Investing in Autonomic Balance for Students with Autism: The Minding Anxiety Project

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What are We Exploring Here?

• A bit about autonomic dysregulation, autism and biofeedback.
• Our initial experience with and plans for the Minding Anxiety Project.
• Your experiences, questions, ideas.

General then focus
A FUNNY THING HAPPENED ON THE WAY TO THE OFFICE

• Solo primary care practice 1986
• Struggling with “New Morbidities” 1990
• Integrating hypnosis and biofeedback as psychophysiological self-regulation strategies 1993
• Primary focus of clinical work since 2007
• CAPS @ RIT 2010
Driving innovation in health and care by helping people help themselves.
Focus on Autism

• Emerging, growing prevalence and morbidity
• Gap between talents and expression
• Trance-like behavior coupled with attempts to self-regulate anxiety
• Compelling puzzle...that might respond really well to efforts to help them help themselves
• ...and validate these kinds of interventions.

N click third bullet..."the experience of being neurodiverse – having an autistic lens– ...
begs for a unifying theory...is anxiety a clue?
Focus on Autism
Autonomic Dysregulation

- Social Attachment
  - Reciprocity
  - Shared attention
  - Empathy
  - "Theory of mind"

- Anxiety
  - Qualitative Language
  - Cognitive Flexibility

- Autonomic Regulation
  - Prosody
  - Creativity
  - Fluency
  - Nonverbal

- Foundational?
  - Arousal or Autonomic Dysregulation Theory

- RRB
  - OCD
  - Perseveration
  - Narrowed interests
  - "Systemization"
“Autonomic Balance”
Animated Graphics by Megan Kushner, RIT IGM Student
Autonomic Dysregulation in Autism
Animated Graphics by Megan Kushner, RIT IGM Student
**Evidence for “Autonomic Apraxia” in Autism**

- **Male predominance**

- **Elevated “resting” sympathetic tone**

- **Frequency of sensory sensitivity**

- **Pervasiveness of stress, anxiety and OC behaviors**

- **RRB’s consistently lower sympathetic tone**

- **Dysfunctional deactivation of the “default network”**

- **Polyvagal Theory: links autonomic balance to emotional/social development**
Therapeutic Implications of Autonomic Dysregulation

Restrictive Repetitive Behaviors (RRB) are "Trance"

Teaching Autonomic Regulation with BF ought to help

Focus on this.

Save this for a workshop on hypnosis.
Effects of Self-Regulation Training

Animated Graphics by Megan Kushner, RIT IGM Student
Reasons to Treat
“Autonomic Apraxia” with Computerized Autonomic Biofeedback

• Young people with autism relate to & learn best from computerized interactions
  - limited, structured role-playing
  - controlled pace of processing information
  - apply virtual models to real world

• Operant conditioning does not require social, cognitive interaction
  - can be used with no or limited verbal ability

• Builds rapport with common interest
  - hardware and software are the primary engagement
  - therapeutic rapport follows, but is not the focus
Tools for Treating “Autonomic Apraxia” with Computerized Autonomic Biofeedback

- **Systems**
  - MindMedia’s NeXus/Biotrace system
  - Heartmath’s emWave

- **Inputs**
  - skin conductance level
  - peripheral skin temperature
  - respiratory rate
  - LF range heart-rate variability

- **Feedback**
  - graphs
  - puzzles
  - games

Click each heading.
Limitations in Treating “Autonomic Apraxia” with Computerized Autonomic Biofeedback

• The autonomic proxies (sensor inputs) have to be valid, discernible and controllable by the user.

• Operant conditioning has to be effective.

• The user must be motivated to generalize it beyond the biofeedback lab.
No click
The Minding Anxiety Project

MAP
The MAP Team

John Weas
Counseling Center Director
Assistant to the VP for Student Affairs

Mark Miles
Director of Counseling

Brian Garrison
CAPS Research Coordinator

Anna Hope
Intern

Bill Destler
President, Inspirateur
Initial Map Funding

The Golisano Foundation
The Douglas Flutie, Jr. Foundation for Autism
MAP
The minding anxiety project

• A pilot service project through RIT’s Counseling Center

• Provide matriculating students with autism training in how to self-regulate autonomic balance.

• Aimed at increasing Heart Rate Variability in Low Frequency Range (LF-HRV) and achieving self-selected goals

• Track progress onward to Coops, Graduation, Work
MAP
Initial Recruitment

• 75 identified students with ASDs through the Student Affairs office...probably less than 5% of RIT population affected

• Spectrum Program with food

• Presentations to Counseling Center Staff

• Ads in The Reporter, student run magazine

• March 2011-2012
MAP
Recruitment Lessons

• It is really hard to get students with conditions that result in social withdrawal to participate...in anything!
• Those students who DO participate are ready for change
• We need to broaden the focus beyond ASDs
• Duh
MAP
Interventions

• AMAS-C, TSCS:2, (ADOS)
• Introduction to the nature of anxiety, brain-body connections and self-regulation of both
• Exposure to SC, Resp, HRV monitoring and biofeedback (NeXus/Biotrace, EmWave)
• Practice with self-selected modalities
  - *EmWave PSR for independent use*
• Integrating hypnosis then self-hypnosis
• Integrating that experience *proactively* into daily life
Interventions, continued

- Weekly visits
- Review progress, challenges, adaptations
- Self-monitor progress towards selected goals
- Practice and alter self-regulation exercise
- Repeat AMAS-CE, TSCS:2 every 4 visits
- Ongoing tracking
MAP
Preliminary Results

Early Trends, Small N,
No Statistical Significance...yet.
Goals Selected

- Self
- Sleep
- Eating
- Class
- Social
- Attn
- Work
- Other

Participants selecting: 18 (Self), 16 (Sleep), 14 (Eating), 12 (Class), 10 (Social), 8 (Attn), 6 (Work), 4 (Other)
SELECTED GOALS: SUCCESS
Selected Goals: Success
TSCS2: Self Concept

Session 1 Session 5

50.00 54.75 59.50 64.25 69.00

Total Self Concept (Percentile)

Before After
AMAS-C: Anxiety

Session 1 Session 5
Total Anxiety (Percentile)

After
Before
Respiratory Rate

Breaths per minute (average)

Session

First Most Recent

10 Hz
Heart Rate Variability (HRV)

- **Peak is** "Power"
- **Area is %"**

**Hz**

**ms^2**

Heart Rate Variability (HRV)
HRV Power

LF POWER (ms²/Hz)

First Session

Most Recent Session

0 4000 8000 12000 16000 20000
Δ HRV LF% & Δ Anx
$\Delta$ HRV LF% & $\Delta$ SC
MAP
Today & Tomorrow

- Mental Health Counseling Intern
- Standardized recording procedure
- Testing a novel, auto-adjusting, dynamic feedback signal set (DyFSS)
- Refined & enlarged set of goals
  - Personal
  - Social
  - Academic
- Prevention
  - Focused effort to anchor skills with daily triggers
Big Next Steps

• Further formulate the protocol so that it is exportable.
• Develop training program.
• Create collaboratives.
• Further research on effects of changing autonomic regulation on phenotype
• Make a bigger investment in these remarkable people.

Would you like to join us?
THANK YOU.

Questions?  Answers?  Ideas?

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MindGamers™

- Therapeutic, physiologically-controlled, customizable, role-playing videogame for young people with RRBs
- Dynamic Feedback Signal Set (DyFSS) creates an optimum physiological fit for the physiological controller
- Avatars represent the player
- “IMPs” represent idealized self and the RRB
- Played with the clinician
- Generates usable data, motivation and conditioning