AAPB Webinar

May 7, 2015

Alterations in Electroencephalographic Patterns Associated with Excessive Usage of i-technologies (e.g., gaming, social media, texting, etc.)

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Swingle Clinic
However,... In clinical populations, excessive use of i-tech is increasingly a major contributor to lack of 'wellness' and lack of healing.
Exploring the Boundaries

“Negative” versus “Positive Usage” & “Excessive” versus “Standard” Usage
Integration versus Interference
Integrated Usage: The use of technology fits in, being integral to modern life, without overriding, or eclipsing, the development, or maintenance, of other behaviors, or relationships.

Integration, or progress, is when a technology, due to superior efficiency, replaces other methods or expands a desired trait. Interference: is when a technology overrides a desirable trait or eclipses a developmental phase.

(i-Minds, M.Swingle, 2015)
As consistent applications of i-tech become more and more of a societal norm, negative & excessive use is increasingly hard to differentiate from healthy or integrated usage.
Clients typically present for the symptom(s) not the disorder.

Still in 2015, Excessive usage of i-tech / digital media is rarely on the radar as a cause or contributor of said symptoms.
Why be aware?

- A major discussion in the literature is if IA (or excessive i-tech usage) is:
  - Disorder on to its own,
  - Co-morbid Disorder,
  - Co-occurring Disorder,
  - Behavioral Manifestation of a Clinical or Subclinical Disorder,
  - Subclinical Disorder that has found a home or expression in a new form (a behavioral addiction).

- The implications, at the least, are that excessive usage should be addressed therapeutically with equal attention to ‘other’ or standard presenting symptoms.
This Presentation:
1) Review Diagnoses & Presenting Symptom Clusters Found with Excessive Consumption of i-Tech

- Adults
- Youth
- Adolescents
- Children
2) Quick Facts, Contributing Lit. & Changing Profiles

3) What is Found on the EEG
   - The influence of instruments
     - Parameters
     - 19 site and 5 site (Q)EEG
     - Normative & Clinical data bases

4) Internet Addiction & Alignment with Pathology.
   - Anxiety
   - Depression
   - OCD (& ADHD)
5) Classifications Beyond Pathology and Content:
   › Why & How we use the technology
     • Generalized Internet Addiction (GIA)
     • Fantasy Internet Addiction (FIA)
     • Technological Internet Addiction (TIA)

6) Back to the EEG: the Raw Signal
   • What’s up with Alpha?
     • Emergent research
     • Cases

7) Critical Concerns, Youth and Development / Creative and Innovative Process.
1] What to look for

- .
Adults: The ‘symptoms’

- **Anxiety & Depression**
  - Behavioral & Substance Addiction
  - Chronic Insomnia
- **Anger Management**
- **Marital / Relationship Discord**
- **Disturbed Family Dynamics**
- **Erectile Dysfunction** (does not respond to Viagra and such)
Children (& Adolescents)

- **ADHD**
  - Dyslexia
  - Written Output Disorders

- Defiance /Conduct Disorders
  - Impulse control issues

- **OCD**
  - Mood deregulation
  - Anger management

**Anxiety**
- Disturbed Family Dynamics
  - ‘Chronic’ Fatigue &
  - Insomnia!!!!!!!
Clinical Impressions, Pseudo Profiling, & the Fine Print of ‘Presentation’
Adults: Hyperarousal & General Malaise

“Agitated Depression”
Children: Boredom, Bad Behavior, & Scholastic Challenges.

“Pesty”, hyperaroused child that can’t focus on anything ... except ... digital devices.

Completely incapable of self entertaining off digital devices (or TV)
Adolescents:

“Adolescence +”

- Withdrawn & ‘edgy’
  - will not engage with anyone/anything ... except ...
  - ... digital devices.
Youth:

Failure to Thrive/launch!
Youth Profiling

- Post high school
- Living with parents or financially supported by family
- Un or underemployed
- Not attending school or with drastically reduced scholastic load
- Diagnosed or symptomatic of Depression and/or Anxiety (or LD)
- Not progressing to the next phases/stages of life
Redefining: "Failure to thrive/launch"

AKA Life Stagnation

- Eternal procrastinator...

- ... but always “busy”
  - (used to be rather exclusively youth; now crossing over to other age classes e.g. retirees & others in transition e.g., unemployment, newly separated, empty nesters, etc.)
Look for:

› ‘Career martyrdom’
  • The true workaholic -- can’t disconnect
  • The pseudo workaholic (work is smoke screen)

› The ‘super student’ / perfectionist
  • Inability to navigate ‘excess of information’

› The ‘rabbit hole’ phenomenon (i-Minds, 2015)

› The FOMO drive
  • The new ‘popular kid’
    • What one has to do in 2015 to maintain social status
      • (social media & texting)

  • (M. Swingle 2013, 2015)
Three Presentations:

1) Excessive use is overt but not identified as central or contributing to the primary ailment/issue (denial & naïve)
2) Covert use (& masked use)
3) Overtly identified (almost exclusively gamers 15-40+)
Once in treatment it becomes apparent that excessive use of digital media has a compounding if not central role in the individual's symptoms and the development or maintenance of the ailment for which they initially sought psychological services.

(M. Swingle, 2013)
And don’t ‘get better’ with the usual interventions
"SYMPTOMS summary"

- **Children & Adolescents:**
  - Learning Difficulties and Disorders
    - ADHD
    - Dyslexia
    - Written Output Disorders
  - Behavioral Issues
    - Defiance / Conduct Disorders
    - Impulsiveness
    - OCD
  - Mood Deregulation

- **Adults:**
  - Addiction
  - Chronic Insomnia
  - Anger Management
  - Marital/Relationship Discord
  - Disturbed Family Dynamics
  - Erectile Dysfunction

- 'Chronic' Fatigue
- Insomnia
- Anxiety (hyperarousal)
- Depression

(M. Swingle, 2013)
IA is rarely detected in North America - Individuals present for the co-morbid issue (as presented above)

- Declared a national health issue in China & Korea.
- Affecting 6 to 14% of the population in North America
- Up to 38% in specific demographics and age ranges
- 8.8% of children (8-18) in the US, show symptoms of pathological addiction to gaming. (80% of children in this age range game).

(see Block 2008 * Gentile, 2009 * Shaw & Black, 2008 * Young & Nabuco de Abreu, 2011)

(M. Swingle, 2013)
Summary of Literature on AGE, Gender, & Orientation

- Equally prevalent in males & females; however females less apparent (masked in social behavior).
- Percentage of males overtly in treatment notably larger 70% (mostly gamers)
- Originally was inversely related to age and education.
- First appeared in adolescent and university culture.
- Differences in activity choice, gender, age & orientation.
  - E.g., fantasy gaming younger males/older females.
  - More females and gay men in cybersex compulsion.
  - More males in compulsive viewing of pornography.
  - Comorbid conditions vary by gender:
    - E.g., in adolescents
    - Wider spectrum of co-morbid and co-occurring disorders in males
    - For females ADHD is dominant.

