Learning Objectives

- Define Self-Regulation
- Identify Assessments of Self-Regulation
- Identify Difficulties in Self-Regulation that can be supported by Technology
- Examine Technology Supports for Self-Regulation
Self-Regulation

- Sensory System Perspective
  - Manipulation of Arousal State:
    - Attaining, Remaining in, & Change
    - Arousal / Alertness
    - Increased neuron activity to maintain alertness
    - Adequate arousal levels support attention & learning
  (Williams & Shellenberger, 1994)

- Cognitive-Behavioral Perspective
  - Using External Feedback to:
    - Continual Process
    - Make Self-Correcting Adjustments
  (Vohs, & Baumeister, 2016)

- Emotional, Behavioral, & Cognitive Control
  - Using Goal Setting, Feedback Loops & Self-Monitoring (Verde, & Baumeister, 2016)
  - Requires Insight & Coordination of:
    - Thoughts, feelings, actions, language
    - Appropriate Responses to:
    - Internal & External Environments
  (Bronson, 2000)
Self-Regulation & Self-Monitor

- **Self-Monitor**
  - Noticing
  - Insight

- **Self-Regulate**
  - Responding appropriately
  (Bronson, 2000)

Self-Monitor & Self-Regulate (Giola, Isquith, Guy, & Kenworthy, 2013)

- **Self-Regulation**
  - Pre-Frontal Cortex
  - Exerts control over multiple other brain areas to coordinate control of thought and behavior

  **Sensory & Emotional Connection**
  - During conflict, anterior cingulate correlate with sensory and emotion systems
  (Posner & Rothbart, 2009)

- **Self-Regulation**
  - Decreased Self-Regulation:
    - Learning State Effected
  (Zelazo & Lyon, 2012)

  Better Self-Regulation Increases:
  - Participation & Motor Skills
  (Galantino, Galbavy, & Quinn, 2008)
Sensory Assessment
- The Sensory Profile 2
- Dunn’s Model of Sensory Processing
- Thresholds (notice stimuli)
- Responsiveness of self-regulation (how you react)
- Sensory Patterns are Not Static or Fixed
- Fluid and different under different environment interactions

Learning Self-Regulation Measures
- The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993)
  - Motivation & Learning Strategies
- Perceived Responsibility for Learning Scale (PRLS) (Zimmerman & Kitsantas, 2005)
  - Motivation, Deportment, Learning processes
- Self-Efficacy for Learning Form (SELF) (Zimmerman & Kitsantas, 2001)
  - Confidence that they can do a particular task

Self-Regulation Measure
- Self-Regulation Questionnaire (SRQ) (Brou, Miller, & Lawendowski, 1990)
  - Measures self-regulation of youth
  - 7 subscales: Receive, evaluation, trigger, search, formulate, implement, & assess
- Preschool Self-Regulation Assessment (PSRA) (Smith-Donald, Raver, Hayes, & Richardson, 2007)
  - Emotion, Attention, Behavior
Difficulties

- Arousal/alertness level regulation
- Emotional control
- Behavior control
- Controlling Attention
- Motor development
- Task Performance

Self-Regulation Technology Supports

- Neurofeedback
- Sound
- Mindfulness
- Yoga
- Metronome
- Emotional/Behavioral Program Apps

Neurofeedback Training

- Biofeedback
- Uses Auditory & Visual Feedback
- Trains EEG (brainwaves)
- Use Operant Conditioning to Reward When Brain Reacts in Desired Manner
- Mixed Evidence, No Clear Guidelines
Neurofeedback Research

- Parent Response
- 90% at 6-month follow-up
- Post-intervention
- Conners 3-P Significant Effect Size
- Attention, EF, Hyper/Impulsive
- BRIEF subscales & GEC (ES = 0.31)
- 6-Month follow-up:
  - NF maintain stimulant medication dose
  - CT/control statistical & clinical significance
  (9 mg [P = .002] and 13 mg [P < .001])
  (Steiner, Frenette, Rene, Brennan, & Perrin, 2014)

Play Attention

- By: Unique Logic & Technology, Fletcher, NC
- Detect 2 Frequency Ranges: Theta & Beta
- Measured by EEG sensor embedded in standard bicycle helmet
- Learn to manipulate figures on the screen:
  - Suppresses theta and increase in beta
  - Learn how to improve attention on the 6 exercises
  (Steiner, Frenette, Rene, Brennan, & Perrin, 2014)

