Research and Services for Individuals with Autism: The Marquette Autism Clinic and Project (MAP)



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### Aims of the MAP

- Gain insights into the nature of autism spectrum disorders
- Provide training/educational experiences for graduate and undergraduate students
- Provide service to SE WI community, per MU mission

#### Autism

- A lifelong, brain-based, developmental disorder, usually diagnosed in early childhood, affecting language and social behavior
- May present with restricted or repetitive behavior, unusual interests
- 4:1 males to females
- A spectrum: from high-functioning (Asperger syndrome) to nonverbal

### Specific Social Problems in Teens with ASD

- Shift from playing alongside other children to the complex world of adolescence: difficult for any child, but especially so in ASD
- Poor conversational skills
- Lack of peer entry attempts: Fewer social initiations
- Poor eye contact
- Poor friendship quality: often focused on restricted interests
- Difficulty understanding the perspectives of others
- Less involvement in everyday social activities
  - Extra-curricular activities
  - Clubs
  - Sports

### Importance of Improving Friendships in ASD

Peer rejection is one of the strongest predictors of:

- Mental health problems
- Juvenile delinquency
- Early withdrawal from school

 Having one or two close friends is predictive of later adjustment, in children both with and without ASD

- Buffers impact of stressful life events
- Improves self-esteem
- Increases independence
- Relates to less depression and anxiety

### Contributions of the Brain and Heart to ASD

Early overgrowth (birth to age 4), followed by reduction

#### Disturbances in:

- Frontal cortex: perspective-taking, emotions, working memory, attention
- Temporal cortex: processing of vocal and speech sounds and faces
- Decreased connections between right and left sides of brain
- Likely that disturbances in "executive" frontal cortex lead to dis-coordination from multiple areas
- Overactive fight/flight and high heart rate

# The Cycle of Social Problems in ASD

- Problems in neural and cardiac systems lead to deficits in initiating social behavior
- Negative social cycle: exposed to fewer opportunities to practice and model social behavior
- Result: social isolation, further deficits, potential for further neural atrophy
- Adolescence: time of brain plasticity: can we change the cycle?

#### PEERS: Program for the Education and Enrichment of Relational Skills

- Developed and tested at the University of California, Los Angeles, Parenting and Children's Friendship Program, Semel Neuropsychiatric Institute
- Parent-assisted
- Addresses core deficits of ASD specific to preteens and teens
- Focuses on practical, concrete friendship skills
- 14-week curriculum
- 90 minute, weekly, class-based sessions with parents meeting concurrently
- Preteens and teens in middle and high school (11-16 years old)

### The Marquette PEERS Program

- Provide free intervention to eligible families, not currently served by other interventions
- Replicate PEERS in Midwest setting
- Determine whether, in teens who do well in PEERS and make social connections, changes are also observed in brain (EEG) and heart rate
- Investigate changes in real-time social behavior with unfamiliar teens
- Groups limited to 8-10 teens, led by a Master's level Ph.D. student in clinical psychology, with less senior graduate and undergraduate student as coaches

### Measures: Intake

Confirmation of diagnosis 64-Channel, non-medicated, resting state Electroencephalogram (EEG) Heart Rate • Live interaction with unfamiliar (non-ASD) teen • Parent, teen, and teacher questionnaires about social behavior, autism, friendships, mood/anxiety, social skills, self-esteem

# **PEERS Weekly Sessions**

- I: Introduction & Conversational Skills I: Trading Information
- 2: Conversation Skills II: Two-way Conversation
- **o** 3: Conversation Skills III: Electronic Communication
- 4: Choosing Appropriate Friends
- 5: Appropriate Use of Humor
- 6: Peer Entry I: Entering a Conversation
- 7: Peer Entry II: Exiting a Conversation
- 8: Get-togethers
- 9: Good Sportsmanship
- O 10: Rejection I: Teasing & Embarrassing Feedback
- 11: Rejection II: Bullying & Bad Reputations
- 12: Handling Disagreements
- I3: Rumors & Gossip
- 0 14: Graduation



### Measures: Out-take

Same format: EEG, Heart rate, Live social interaction

Same questionnaire measures



### Marquette PEERS Preliminary Findings<sup>1</sup>

- Fewer symptoms of autism
- Fewer impairments in social communication and overall social responsiveness
- Better teen ratings of companionship, closeness, and overall friendship quality
- Better social skills knowledge

Increase in brain activity in the right temporal-parietal lobe, an area known to be a key contributor to the "social brain," and in the frontal cortex, the "executive," decision-making area of the brain