(M. Swingle, 2013)
2015: Forget the stereotype of the nerdy young male!

The profile is changing
Broader range of individuals affected
Many niche profiles

Top 3 risk factors:

1] In transition

2] Feeling displaced or a member of a disenfranchised population
   - Divorce, retirement, adolescence
   - new city, new job, new school
   - gay/lesbian in small communities, transgender
   - (M. Swingle, 2013)

3] Experiencing from some form of mental (psychological) or social (interpersonal) difficulty.
3] What does excess, AKA addiction, look like on the EEG?
1) What you find will depend on your instrument & how you use it!
Data Bases

1) Normative Databases
&
2) Clinical Data Bases

M. Swingle, AAPB Webinar, May 7, 2015
Normative: The ‘normal’ or efficient brain function. Measurements from a sample of individuals who have no reported or diagnosed psychological or psychosocial issues (e.g., learning, behavior, mood, addiction, etc.).
  > E.g., Neuroguide Normative Data Base

Clinical: The variant or inefficient brain function. Measurements of brain activity of people with active symptoms and diagnosis of psychological or psychosocial issues (e.g., ADHD, depression, anxiety, psychosis, etc.).
  > E.g., Swingle Clinical Data Base
ELECTROENCEPHALOGRAPHIC PATTERNS IN A CLINICAL SAMPLE OF ADULTS DIAGNOSED WITH AN INTERNET ADDICTION: Instrument 1) 19 site QEEG
1) **QEEG analysis:**

- 1) Neuroguide Normative Database Parameters:
  - 152 variables (19 recording sites / 8 bandwidths) by hemispheric classification (right / left / center).

Inclusion Criterion:

- 4560 data points - only z scores of + or - 2 were included / tabulated (significant deviations).

5 levels of analysis
152 variables (19 recording sites / 8 bandwidths) by hemispheric classification (right / left / center).

- 77% of the sample had significant departures from the statistically verified norms (standard means) of the data base. Z score of + OR – 2 (2 or more standard deviations out)
- Distribution was positively skewed. Out of a total 152 possible departures per participant, the highest number of departures was 80 and the lowest 0. (M = 10.7, SD =20.8).
- The 30 tables were visually examined for systematic patterns; deviations or clinical patterns reported in the literature.
- There were no immediately visible clinical patterns.

**Level One: No cluster pattern ... deregulation pattern**

**Generalized pattern of deregulation throughout the entire sample**

- Departures are widely distributed across the 19 sites and 8 bandwidths.
- Site and bandwidth specific deviations ranged from 0 to 5 occurrences.
- More deviations observed in the Theta and Beta bandwidths.

(M. Swingle, 2013)
<table>
<thead>
<tr>
<th>Left Hemisphere</th>
<th>Delta 1-4Hz</th>
<th>Theta 4-8Hz</th>
<th>Alpha 8-12Hz</th>
<th>Beta 12-25Hz</th>
<th>HiBeta 25-30Hz</th>
<th>Beta 1 12-15Hz</th>
<th>Beta 2 15-18Hz</th>
<th>Beta 3 18-25Hz</th>
<th>Totals</th>
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<td>19</td>
<td>9</td>
<td>19</td>
<td>14</td>
<td>17</td>
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<table>
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<th>Theta 4-8Hz</th>
<th>Alpha 8-12Hz</th>
<th>Beta 12-25Hz</th>
<th>HiBeta 25-30Hz</th>
<th>Beta 1 12-15Hz</th>
<th>Beta 2 15-18Hz</th>
<th>Beta 3 18-25Hz</th>
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<td>Total Right</td>
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<td>17</td>
<td>9</td>
<td>16</td>
<td>22</td>
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<table>
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<tr>
<th>Center</th>
<th>Delta 1-4Hz</th>
<th>Theta 4-8Hz</th>
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<th>Beta 12-25Hz</th>
<th>HiBeta 25-30Hz</th>
<th>Beta 1 12-15Hz</th>
<th>Beta 2 15-18Hz</th>
<th>Beta 3 18-25Hz</th>
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<tr>
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<td>3</td>
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<td>3</td>
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<tr>
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<td>1</td>
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</table>

Note: Inclusion Criterion: Z score equal to or greater than + or -2
Refining Parameters (of instrument use)

Data collapsed by clinical parameters (Clark et al., 2011 & Agner Et al., 2005)

- 24 variables (3 recording regions, 8 bandwidths) by regional classification (frontal / central / posterior)
Proportionately more deregulation in the Theta (4-8Hz) and Beta 3 (18-25Hz); Pattern of non-equality of left to right hemispheres in the Beta, Beta 1, Beta 2 and Beta 3 bandwidths (Beta 12-25Hz L>R 33%; Beta 12-15Hz L>R 41%; Beta 15-18Hz R>L 32%; Beta 18-25Hz R>L 28%).

- Clinically, Theta deregulation centrally and frontally is associated with difficulties sustaining focus; occipitally it can be associated with anxiety and addiction.

- Beta deregulation uniformly is associated with excess mental chatter and anxiety.

- Left to right asymmetry in the Beta bandwidth is associated with emotional deregulation such as depression and anxiety. (Note: data set / not participant specific).

(M. Swingle, 2013)
Table 6

Proportions of Deregulation by Left Hemisphere, Right Hemisphere and Center

<table>
<thead>
<tr>
<th>Proportions</th>
<th>Delta 4Hz</th>
<th>1-4 Hz</th>
<th>Alpha 4-8Hz</th>
<th>8-12Hz</th>
<th>Beta 12-25Hz</th>
<th>HiBeta 25-30Hz</th>
<th>Beta 1 12-15Hz</th>
<th>Beta 2 15-18Hz</th>
<th>Beta 3 18-25Hz</th>
<th>Total Deviation Count</th>
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<tbody>
<tr>
<td>Left</td>
<td>.115</td>
<td>.181</td>
<td>.057</td>
<td>.157</td>
<td>.074</td>
<td>.157</td>
<td>.115</td>
<td>.140</td>
<td></td>
<td>125</td>
</tr>
<tr>
<td>Right</td>
<td>.104</td>
<td>.187</td>
<td>.083</td>
<td>.118</td>
<td>.062</td>
<td>.111</td>
<td>.152</td>
<td>.180</td>
<td></td>
<td>144</td>
</tr>
<tr>
<td>Center</td>
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<td>.178</td>
<td>.035</td>
<td>.142</td>
<td>.071</td>
<td>.160</td>
<td>142</td>
<td>.23</td>
<td></td>
<td>56</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>321</td>
</tr>
</tbody>
</table>

Total Proportions (L,R,C) | .096 | .183 | .065 | .137 | .068 | .137 | .137 | .174 |

Percentage Difference of Proportions R>L

- - - -33 - -41 +32 +28
Levels 3, 4 & 5

- Data collapsed to 15 variables (3 recording regions, 5 discrete bandwidths) & removal of overlapping parameters
Level 3:

- Broad distribution of the EEG deviations may obscure regional patterns associated with specific clinical profiles. Data collapsed & retabulated according to the parameters in Clark et al (2011).
- Yes/no inclusion count (not frequency count).
- (front, central, posterior)

- Central deregulation appears.
- Pattern of deregulation within the Theta band remains apparent.

