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

1: Introduction & Conversational Skills I: Trading Information
2: Conversation Skills II: Two-way Conversation
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
10: Rejection I: Teasing & Embarrassing Feedback
11: Rejection II: Bullying & Bad Reputations
12: Handling Disagreements
13: Rumors & Gossip
14: Graduation
Measures: Out-take

- Same format: EEG, Heart rate, Live social interaction
- Same questionnaire measures
Marquette PEERS Preliminary Findings

- 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)

- Learn:
  - 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
Learn:

- How to intervene with toddlers with ASD via externships with community partner intervention agencies (e.g., 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)

- Learn:
  - 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.)

Learn:

- 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

- PEERS research featured on Lake Effect, WUWM 89.7, January 16, 2012

- 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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