1: Presented at the International Meeting for Autism Research, 2011, San Diego, CA

# **Future Directions**

- Continue to offer teen PEERS to more families and collect more data
- Examine changes in neural connectivity and compare with teens without ASD (Stevens, Meyer)
- Examine changes in heart rate and anxiety (Schohl)
- Look at changes in live teen interactions (Dolan)
- Examine changes in parent mental health (Karst)
- Apply for foundation grants to support free provision and continue expanding
  - Offer PEERS to adults
  - Offer PEERS to Spanish-speaking families

#### So, who does/will do all of this work?

Our Collaborative Lab Team! -Training -Projects -Service

#### MAP members at Dylan's Run for Autism Research, Fall, 2011



Back row, left to right: Me, Noelle Fritz, Scott Brockman, friend, Jeff Karst, friend, Bridget Dolan Front row, left to right: Rheanna Remmel, Sheryl Stevens, friend, friend, friend, friend, Kirsten Schohl Not pictured: Audrey Meyer, Grand McDonald, Chelsea Gasaway

# **Training Experiences**

- Marquette Autism Clinic
- Infant/Toddler Study
- Autism Intervention Study
- Program for the Enrichment and Education of Relational Skills (PEERS)
- Psychology 4956, Directed Research, and 4999, Senior Thesis
- Volunteers

#### **Graduate Students**

 Admitted to my lab during interviews, an "autism track" for clinical work and research; 5 years of study for M.S. and Ph.D. in clinical psychology (followed by internship and postdoctoral fellowship)

- How to formulate questions, do literature reviews, collect and analyze data, and write up results
  - Master's thesis
  - Dissertation Qualifying Exam
  - Doctoral Dissertation
- How to assess and diagnose individuals with autism spectrum disorders, ages 2-85
- How to intervene with teens with ASD in PEERS

### Grad students (cont.)

- How to intervene with toddlers with ASD via externships with community partner intervention agencies (eg., Autism Intervention Milwaukee, Easter Seals)
- How to assess young children for neuropsychological deficits via partnership with externship sites at Children's Hospital
- How to do individual therapy with adults with ASD suffering from depression, anxiety, and suicidality
- How to collect and analyze indicators of brain activity (Electroencephalograms: EEG) and heart rate
- How to observe and code social behavior

#### **Undergraduate Students**

Have a three-pronged experiential learning process:

- Interacting with individuals with ASD
- Organizing and entering data
- Learning how to analyze a specialized data area (I.e., EEG, heart rate, social observations)

- How to interact with individuals with ASD
- How to serve as "coaches" for PEERS and model appropriate social behavior for teens with ASD
- How to do "fidelity checks" for the PEERS intervention
- How to enter assessments in a large database examining characteristics of autism across the lifespan

#### Undergrads (cont.)

- How to collect and analyze EEG and heart rate data
- How to observe and code social behavior
- How to formulate questions, do a literature review, structure a study, complete a study, write up results, and present at conferences
- What graduate school is like and how to enhance their applications

### **Student Projects**

#### Graduate:

- Meyer: EEG connectivity in teen with and without ASD
- Karst: Change in parent mental health as a result of participation in PEERS
- Stevens: Change in neural activity due to PEERS
- Schohl: Change in anxiety and heart rate due to PEERS
- Dolan: Change in social behavior due to PEERS

#### Undergraduate:

- Brockman: EEG Gamma band activity in ASD
- Gasaway: Adaptive behavior changes due to PEERS
- Fritz: TBD
- Remmel: EEG TBD
- McDonald: Self-esteem changes due to PEERS

## **Community Service**

#### Marquette Autism Clinic:

Provides diagnostic and therapy services to area residents

- Sliding scale clinic
- Inner-city location

#### PEERS

- Free intervention
- Starts at age 11

 Dylan's Run for Autism Research (Autism Society of SE WI): MAP team

Lab service outings

#### Find out more: MAP in the Media

- Named one of the "Big Ideas of 2011" by the Milwaukee Journal-Sentinel
  - http://www.jsonline.com/news/opinion/big-ideas-2011-753erfc-136449923.html
- PEERS research featured on Lake Effect, WUWM 89.7, January 16, 2012
  - <u>http://www.wuwm.com/programs/lake\_effect/le\_sgmt.php?segme\_ntid=8665</u>
- Call the Marquette Autism Project at 414-288-4438
- Go to our website
  - http://www.marquette.edu/psyc/research\_map.shtml

Contact me, amy.vanhecke@marquette.edu

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