(M. Swingle, 2013)
Table 7

**Collapsed Data Set of 24 Variables: Deviation Tabulation by Region, Frontal, Central and Posterior**

<table>
<thead>
<tr>
<th></th>
<th>Delta 1-4</th>
<th>Theta 4-8</th>
<th>Alpha 8-12</th>
<th>Beta 12-25</th>
<th>HiBeta 25-30</th>
<th>Beta1 12-15</th>
<th>Beta2 15-18</th>
<th>Beta3 18-25</th>
<th>Total</th>
<th>Proportion</th>
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<tr>
<td><strong>Frontal:</strong></td>
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<td>5</td>
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<td>3</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>32</td>
<td>.299</td>
</tr>
<tr>
<td>Fp1, F3, F7, FP2, F4, F8, FZ</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Central:</strong></td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
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<td>43</td>
<td>.401</td>
</tr>
<tr>
<td>C3, C4, Cz, T3, T4</td>
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<td></td>
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</tr>
<tr>
<td><strong>Posterior:</strong></td>
<td>3</td>
<td>6</td>
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<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>32</td>
<td>.299</td>
</tr>
<tr>
<td>T5, T6, P3, P4, Pz, O1, O2</td>
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<td>14</td>
<td>13</td>
<td>13</td>
<td>107</td>
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<tr>
<td><strong>Proportion</strong></td>
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<td>.186</td>
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<td>.121</td>
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<td>.130</td>
<td>.121</td>
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<td></td>
</tr>
</tbody>
</table>

(M. Swingle, 2013)
Level 4:
- Removing overlapping parameters of the Beta Bandwidth.
- Pattern of deregulation in Theta becomes stronger
- Regional proportions remain relatively the same
- [Also tabulated by original parameters (Left, Right & Center) same findings]

(M. Swingle, 2013)
### Table 8

**Collapsed Data Set of 15 Variables: Deviation Tabulation by Region, Frontal, Central and Posterior**

<table>
<thead>
<tr>
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<th>Delta 1-4</th>
<th>Theta 4-8</th>
<th>Alpha 8-12</th>
<th>Beta 12-25</th>
<th>HiBeta 25-30</th>
<th>Total</th>
<th>Proportion</th>
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</thead>
<tbody>
<tr>
<td>Frontal: Fp1, F3, F7, Fp2, F4, F8, FZ</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>20</td>
<td>.298</td>
</tr>
<tr>
<td>Central: C3, C4, Cz, T3, T4)</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>28</td>
<td>.417</td>
</tr>
<tr>
<td>Posterior: T5, T6, P3, P4, Pz, O1, O2</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>19</td>
<td>.283</td>
</tr>
<tr>
<td>Totals</td>
<td>14</td>
<td>20</td>
<td>8</td>
<td>13</td>
<td>12</td>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>

Proportion .208 .298 .119 .194 .179
Level 5

- Following Agner Et al., (2005)
- By Clark et al.’s 3 regions, only including 5 or more departures within the sample.
  - Prominence of Theta deregulation magnified.
  - Balance of regional proportions of frontal to posterior deregulation remains the same.
  - Central deregulation becomes stronger.

(M. Swingle, 2013)
**Table 9**

*Collapsed Data Set of 15 Variables: Deviation Tabulation by Region, Frontal, Central and Posterior*

<table>
<thead>
<tr>
<th>Bandwidths in Hz</th>
<th>Delta 1-4</th>
<th>Theta 4-8</th>
<th>Alpha 8-12</th>
<th>Beta 12-25</th>
<th>HiBeta 25-30</th>
<th>Total</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal: Fp1, F3, F7, Fp2, F4, F8, FZ</td>
<td>6</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>11</td>
<td>.234</td>
</tr>
<tr>
<td>Central: C3, C4, Cz, T3, T4</td>
<td>5</td>
<td>9</td>
<td>-</td>
<td>5</td>
<td>6</td>
<td>25</td>
<td>.531</td>
</tr>
<tr>
<td>Posterior: T5, T6, P3, P4, Pz, O1, O2</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>11</td>
<td>.234</td>
</tr>
<tr>
<td>Totals</td>
<td>11</td>
<td>20</td>
<td>-</td>
<td>10</td>
<td>6</td>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>

Proportion: .234 .425 .212 .127
Summary of ‘Instrument 1’:

- Broad distribution of the EEG deviations may obscure regional patterns associated with specific clinical profiles.
- Any significant deregulation is a liability.
- Only when data is collapsed do patterns appear.

(M. Swingle, 2013)
1. **Full QEEG (19 site)**

- 19 site When compared to a **normative** data base:
  - No standardized or systematic pattern
  - any deviation (z score of + or – 2) is a liability
  - Only when data is collapsed does central deregulation of Theta appear
    - excessive Theta implies a connection with ADHD

**CONCLUSION**: comorbid or co-occurring with ADHD

M. Swingle, AAPB Webinar, May 7, 2015
Instrument 2)
5 point Clinical Q compared to a clinical database:

M. Swingle, AAPB Webinar, May 7, 2015
5 sites

- FZ
- F3 & F4
- Cz
- O1

- (02-48hz)

Inclusion criterion:
- Clinical signature present in over 25% of sample.

