychosis (n = 6)

- Five most important features:
 - Salience to ventral attention network
 - Sensorimotor mouth to cinguloparietal network
 - Auditory to sensorimotor hand network
 - Salience to cinguloparietal network
 - Cinguloparietal to visual network

Future directions

- Sex: Important for both ASD and psychosis in youth
- Age: Important insofar as onset of symptoms can be a signal
- Default mode and salience network connectivity may help differentiate signature patterns in ASD from signature patterns in psychosis
- Need very large sample sizes to make definitive statements about co-occurring ASD and psychosis on an individual level

Mentors and collaborators

- Rose Donohue
- Jennifer Foss-Feig
- Jeremy Veenstra-VanderWeele
- Agnes Whitaker

Amandeep.Jutla@nyspi.columbia.edu

Clinical paper
(*medRxiv*):

<https://doi.org/10.1101/2020.02.07.20021170>