Atypical Visual Development in Infants at Risk for Autism Spectrum Disorders (ASD)

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MINDFULNESS and MENTAL WELL-BEING (MWB) Lecture Outline

1) Why We Should Care About MWB

2) What Went Wrong?
   - The Biological Evolution of Human Suffering
   - Mindfulness as a Cultural Evolution Solution

3) Is Mental Well-Being Malleable?

4) How to Practice Mindfulness

5) Mindfulness Based Interventions (MBI)
   (vs. Cognitive Therapy, Life Coaching and Positive Psychology)

6) Positive Effects of MBI
   - Mental Well-Being, Physical Health, Cognitive Processing, Neural Processing

7) Extra Benefits of Combining Mindfulness + Exercise (if there’s time)
1) WHY CARE ABOUT MENTAL WELL-BEING?

### Anxiety

- Panic disorder
- Agoraphobia
- Generalized anxiety disorder
- Specific phobia
- Post-traumatic stress disorder

### Depression

- Age-standardized* percentage of adults meeting criteria for current depression,
by state/territory — Behavioral Risk Factor Surveillance System,
United States, 2006 and 2008§

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**Effects of Anxiety**

- High Blood Pressure
- Memory Loss
- Ulcers
- Immune Deficiencies
2) BIOLOGICAL EVOLUTION OF HUMAN SUFFERING
First, a quick review of human evolution

Earliest Primates ~ 65 MYA
Earliest Humans ~ 5 MYA
Homo Sapiens ~ 200K – 300K YA
Homo Sapiens Sapiens (modern) ~ 100K YA
Civilization ~ 6000 YA
How did humans get so smart?

BRAIN SIZE has tripled in the last 5 Million Years!
- How did humans get so smart?

  BRAIN SIZE has tripled!
  And Prefrontal Cortex has sextupled!
What Does Prefrontal Cortex Do?

“Executive Functioning”

- Planning
- Predicting outcomes
- Advanced Reasoning
- Emotional Control
- Response Inhibition

Uniquely Human Traits…… well, mostly unique

Prefrontal Cortex: It HELPS us, it HURTS us

(I’ll come back to this later)

…… but probably not needed for BASIC SURVIVAL
So, what IS needed for SURVIVAL?
… in *all* animals (including humans)?

1) FEAR Response
So, what IS needed for SURVIVAL? .... in all animals (including humans)?

2) HEDONISTIC Pleasures
Back to **Prefrontal Cortex**

It’s *helpful* to have
“Executive Functioning”!

1) **Build Tools**
Spears …. To Kill the Lion
Technology…. to have everything at our fingertips

Technology…. manipulates the environment
Digression……

Evolving Prefrontal Cortex

Create New Evolutionary Pressures

Manipulate the Environment

Your Brain on Computers, NYT, June 7, 2010
Back to **Prefrontal Cortex**

It’s *helpful* to have

“The Executive Functioning”!

2) **Planning**

**Sense of TIME**…

which we “figured out” from natural cycles

We’ll come back to animals in a minute

And then…. Reinforced with more tools!
Back to **Prefrontal Cortex**

So the **GOOD** news……..

Prefrontal Cortex does many good things, and may allow us to evolve even more!

Now for the **BAD** news……..

Planning and a Sense of TIME ->
Living in (worrying about) the Future -> **Anxiety** ->
Anxiety is Not So Good

High Blood Pressure
Memory Loss
Ulcers
Immune Deficiencies
Apes and monkeys don’t plan (Silberberg et al. 1998)

Yes, some animals (birds) hoard food, but probably genetically programmed and not “cognitive”
Human Suffering (e.g., Anxiety) comes from not living in the present moment

“Do not dwell in the past, do not dream of the future, concentrate the mind on the present moment”

Siddhārtha Gautama (aka the “Buddha”) circa 500 BCE, Nepal Area
So, how can we combat “Human Suffering”?  

**MOTHER NATURE**

1) **Survival of the Fittest!** Weed out the “Worriers”? **X**  
   (and yes, there are people genetically prone to worrying…… upcoming slides)

2) **Combat with Hedonistic Pleasures** **X**

3) **Sustainable Happiness** **X**

**A CULTURAL “MEME”**

1) **Religion**

2) **Mindfulness**
Mindfulness

Paying attention
On purpose
To the present experience
Without judgment

...... but can Mindfulness really affect MWB or is state of MWB something you are just “born with”? 
3) IS MENTAL WELL-BEING MALLEABLE?

Um…… Maybe not 😞

Happiness “set point”, only slightly affected by circumstances (Myers & Diener, 1995)

Twin Study on MWB (Lykken & Tellegen, 1996)

Genes account for 80% of MWB

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<th>Number of pairs</th>
<th>Intraclass R</th>
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<td>Twins reared apart:</td>
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<tr>
<td>Monozygotic</td>
<td>75</td>
<td>.52 (±.10)</td>
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<tr>
<td>Dizygotic</td>
<td>36</td>
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*We are indebted to T.J. Bouchard, Jr., for providing these data from the Minnesota Study of Twins Reared Apart.