Neurofeedback Results

- Maintenance of learned self-regulation
- 3 initial neurofeedback sessions across 3 weeks
- Learned self-regulation of visual cortex activity
- Re-scanned 6 and 14 months: results maintained
  (Robineau et al., 2017)
- Take Away:
  - Overall Mixed Evidence
  - Best Used as Part of an Overall Intervention Plan
Sound Interventions

- Auditory Programs
  - Often used to supplement traditional interventions
  - Listening to processed musical selections (modified music)
  - Designed to supplement other sensory-based strategies
  - Based on Tomatis and AIT (Fischer, Langner, Birbaumer, & Brocke, 2008)

Auditory Integration Training (AIT): The Berard Method

- Study ASD Children after 20 AIT sessions
- Aberrant Behavior Checklist (ABC): Statistically Significant Improvements in Irritability & Hyperactivity subscales
- Repetitive Behavior Scale (RBS-R): Decrease in overall score and stereotype repetitive and restricted behavior
  - (Sokhadze, Casanova, Tasman, & Brockett, 2016)

Tomatis

- Study ASD
  - significant differences among mean scores of autistic symptoms in the 2 groups,
  - Conclusion
  - increase social interaction, communication, and reduce stereotypical movements
  - (AbediKoupaei, Poushaneh, Mohammadi, & Siampour, 2013)
The Listening Program

The Listening Program (TLP)

- Case Study: 7 year old ASD
- 20 weeks
- Functional decrease negative (avoidant, verbal/physical negative) & self-stimulatory (Gee, Thompson, & St John, 2014)
- Single-Subject Case Study
- Child with PDD-NOS
- 20-week TLP intervention
- Sensory Profile and Listening Checklist
- Results: improved behavior & sensory tolerance (Nwora, & Gee, 2009)

Therapeutic Listening (TL)

- Retrospective of Study
- Motor, Sensory, & Social Emotional Capacities
- TL as part of comprehensive OT (Nwora, & Gee, 2014)
- Pre-School Support Intervention
- 15 preschoolers: TL & Typical therapy
- 6 assessments: FM, VM, Social, Language, & Sensory
- Statistically Significant Inc.: All areas except S-P & behavior
- Proportional Change Index: Accelerated Development
- FM, VM, Nonverbal ability, & Language (Nwora, & Gee, 2014)
Integrated Listening Systems (ILS)

- Bone Conduction: Vibration
- Modified Music
- Program includes:
  - Listening to acoustically processed music
  - Low frequency music via air conduction & bone conduction
  - Concurrently with balance, movement, & visual-motor tasks

Integrated Listening Systems

Pilot Study using the ILS Focus Series

- 7 Children in a 40-session intervention
- At home and in a clinic setting
- Repeated Measure: Individualized Family Goals
- Exploratory Analysis: Physiological Arousal
- Improvement: Home & Education Goals
- Changes in physiologic arousal noted in 5/7
- Standardized scales demonstrated sensitivity to change

(Schroer, Vita, & Sullivan, 2015)

Background

White Noise

- ADHD
  - Positive cognitive effect ADHD group
  - Negative effect on control grp performance
  - ADHD: More noise for optimal performance
    (Satterfield, Sherman & Sprent, 2001)
  - Attention & Memory Secondary Students
    - Episodic verbal recall task with & w/out noise
    - Improved performance for inattentive
    - Decreased performance for attentive children
      (Pickering, Shering, Laffont, & Nangyal, 2005)
b-Calm
- B-calm System ($139) App ($10)
- Audio Sedation Sounds
- Acoustic Masking: Typically distracting noises less obvious
- Live Nature Recordings: Relax & “reboot”
- Can be optimized for various environments
- Adding control of sounds in environment, help increase on task behavior and reduce irritability
- No studies of the system

Mindfulness
- Mindfulness Concept
- By Bishop et al. (2004)
- Consists of two facets:
  - Self-regulation of attention
  - Focus on present experience

Breathing & Mindfulness
- Breathe Deep
- Apple app
- Deep Breath
- Android app
- Simple visuals
- Easy way to teach breathing
- Customize:
  - Overall breathing duration
  - Inhalation
  - Hold and Exhalation
Mindfulness Research