(M. Swingle, 2013)
## Inclusion parameters: Clinical Q

### Clinical Parameters of the Clinical Q

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Associated Symptom(s)</th>
<th>% of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3 &lt;&gt; F4 by 15%</td>
<td>Emotional deregulation</td>
<td>40%</td>
</tr>
<tr>
<td>F3 &amp; F4 Theta/Alpha &lt; 1.20</td>
<td>High frontal Alpha ADHD</td>
<td>89%</td>
</tr>
<tr>
<td>Cz Theta/SMR &gt; 3.0</td>
<td>Lack of body stillness &amp; focus</td>
<td>26.6%</td>
</tr>
<tr>
<td>O1 Theta/Beta &lt; 1.80</td>
<td>Anxiety/agitation, insomnia, addiction</td>
<td>100%</td>
</tr>
<tr>
<td>Fz High Beta/Beta &gt; .55</td>
<td>Compulsive perseveration/ fretting, OCD</td>
<td>66%</td>
</tr>
</tbody>
</table>

(M. Swingle, 2013)
CONCLUSION: Cluster Pattern Implying a Discrete Disorder

100% Low Theta/Beta ratios @ O1
  › Symptom Cluster: Anxiety/Agitation, (Insomnia) & Addiction
89% Elevated Alpha/Theta ratios @ F3/F4
  High Frontal Alpha ADHD
66% High HiBeta/Beta ratios @ Fz
  › Compulsive Perseveration / Fretting & OCD
40% Over 15% difference in discrete bandwidths amplitudes @ F3/F4
  › Emotional Deregulation
27% Elevated Theta/SMR @ Cz
  › Lack of body Stillness, ADHD … (lower seizure thresholds…)

M. Swingle, AAPB Webinar, May 7, 2015
Excessive Usage and Alignment with Pathology
So... What is Internet / Digital Addiction? (more from the lit.)

- Co-morbid, Co-occurring, or Discrete Disorder?
- No clear picture other than alignment with other pathology.
- Great variation in findings other than shared circuitry with addiction & individuals with IA are also suffering from ‘something else’.

- Predisposing Environments
- Predisposing Personality Traits
- Predisposing Demographics
- High Comorbidity
- High Co-occurrence

(M. Swingle, 2013)
Placing Internet Addiction in the Map of Pathology

- **Comorbidity:**
  - Depression, Anxiety Disorders, Personality Disorders, OCD, ODD, CD, other Addiction, Intimacy Disorder

- **Predisposing Environments:**
  - Isolation & family dynamics

- **Predisposing Personality Traits:**
  - Sensation seeking, impulsivity, reduced attentiveness
  - Conversely, introversion: shyness & low self-esteem

- **Risk Factors:**
  - Need to escape from family discord, loneliness, guilt
  - Need to detract from (seek to ease) anxiety, depression, social phobias

(M. Swingle, 2013)
Summary

- The literature is unified: Individuals with IA are suffering from some other form of mental (psychological) or social (interpersonal) difficulty. Psychosocial problems are directly related to the development of problematic Internet usage.


- Findings on the EEG 19 cite (normative comparative) & 5 cite (clinical comparative) completely support this.
WHY?
The addiction or excessive usage is ‘serving a purpose’...!
The Big Three:

Anxiety, Depression, OCD & ICD (including ADHD)
Anxiety: Using the Medium as a Mood Regulator

- IA can develop due to the individual using the medium to regulate against anxious mood states or to mitigate against pre-existing social anxiety.
- Individuals preferring online social interaction to face-to-face interaction are at risk for developing problematic use: The preference turns into a reliance.
- Medium used to regulate or mitigate affective distress
  - replaces traditional/face-to-face support networks (family & friends)
  - leads to increased deficiencies in self-regulation
  - develops into cognitive preoccupation with the medium (the Internet) and its compulsive use

Outcome:

- With reliance on the medium for anxiety relief individuals develop obsessive though processes and are unable to detach themselves from the technology.
- Changes the behavior of the user: anonymity and/or the shield of the screen decreases self-consciousness. As all interactions are technologically mitigated intimacy can be precisely controlled by timing and quantity of communication.
- Using the medium as a mood regulator is highly associated with negative outcome such as interpersonal difficulties at home and work.


(M. Swingle, 2013)
Individuals with mood deregulation can be drawn to excessive internet use or deregulation can develop due to excessive Internet use.

- Vulnerability factor in all age groups
- ‘Loneliness’ was single most predictive factor for problematic Internet use in gaming addiction
- Some forms e.g., sexual preoccupation have same neuromechanisms as depression as responds to antidepressants (SSRI’s, SNRI’s & opiate blockers)
- Outcome: Temporarily alleviates the sentiment but then leads to further aggravation of the original emotion.
- Driving force: External life factors


- Is Internet Addiction a Behavioral Manifestation of Depression?

(M. Swingle, 2013)
OCD and ICD's

- Newer impulse disorder (Dell’Osso et al, 2007)
- Is this a perfect overlap of compulsive impulsive and addictive behavior or is it and addiction to itself? (Fontenelle et al, 2011)
- Blurring of definitions of addiction(s) and compulsive behaviors (Pies, 2009).
- Have other disorders including psychosocial problems found a home, a new expression in a new medium? (Pies)
- Manifestation of an underlying disorder or a discrete disease entity? (Pies)
- Independent addiction? An Impulse Disorder? Symptom of another Disorder? …. Potential for addiction for any subclinical pathology (te Wildt et al., 2010)
- Literature in agreement: There is definitely a relationship between IA and the Obsessive/Compulsive Spectrum due to high co-morbid rates and common variation in neurochemistry, neurocircuitry, neurocognition, phenomenology & family factors. BUT varying degrees of association/co-morbidity in the studies.
- Summation: Variation in findings re. frequency of co-morbidity and strength of the relationship of IA with Obsessive/Compulsive Spectrum may be directly related. The severity of one is related to the severity of the other (see Bernardi & Palanti, 2008). 

(M. Swingle, 2013)
The emergence of a specific clinical condition or symptom is dependent upon an environmental trigger. The literature on personality traits, risk factors, and predictive environments in IA, and addiction in general, supports this hypothesis.

(see Beard, 2008; Ha et al., 2006; Jang, 2005; Jang, Hwang & Choi, 2008; Kendler & Prescott, 2006; Kim et al., 2006; Lin & Tsai, 2002; Ryu, Choi, Seo, & Nam, 2004; Rutter, 2006; 2008; Young & de Abreu, 2011).

(M. Swingle, 2013)
5] Beyond Diagnostic or Pathological Applications

Why / How Do Individuals Use the Medium?

1) Classifications of Usage
2) Purpose of Usage

(M. Swingle, 2013)
Back to Basics!
#1) Reason is Psychosocial Instability

- Instead of seeking professional help or otherwise communicating mental, physical or emotional unrest to family or friends, individuals seek some sort of solace, or shelter, in escaping to i-media. And here is where a problem not only blossoms, but starts to grow roots.

- In what we now know as the catch of the medium, different from many other distracting activities or avoidance strategies, escaping to i-tech will exacerbate, rather than solve (or sooth) an individual’s original problem.