Maybe genes are associated with propensity to WORRY (i.e., not being present)
Not being Present (Mind Wandering) is bad for MWB

Killingsworth & Gilbert (2010)

1) What are you doing now?
2) How are you feeling right now?
3) Is your mind wandering?
   And if so: pleasant, unpleasant or neutral?

Oh … and rent the movie “Happy”
Mindfulness

Paying attention (in a particular way)
On purpose
To the present experience
…..Without judgment
4) HOW TO PRACTICE MINDFULNESS

Paying attention (in a particular way)
   On purpose
   To the present experience
   Without judgment

1) Meditation
   a) Transcendental (Chants and Mantras)
   b) Samatha (*Focused Attention* on Breath or Object)
   c) Vipassana (*Open Monitoring*, practice “Mindfulness”)
   d) Loving-Kindness

* Different parts of the brain are activated in different meditation styles
  (Lutz et al., 2008)

2) Everyday Living
So, how does Mindfulness/Meditation Work?

Based on 3 principals from Buddhism

1) **Impermanence**: Sense impressions and mental events are transient.

2) **Suffering**: Suffering comes from habitual reactions (i.e., “grasping” and “aversion”) to the feelings of a sense impression or mental event, and a lack of awareness of this process. i.e., “Pain” does not have to lead to “Suffering”

3) **Not-Self**: Sense impressions and mental events do not contain or constitute any lasting, separate entity that could be called a self (“I have thoughts, but I am not my thoughts”)

Example: Breathing during meditation
5) MINDFULNESS-BASED INTERVENTIONS (MBI)
And Relation to Cognitive Therapy (CT),
Life Coaching (LC), Positive Psychology (PP)

Mindfulness-Based Stress Reduction (MBSR), Kabat-Zinn, 1982
Mindfulness-Based Cognitive Therapy (MBCT), Teasdale

Notice emotions and body sensations with curiosity and acceptance,
become comfortable with “not knowing”, “loving what is”, letting
things unfold in their own time, yoga, meditation

Commonalities across MBI, CT, LC and PP:
Focus on the present, and decrease “grasping” to negative thoughts

CT, LC and PP: have an agenda with “deliverables”, fix the problem,
question faulty assumptions using “common sense”, focus on “flow”

(CT is exposure-oriented, LC is goal-oriented,
PP is focused on positive thoughts and gratitude)
6) POSITIVE EFFECTS OF MBIs
6) POSITIVE EFFECTS OF MBIs

A) Mental Well-Being (MWB)

MBSR: Increases Mindfulness and MWB
(e.g., Carmody and Baer, 2008, Kuyken et al. 2010
also, Samatha Meditation: Jacobs et al. 2013)

MBSR and MBCT: Decreases depressive and anxiety episodes
(Teasdale et al. 2000, Miller et al. 1995)

LovingKindness Meditation: Decreases distress (Carson et al. 2004)

Vipassana Meditation: Decreases depression and anxiety,
increases empathy (Shapiro et al. 1998)
6) POSITIVE EFFECTS OF MBIs

B) Physical Health

MBSR: Enhances immune function in cancer patients  
(Carlson et al. 2004)

MBSR: Better sleep (Shapiro et al. 2003)

MBSR: More rapid clearing of psoriasis (Kabat-Zinn et al. 1998)

MBSR: Better immune response after flu vaccination  
(Davidson et al. 2003)

MBSR: Increases in immune cell telomerase activity  
(Jacobs et al. 2011)
6) POSITIVE EFFECTS OF MBIs

C) Cognitive Processing

Samatha Meditation: Increases visual discrimination and sustained attention (MacLean et al., 2010)

Vipassana Meditation: Improves response inhibition  
(Zanesco et al. 2013)
6) POSITIVE EFFECTS OF MBIs

D) Neural Processing

MBSR: Increases grey matter in hippocampus (memory)  
(Holzel et al. 2011)

Vipassana Meditation: Neural changes in response to pain (heat)  
(Zeidan et al. 2011)

Meditation and MBSR: Changes in alpha brainwaves (EEG)  
(Davidson et al. 2003: Changes in Left Anterior, thought to be associated with Happiness)  
(Saggar et al., 2012: Reduced Alpha over Frontal Cortex)
7) EXTRA BENEFITS OF COMBINING MINDFULNESS AND EXERCISE

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7) EXTRA BENEFITS OF COMBINING MINDFULNESS AND EXERCISE

1) Exercise and mindfulness both good for physical and mental health
2) Synergy: Memories (mindfulness) encoded better with adrenaline
3) Exercise allows a “Re-attrtribution” of the “Stress Response”
3) BOOTCAMP for Mindfulness!