- Mindful Awareness Practices (MAP)
  - EF improvements in elementary school kids
  - MAP training 30 min 2x per wk, 8 wks
  - Improvements
  - Behavioral regulation, metacognition, & overall global executive control
  (Flook, et al., 2010)

Websites

- Calm.com
  - Visuals, sound, option of guide
- Mindyeti:
  - For kids: http://www.mindyeti.com/
- UCLA
  - Body scans, Breathing & Meditation
    http://marc.ucla.edu/body.cfm?id=22
- Fragrant Heart.com
  - Wide variety of guided breaks, no visuals

Calm.com or app

- Available Free Sections to Anyone
- The Calm Classroom Initiative:
  - Teachers: K-12 classrooms
  - Anywhere in the world
  - Free access Calm’s paid subscription
  - Includes CalmKids PK-K

Used with permission from Calm.com
MindYeti

Mindfulness/Meditation Apps

**Free Apps**
- Calm
- Mindyeti
- OMGMeditate
- Headspace
- Settle your glitter
- TheMindfulnessApp
- Omvana
- SmilingMind
- Takeabreak!

The 2 minute “Reset”

- Lay on stomach
- Prop on elbows
- Wt. blanket on back or legs
- Watch:
  - Fluidity & Suspension (iPad)
  - Fluid Monkey & Flasia (Android)
- Timer: 2 minutes

Used with Permission from MindYeti
Used with Permission from Angela Ingram
Mindfulness with Movement

- Yoga
- Research:
  - Stretching & Deep Breathing
  - Must include mindfulness for executive function and self-regulation improvements

(Manjunath & Telles, 2001; Razza, Ringer-Coo, & Raymond, 2016)

Mindfulness with Movement Apple

- YogaKids App- $3
  - Demonstrates Movements
  - Relaxing Visuals
  - Inspirational Messages
    - No Sanskrit / Religious
    - No Banners / Ads.
    - No Internet connection
    - No in-app purchases
  - Super Stretch Yoga HD- Free
    - Animated Video Examples of 12 poses

Mindfulness with Movement Android

- Yoga for Kids (Yoga Kids)
  - Pictures with Timeframe
  - My little yoga for kids app
  - Still Pictures
  - Kids Fitness Yoga
    - 10 Daily Poses with Focus on Autonomy & Fitness
Yoga

- Websites
  - YoKid.org
  - Find Resources
  - Yoga Journeys
  - Webcast Videos
  - GoNoodle
  - Cosmickids

Video Modeling

- Video-Based Intervention
  - Videos of others or of the person taught
  - View Point
    - First Person
    - Third Party
  - Performing a functional sequential task
  - Model self-regulation strategies in real tasks
  - Participating in social or communication tasks
  - Model Perspective Taking

Video Modeling Evidence

Autism Research:
- Gain/maintain/generalizing:
  - Settings, Materials, People (Delano, 2007; Papan et al., 2008)
- Improvements:
  - Imitation & Attention (Shukla-Mehta et al., 2010)
  - Preschool (Green et al., 2013)
  - Increased time in positive social interactions
Video Model

- Frequency & Duration (Shukla-Mehta et al., 2010)
  - Repeatedly View Video
  - < 5 min in length
  - Better Compliance with Adult Model
  - Always Model the Correct Way to Do the Task
  - Watch Frequently & Right Before a Routine Task

Video Model Programs

- Lifelog technology
  - Record & Review (Cureros-Urbano et al. 2016)
- Apple
  - iModeling
- ModelMeKids
- Android
  - Model Me Going Places
  - Social Skill Builder lite
  - My Pictures Talk - Video

Video Model Example

Used with permission from Angela Ingram
Make Your Own Video Model
- Written Permission
- Be Time and Task Specific
- Use Work Device
- Only Use to Teach That Person
- Only Model the Correct Way
- Do Task Analysis Prior to Attempting

Interactive Video Games/ Instruction
- Challenge Software Program

Challenge Software Video
Image from https://www.youtube.com/watch?v=ek_C9jR7hUg
Video Games

Logic and Social Awareness Games
- Timeframe set 10-30 min. not more than 2 hours
- Children Complied with Playing with More “Game Like” Applications
  - (Ke, 2008; Shum, Grayson, & Lewis, 2005)