(i-Minds, M. Swingle, 2015)
Examination of Classification of Usage

- **Standard Classifications:**
  - Sexual
  - Social
  - Gaming
  - (Searching!)

- **Blurring of Classifications**
  - Although often studied/treated by ‘content’ ... SEXUAL * SOCIAL * GAMING

  The addiction Goes Beyond Content. Speaking of the addiction in terms of content choices limits the understanding of the phenomenon (including content overlap: e.g., social/sexual pursuits as a component of gaming).

  - What is unique to IA is that first, it expands beyond a specific classification or choice of activity or content and second, that the method or medium of access itself is central to the addiction (see Greenfield, 1999, Shaffer, 1996).

  - It may be the medium as opposed to the content of the medium that is the true addiction.

  - It At its core IA involves a behavior and the technology that facilitates the behavior.

(M. Swingle, 2013)
Presenting an Inclusive Unifying Theory

Isolating & Defining three Dominant Perspectives within the Literature.

A New Classification System Inclusive of Content & Medium.

- GENERALISED INTERNET ADDICTION (GIA)
- FANTASY INTERNET ADDICTION (FIA)
- TECHNOLOGICAL INTERNET ADDICTION (TIA)

(M. Swingle, 2013)
Generalized Internet Addiction (GIA)

There is No Internet Addiction Per Se. The Internet is Merely the Medium.

- Excessive Internet usage is not an addiction in itself but rather the space where an individual can engage in the addictive behavior. The fact that the individual chooses the Internet as the preferred tool of engagement is deemed irrelevant.
- Activity is done on and offline: e.g., gambling (casino, private game, or Internet), sexual preoccupation (porn, cybersex, or massage parlors & strip clubs), shopping (online sites & stores)

(see Greenfield, 2000)

(M. Swingle, 2013)
Fantasy Internet Addiction (FIA)

The Technology is Intrinsically Intertwined with the Addiction

- The individual would otherwise not engage in the activity if it were not accessible by this specific medium.
- Directly related to anonymity, the shedding of self or the development of a new or different identity (typically involving the development of another persona and role play as this persona)
  - roleplaying games e.g., Secondlife
  - virtual affairs under pseudonyms
  - trolls
- Key: Disinhibition effect. The Internet offers different rules of engagement wherein consequences can be avoided and individuals can explore aspects of behavior or personality they would otherwise not do in real life.
  - The individual does not pursue the chosen activity offline. A COMPLETELY CONTEXTUALIZED ADDICTION.
  - (see Cooper, Demonaco & Burg, 2000, Griffiths, 2000, Suller)

(M. Swingle, 2013)
Technological Internet Addiction (TIA)

Pure Technological Addiction
The Perfect Marriage of Content and Process: TOTAL IMMERSION

- The structural component of the medium and the software combined are central in providing the properties that support addictions.
  - Variable reinforcement schedule
  - unpredictable in frequency and saliency
- When content and process are combined with a variable reinforcement schedule as well as 24 hour access, potential for increasingly stimulating content and free it is the perfect context for the development of addiction.

(see Greenfield, 1999, Young, 1998)

(M. Swingle, 2013)
COMPOUNDING CROSSOVER

Acceleration of the Addiction:

- Possibility of compounding crossover of the last two categories. An individual may initially develop a compulsion due to the disinhibition factor but may later lose the need for anonymity with the acceleration of the addiction.
- Shedding of anonymity may be part of the heightening process of addiction; part of the value to the increased stimulation the individual is seeking.

- The three levels are progressive:
  - Convenience (GIA)
  - Escapism (FIA)
  - Total Immersion (TIA)

(M. Swingle, 2013)
6] Back to the EEG
Classifications

- Associations with Neurological Deregulation as per Deviation Counts on the 19 Site QEEG
Table 10

*Distribution of Three Classifications (Generalized IA, Fantasy IA and Technological IA)*

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th></th>
<th></th>
<th>Male</th>
<th></th>
<th></th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f$</td>
<td>$%$</td>
<td></td>
<td>$f$</td>
<td>$%$</td>
<td></td>
<td>$f$</td>
</tr>
<tr>
<td>GIA</td>
<td>7</td>
<td>46.7</td>
<td></td>
<td>4</td>
<td>26.7</td>
<td></td>
<td>11</td>
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<tr>
<td>FIA</td>
<td>1</td>
<td>6.7</td>
<td></td>
<td>4</td>
<td>26.7</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>TIA</td>
<td>7</td>
<td>46.7</td>
<td></td>
<td>7</td>
<td>46.7</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
<td></td>
<td>15</td>
<td>100</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

(M. Swingle, 2013)
# Deviation Counts

<table>
<thead>
<tr>
<th>Classification</th>
<th>Female</th>
<th>Male</th>
<th>Male / Female</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deviation Count</td>
<td>$f$</td>
<td>Deviation Count</td>
<td>$f$</td>
</tr>
<tr>
<td>GIA</td>
<td>36</td>
<td>7</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>FIA</td>
<td>26</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>TIA</td>
<td>92</td>
<td>7</td>
<td>156</td>
<td>7</td>
</tr>
<tr>
<td>Totals</td>
<td>154</td>
<td>15</td>
<td>167</td>
<td>15</td>
</tr>
</tbody>
</table>

*Note.* The comprehensive tabulation of distribution of deviations by addiction classification across the 152 variables is presented in Appendices 2, 3 and 4.
Summary of Findings:

- Severity of Deregulation is Interlinked with the Level of Immersion (notably more for males).
- Choice of content or subject does not appear to be primary making the addiction truly about process (provided by the digital medium)
  - (content not associated with level of deregulation but may be associated with specific comorbidity)
  - (Blurred lines in ‘fantasy’... crosses over into reality)
- The classifications are of progressive immersion; the more immersed one is in the technology, the more severe the deregulation.

(M. Swingle, 2013)
2015: TIA is the Classification of Concern in patients/clients
Online activities

Table 3

*Online Usage of the Sample by Activity Type and Gender*

<table>
<thead>
<tr>
<th>Type</th>
<th>% Female</th>
<th>% Male</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Social</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>Sexual</td>
<td>93</td>
<td>86</td>
<td>77</td>
</tr>
<tr>
<td>Gaming</td>
<td>73</td>
<td>40</td>
<td>56</td>
</tr>
</tbody>
</table>

*Social sites and chat rooms

*Dating sites, erotic services, pornography

*Gaming: 1st person search and destroy (26%), traditional e.g., solitaire & bridge (36%) socially dependent fantasy / role-play (43%).*

(M. Swingle, 2013)
Activities are not static!
Interesting Sub Findings

- Sexuality: arousal templates affected for males (not females)
  - **Females**
    - 67% sexually active online
    - 90% (OF THE 67%) using pornography & erotica
    - *REAL LIFE INTEREST IN SEX NOT AFFECTED (0%)*
  - **Males**
    - 87% engaging in pornography
    - *100% (of the 87%) / 69% of the male sample reported less interest in sex’ and “almost no interest in sex” on the BDI

- Males appear to prefer novelty, anonymity and variety on line.
- Males need higher and higher points to peak sexual interest. De facto division of sexuality and intimacy provided by the medium.
- [Sexual orientation: Disenfranchised groups over represented in compulsive use / most efficient medium for social and sexual contact especially in smaller communities (see Cooper et al, 2000)]
- (47% non hetero females)
- Note: (No difference in hetero and non-hetero females usage of pornography & erotica)

(M. Swingle, 2013)
*How do we classify?*

- E.g., What classifies as sexual …
- (Gaming and sexual pursuits for females)

- Of those sexually engaged on line the dominant form of sexual engagement is pornography.
- 100% of males (13 of 13)
- 88% of females (9 of 10)
- 56% engaging in one or all of the three categories of gaming: search and destroy, fantasy role play and traditional.
  - Gender trends in the gaming classifications:
    - Socially dependent role playing games Females 53%, Male 33% (sexual role play in games)

(M. Swingle, 2013)
How this affects your clients:

- Implications for couple’s counselling
- Keeping up with the times
  - The world IS different
  - Negotiating new realities
    - Dating & sexuality old & young
Arousal Templates

- The new ED
  - Real people, real experiences are no longer sufficiently arousing (for men).

- Affecting women’s behavior and pursuit patterns

- Performance expectations elevated

- Disaffected Pair bonding
  - Constant pursuit of ‘more’
  - 7 year itch replaced by the 7 hour itch
  - Loss of intimacy
4th dimension: Where are we going?

- Internet replacing human relationships
Initial inclusion criterion for my 2013 study was a score of 70 to 100 on the Internet Addiction Test (IAT). Early in the recruitment process, however, it became apparent that potential participants who were single or not living with significant others were systematically not scoring high enough for inclusion. A subsequent examination of responses on the IAT revealed that uniformly individuals who were not in partnerships or interactive cohabitation responded “does not apply” to the questions on the IAT designed to evaluate “interference with family relationships”. The questions that were systematically affected were: 3, 5, 9, 13, and 18 (see Young, 1998, 2011). The interesting factor, however, was that this was not because Internet usage did not interfere with said existing offline relationships; rather that these relationships did not exist.

A lot of questions “did not apply” because they involved someone else’s opinion on how I spend my time and I do not have that kind of relationship with anyone, where they would judge/ask how I spend my time.

There is now a profile of an adult Internet user who has disengaged from offline life to such an extent that the IAT, as currently scored, may no longer be applied as an accurate measure of severity of Internet Addiction. This study presents an argument that the model becomes three dimensional. Alternately, it can be argued that the fourth dimension is or has become the Internet. Without additional personal information, it is unclear whether the selection of the category “does not apply / non applicable” (Young, 1998, 2011) speaks to a reduced level of interference in real-life interpersonal relationships or, in contrast, that it speaks to the nonexistence of real-life interpersonal relationships due to total immersion in the technology. In the case of this study, it would appear to be the latter.

(M. Swingle, 2013)
Research VS Practice

- Research participants very self aware
- Clients... *not so much!*
  - Fear of loss
  - Fear of void
- Research input can feed clinical intervention strategy: What we can learn from those not in denial.
- [Phases & stage of addiction: clients tend to be either in the denial or (pre)contemplation phase. Not ready for action]
Participant self awareness

- Participant comments on purpose & perceive effects of Internet usage:
  - (With the exception of social anxiety and perceived physical distance from offline social networks) none of the participants were under the illusion that what they were doing online was productive.
  - Expressed significant distress and self-disappointment at inability to disengage.

- Reported interference with
  - Achieving goals
  - Self-fulfillment
  - Purpose

- Used primarily to mitigate situations and emotions

- Can be classified in three categories:
  - 1) Abate an emotion or a state
  - 2) Explore aspects of fantasy one would not in real life (pos & neg)
  - 3) An avoidance or procrastination strategy.

(M. Swingle, 2013)
MULTIPLE LEVELS

- Deregulation, as per the EEG
- Underlying psycho-social issue
- Overt pathology (Anxiety, Depression OCD/ADHD)
Summary of findings

- Supports position in the literature that IA is a behavioral manifestation of a clinical or subclinical disorder.
- It is a deregulation disorder with a distinctive profile if not a EEG phenotype. Any deregulation is a vulnerability to IA.
- Choice of content or subject does not appear to be primary making the addiction truly about process (provided by the digital medium).
- Severity of deregulation is fully interlinked with the level of perceived engagement.
- Disenfranchised & individuals in transition further at risk.
- Concurrent disorder: level of interdependence of one disorder on the other not yet clear (future research).
- Co-occurring disorder or subclinical disorder should be addressed (therapeutically) with equal attention.

(M. Swingle, 2013)
Presented EEG clusters are not exclusive to IA!

Systematically found in

- Other Addictions
- Learning Disorders and Disabilities
- Behavioral and Conduct Disorders
- Emotional Deregulation

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NO COINCIDENCE!
Key points reviewed: Using research data to inform clinical practice.

- The underlying mental (psychological) or social (interpersonal) difficulty must be discovered and addressed.

- The psychosocial problem is being soothed / ‘medicated’ by i-tech usage (it has found a ‘home’ or expression).

- The psychosocial problem can thereafter ‘bloom’ into mental illness (anxiety / depression).

- ‘Other’ symptoms emerge (insomnia, anger, ED, LD, etc.) caused by or maintained with excessive usage.
It is not what you are doing it is why!

- The underlying ‘cause’ must be treated in tandem or the client will not get better
  - What is the ‘cause’?
    - Loneliness?
    - Depression?
    - Need to belong?
    - Core emotional belief?
    - Why is the individual turning to the net?
    - Follow the EEG (clinical) & figure out what purpose (emotional regulation) is it serving?

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Catches of the 21st Century

- Parallel to eating disorders
- Total abstinence is not an option
- Tool of social bonding... what replaces it?
- Individuals must learn to regulate the behavior
- Guardians/parents have CRITICAL role (they are also in the ‘denial’ or ‘contemplation’ phase.
  - & must be a part of the ‘solution’
  - Prepared to pay for treatment for their child to ‘get better’; unprepared to take the parenting steps to ensure success.

M. Swingle . AAPB Webinar, May 7, 2015
7] Critical Concerns

.
And now the really scary stuff...