Logic & Planning Video Games

<table>
<thead>
<tr>
<th>Video Games</th>
<th>Rules &amp; Recommendations</th>
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<tbody>
<tr>
<td>RushHour</td>
<td>Set Goals</td>
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<tr>
<td>Minecraft</td>
<td>Set Time Limit</td>
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<tr>
<td>Legend of Zelda</td>
<td>Report Results</td>
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<td>MindSweeper</td>
<td>Reflect on What Worked Well and Did Not</td>
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<td>The Bridge</td>
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<td>Nancy Drew</td>
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<td>CrazyMachines</td>
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Academic Skills Video Games

- Nessy: Reading/Math
- MathBlaster
- FunBrain
- ABCMouse
- My Word Coach: Wii Nintendo DS, verbal communication skills
- SmartPants: Trivia game

Why They Help:
- Frequent Rewards
- High Interest or Value by the Player
Metronome Research

- Interactive Metronome
  - Improved attention, motor, lang., read & behavior (Shaffer, et al., 2001)
  - Visual motor control & reaction time- no attention impulse (Cosper, Lee, Peters, & Bishop, 2009)
  - In DD pilot study grp SI and IM: concentration, motor control, and reflex integration (Kim, Bo, & Yoo, 2012)

Interactive Metronome Intervention

- 50 minutes per week total
- 10 minutes
- 5 times per week
- 1 month
- Part of a total 45 minute session
- OT based in SI theory (Kim, Bo, & Yoo, 2012)

Metronome Video

Used with permission from Angela Ingram
Metronome Integration

- Spelling, Reading, Multiplication tables
- Recalling sequences
- Grocery list
- Numbers, Letters
- Chores
- Schedules, HEP
- Safety Precautions
- Pace for Exercise, Walking, ADLs

Integrating Technology

Used with permission from Angela Ingram

Free Metronome Apps

- GuitarTuna/GuitarTuner
- Metrotimer
- Prometronome
Self-Regulation apps (free!)
- Moodzie Oh! Play, Learn, Chill
- Woop (Wish Outcome Obstacle Plan)
- Self-regulation through mental contrasting
- PowerPacks Pre-K Self-Regulation
- Lessons for parents to guide children through

Self-Regulation iPad App
Brad Chapin
- Physical
- Emotional
- Cognitive Regulation
- Skills
- No Research

http://www.selfregulationstation.com

Helping Young People Learn Self-Regulation by Brad Chapin www.selfregulationtraining.com
The Zones of Regulation

App Supporting the Curriculum

- Regulate Emotions & Behavior
- Learning regulation techniques facilitates self-control & problem solving skills

Intervention to Increase Self-Regulation in Kindergarten Students (Yack, n. d.)
- Findings Limited: Interpret with Caution
- Overall Positive Change
- Functional Relationship between Self-Regulation and the Intervention

Summary of Zones App

- 4 Zones Represented by Interactive Color Visuals
- Track Your Zone
- Learn to Use Strategies to Move Between Zones or Remain in a Zone
- Explore Calming Techniques
- Learn Cognitive Strategies
- Choose Sensory Strategies to Assist Regulation

The Zones of Regulation App

Used with permission from The Zones of Regulation
Summary of Exploring Emotions App

- Facial Expressions
- Recognize a Range of Emotions
- Perspective: Taking
- Examine Reactions to Other’s Behavior
- Triggers
- Problem solving skills

Exploring Emotions App

Used with permission from The Zones of Regulation.

Case Study

- Henry, 10 years old, ADHD & LD
- Sensory Profile 2:
  - Seeker movement, deep touch, proprioception
  - Avoider: Sound, crowds, visual, light touch
- VMI: Low average VMI, average visual perceptual, below average motor
- Implications:
  - Fidgets, Distracts self, get up and moves around, makes everything into a game, difficulty with initiation, sustaining, completing tasks, sensitive to clothes, sounds at ball games, movies and in class, difficulty with crowds
OT Intervention

- Use Zones app to Identify Current Zone
- Breathe Deep App - 1 min
- Heavy Work
  - TheraBand Routine Supported by a Song
- Sound Intervention
  - Therapeutic Listening while performing heavy work, prone on ball, mazes

Classroom Program

- b-Calm while doing desk or independent work
- Use metronome during spelling words
- Follow Yoga poses app for 3 poses between sides of worksheet
- Use exploring emotions app prior to reading

Questions