ALPHA!
Case 1(1): male, 18
#1) excessive usage of i-tech not identified @ intake.

&

#2) unable /(unwilling) to reduce screen time.

- presenting issues: ADHD & Anxiety
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cz Theta/Beta</td>
<td>2.31</td>
<td>2.63</td>
<td>2.24</td>
</tr>
<tr>
<td>O1 Theta/Beta</td>
<td>2.32EO / 1.75EC</td>
<td>2.26EO / 1.42EC</td>
<td>2.65EO / 1.42EC</td>
</tr>
<tr>
<td>F3/F4 Theta/Alpha</td>
<td>.65F3 / .62F4</td>
<td>.65F3 / .66F4</td>
<td>.64F3 / 70F4</td>
</tr>
<tr>
<td>FZLo/High Alpha</td>
<td>3.22</td>
<td>3.64</td>
<td>3.05</td>
</tr>
<tr>
<td>CZ % Alpha change EO to EC</td>
<td>198%</td>
<td>83%</td>
<td>55%</td>
</tr>
<tr>
<td>O1 % Alpha change EO to EC</td>
<td>194%</td>
<td>598%</td>
<td>642%</td>
</tr>
</tbody>
</table>

M. Swingle. AAPB Austin 2015
Case 2(1): male, 9yrs (in 2010)
Extremely creative in 2010 seeking treatment for mild focus & anxiety issues. Returned in 2014

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1 Theta/Beta</td>
<td>1.61EO / 1.36EC</td>
<td>2.00 EO / 1.23EC</td>
<td>1.69 EO / 1.10EC</td>
</tr>
<tr>
<td>Alpha increase CZ</td>
<td>38%</td>
<td>82%</td>
<td>79%</td>
</tr>
<tr>
<td>Alpha increase O1</td>
<td>279%</td>
<td>307%</td>
<td>579%</td>
</tr>
</tbody>
</table>
Seizure Disorders: % increase in Alpha EO to EC in the range of 250.

‘IA’: % increase in Alpha EO to EC also in the 250+ range.
  - Over the past 3 years (2013-2015) however, dramatically increasing e.g. +500-600%

Morphology identical!
Case 3(1): 9, female
Catatonic seizures

- Alpha increase @ CZ 43%
- Alpha increase @ O1 230%
- Looks identical on the EEG!

M. Swingle, AAPB Webinar, May 7, 2015
## Artifact rejection - Standard bands

### EEG C raw & 2D FFT

![EEG C raw & 2D FFT](image)

### EEG D raw & 2D FFT

![EEG D raw & 2D FFT](image)

### Standard bands: Amplitude epoch means (C = left, D = right)

<table>
<thead>
<tr>
<th>Band</th>
<th>Mean (uV)</th>
<th>Standard bands: Amplitude epoch means (C = left, D = right)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>7.84</td>
<td></td>
</tr>
<tr>
<td>Theta</td>
<td>4.19</td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>34.53</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>11.82</td>
<td></td>
</tr>
<tr>
<td>High Beta-Gamma</td>
<td>4.89</td>
<td></td>
</tr>
</tbody>
</table>

### Whole session means (uV)

<table>
<thead>
<tr>
<th>Band</th>
<th>Mean (uV)</th>
<th>Whole session means (uV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>18.33</td>
<td></td>
</tr>
<tr>
<td>Theta</td>
<td>15.08</td>
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</tr>
<tr>
<td>Alpha</td>
<td>13.84</td>
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</tr>
<tr>
<td>Beta</td>
<td>9.73</td>
<td></td>
</tr>
<tr>
<td>High Beta-Gamma</td>
<td>5.94</td>
<td></td>
</tr>
</tbody>
</table>

Note: Drag the mouse cursor across artifacts while pressing the [Control] key to place a manual segment.
Artifact rejection - Standard bands

Define auto-rejection settings by click and drag the mouse cursor across artifacts while pressing the [Ctrl] key to place a manual treatment.

Standard bands: Amplitude epoch means (C = left, D = right)

<table>
<thead>
<tr>
<th>Band</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>7.59</td>
<td>8.57</td>
</tr>
<tr>
<td>Theta</td>
<td>14.36</td>
<td>15.30</td>
</tr>
<tr>
<td>Alpha</td>
<td>36.98</td>
<td>14.07</td>
</tr>
<tr>
<td>Beta</td>
<td>11.66</td>
<td>9.50</td>
</tr>
<tr>
<td>High Beta-Gamma</td>
<td>5.17</td>
<td>6.13</td>
</tr>
<tr>
<td></td>
<td>Theta Beta</td>
<td>1.23</td>
</tr>
<tr>
<td></td>
<td>Alpha Beta</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>High Beta-Gamma Beta</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Whole session means (µV)

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<td>5.17</td>
<td>6.13</td>
</tr>
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</table>

M. Swingle. AAPB Webinar, May 7, 2015
**NAME:** la  
**Session Date:** 01/05/2015

<table>
<thead>
<tr>
<th>CZ</th>
<th>Values</th>
<th>%Change</th>
</tr>
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<tbody>
<tr>
<td>EO Alpha</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td>EC Alpha</td>
<td>19.41</td>
<td></td>
</tr>
<tr>
<td>% change EO to EC Alpha</td>
<td></td>
<td>159.48%</td>
</tr>
<tr>
<td>EO Alpha Recovery</td>
<td>13.47</td>
<td></td>
</tr>
<tr>
<td>% change EO Alpha to EO Alpha after EC</td>
<td></td>
<td>80.00%</td>
</tr>
<tr>
<td>Theta Amplitude EO</td>
<td>11.02</td>
<td></td>
</tr>
<tr>
<td>Beta Amplitude EO</td>
<td>5.48</td>
<td></td>
</tr>
<tr>
<td>Theta/Beta EO</td>
<td>2.02</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Difference</th>
<th>F3 Values</th>
<th>F4 Values</th>
<th>F3-F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theta Amplitude EC</td>
<td>9.22</td>
<td>9.92</td>
<td></td>
</tr>
<tr>
<td>Beta Amplitude EC</td>
<td>7.60</td>
<td>9.85</td>
<td></td>
</tr>
<tr>
<td>Theta/Beta (EC)</td>
<td>1.21</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>% Difference b/w F3 T/B &amp; F4 T/B EC</td>
<td>-20.34%</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>9.92</td>
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<td>18.36</td>
<td>17.60</td>
<td></td>
</tr>
<tr>
<td>Theta/Beta (EC)</td>
<td>0.50</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>% F4&gt;F3 Beta</td>
<td>7.60</td>
<td>9.85</td>
<td>29.68%</td>
</tr>
<tr>
<td>% F4&gt;F3 Alpha</td>
<td>18.36</td>
<td>17.60</td>
<td>-3.12%</td>
</tr>
<tr>
<td>% F4&gt;F3 Theta</td>
<td>9.22</td>
<td>9.92</td>
<td>7.63%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ö1</th>
<th>Values</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha EO</td>
<td>7.48</td>
<td></td>
</tr>
<tr>
<td>Alpha EC</td>
<td>18.93</td>
<td></td>
</tr>
<tr>
<td>% change in Alpha EO to EC</td>
<td></td>
<td>152.99%</td>
</tr>
<tr>
<td>EO Alpha Recovery</td>
<td>16.77</td>
<td></td>
</tr>
<tr>
<td>% change EO Alpha to EO Alpha after EC</td>
<td></td>
<td>124.16%</td>
</tr>
<tr>
<td>Theta Amplitude EO</td>
<td>10.45</td>
<td></td>
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<tr>
<td>Beta Amplitude EO</td>
<td>6.30</td>
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</tr>
<tr>
<td>Theta/Beta EO</td>
<td>1.66</td>
<td></td>
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<td></td>
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<td>Beta Amplitude EC</td>
<td>8.02</td>
<td></td>
</tr>
<tr>
<td>Theta/Beta EC</td>
<td>1.25</td>
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<tbody>
<tr>
<td>Theta Amplitude</td>
<td>10.80</td>
<td></td>
<td></td>
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<tr>
<td>Beta Amplitude</td>
<td>7.73</td>
<td></td>
<td></td>
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<tr>
<td>Theta/Beta Amplitude</td>
<td>1.40</td>
<td></td>
<td></td>
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<tr>
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<td>3.62</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>HiBeta/Beta</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum HiBeta + Beta Amplitudes</td>
<td>11.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LoAlpha Amplitude</td>
<td>11.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HiAlpha Amplitude</td>
<td>4.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LoAlpha/HiAlpha</td>
<td>2.72</td>
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Alpha Peak Frequency EC | 9.8 |        |
**NAME:** ia  
**Session Date:** 01/05/2015

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</table>
Highly coordinated with creativity in both the modern sense (singing, dancing, painting, drawing & constructing) as well as the classical sense, higher levels of mathematics, architecture (spacial planning and unique ability to see and create patterns).
Creativity

- **Alpha Bursts & Deregulation of Frontal Alpha:** Creativity/Artist signature gone bad...

  "When I was in my teens and very early 20s my creativity level was very high. This has declined drastically and caused me a tremendous amount of anxiety and deep depression. It recently dawned on me that there seems to be a direct correlation to the amount of time I spend online and the drop in my creativity and imaginative abilities. It became harder and harder to get that electric sensation in my body that comes from creative thinking, and at this point in time it feels almost impossible. I have tried to cut off exposure to any media devices in an attempt to regain this ability but those attempts have failed."

- "I often (daily) find myself researching subjects and activities for offline purposes (for example wood working/painting projects) but I spend so much time doing this I never actually get to the real activity. It’s become a cycle. Whenever I think about getting offline to paint or woodwork I instead stay online to look up more information about these subjects whether it’s techniques or inspirational pictures. Any inspirational ideas that I have on my own, instead of being expressed, gets filed away for use at a later date on one of my many lists. If I do not make these lists and lose ideas because I am busy getting more ideas from the Internet it causes a very high degree of distress and anxiety.”
Discussion

- Creativity
- Innovation
- Absent seizures?
The good news

- Alpha reduction with
  - Reduction of i-tech usage
  - EEG intervention
  - Engagement
- Cassandra
- Reduce i-tech and get on with (therapy) & life!
Case 4.1: female 19, not working, not in school, living with parents

- ‘Failure to thrive/launch’
- Symptom check list: (1 not true of me...5 very true of me)
  - I am very anxious 5
  - I am stubborn 4
  - I feel depressed 4
  - I am a perfectionist 5
  - Sometimes I can’t get rid of annoying or disturbing thoughts 4
  - I have sleep problems 4
  - I feel restless and can not sit still 4
  - Artistic 4

- Presenting symptoms:
  - Constant headaches
  - Erratic eating habits (missing meals over eating without being conscious of over eating /not eating in the moment)
  - High lack of motivation
    - I don’t do anything
    - Or don’t have the energy to do anything
Clinical Q (case 4.2)

- Theta/Beta @ O1: 0.78 EO / 0.67 EC
- F3 & F4 Theta/Alpha ratio: 0.70 & 0.70
- F4 Beta > F3: -27%
- HiBeta/Beta: 0.65

Alpha increase

- @ Cz EO to EC = 127%
- @ O1 EO to EC = 249%
Case 4.3: After 5 treatments (1X/week) AND elimination of ALL non-essential digital media usage.

- Theta/ Beta @ O1 0.78 to 1.18 EO / .67 to .71 EC
- F3 & F4 Theta/Alpha ratio: .70 & .70 insignificant change
- F4 Beta > F3: -27% to -46% (using i-tech as mood regulator)
- HiBeta/Beta: .65 to .74

Alpha increase
  - @ Cz EO to EC = 127% reduced to 46%
  - @ O1 EO to EC = 249% reduced to 142%
4.4 Life Effects: Applied for and was hired for entry level job

Applied to college

Remaining psychological issues for which services were originally sought can now be addressed
Conclusion

- To what extent are we immersed in the technology & why?
- Is our usage Integrated or Interfering?
The issues and patterns are ever changing by generations, the mere passage of time, application and exposure.

Chances are, 50% or more of the data presented today will soon be ‘historical research’ … very likely outdated in 5 years or less (e.g., like profiling today vs 10 yrs. ago).

Next Webinar: All about the kids!

It's different!
i-Minds
How Cell Phones, Computers, Gaming, and Social Media Are Changing Our Brains, Our Behavior, and the Evolution of Our Species

MARI K. SWINGLE, PhD
Is your cell phone invading your life?
Are video games changing the personalities of your kids?
Are you addicted to texting, email, or social media?
Are you being sucked down the vortex of searching?

DR. MARI SWINGLE's new book provides the clear scientific proof to back up what we've all been suspecting: we're all subjects in a massive experiment to see what "i-Technology" (video games, social media, cell phones and a host of other screen-based devices) will do to our brains. The evidence is in, and it's frightening.

In a witty and entertaining style, Dr. Mari (as she's known to her patients) walks us through the science on how rapidly our brains are changing after 100,000 years of slow development, what the dangers are, and the positive steps we can all take to embrace technology while still saving our brains, and steering Humanity's future in a much more human direction.

"A genuinely original position on a historically significant cultural issue." -Kirkus