Digital Assessments for Predicting Patient Success, Personalizing Care Plans & Measuring Outcomes

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Speaker

Dr. Evian Gordon, MD, PhD, Founder and Chief Medical Officer, Total Brain

Selected video input:
Dr. David Whitehouse. Harvard Trained Psychiatrist with 30 years experience in treating Addiction.
Digital Assessments for Predicting Patient Success, Personalizing Care Plans, & Measuring Outcomes

3 Clinician, Patient and Payer Use Cases

1. **ASSESS**: Assess brain capacity deficits and strengths, apply predictive outcome analytics, personalize treatment.

2. **TREAT**: Personalize traditional therapy and medication if/as needed. Support it with adjunctive digital Therapeutics.

3. **TRACK**: Track evidence-based and value-based outcomes.

The Science of Addiction and Recovery

A chronic relapsing brain disease with loss of control over drug taking.

- Desensitization of the reward circuits of the brain
- Declining function of brain regions that facilitate decision making
- Cognitive flexibility and self-regulation, especially of cravings at critical trigger moments.

Presented by: Evian Gordon, MD, PhD
The Power of Integrative Neuroscience

Neuroscience has not only improved our understanding of the way substance use disorders wreak their havoc on the brain but the insights and approaches that have come out of that understanding can help us:

• Understand our patients better
• Understand possible markers of vulnerability to relapse
• Track the changes in brain function shortly after recovering sobriety
• Track improvements in cognitive and emotional capacities over time
• Inform our approach to structuring interventions by using areas of strength and avoiding relying on areas where major deficits exist
Emotion-Stress Control in Addiction

SAFETY FIRST: At its core, the brain is wired to trigger stress to keep us safe.

NON-CONSCIOUS CASCADE: Acute and chronic stress primes compensation with substances for coping

IMPACT: Substance use hijacks decision making and self-regulation

SOLUTION: Stress control and cognitive flexibility “in the moment” and new self-efficacy habits

Emotions: Essence - Details

WHAT? Triggered by CUES → MISMATCH: Match (Facial expression, language intonation, body language)


HOW? MISMATCH: Match Attractors in a dynamical space state.

IMPACT? Astounding impact on ALL behaviors.

DYNAMICS? Sensitive Dependence On Initial Conditions: Therefor even “Nudges” can generate significant Negative or Positive CONTAGION.

MODIFY Yes. Neuroplasticity.

{ Over-Reactive Over-Intense Unstable-Cycling Poor Control } Adaptive Regulation
**Nonconscious Fear Emotion: Arousal, Temporo-Spatial Processing**

Conscious  SCL  Nonconscious

**Temporal ERP**


**Stress Happens When Demand Exceeds Capacity**

- Coping
  - In Control
- Not Coping
  - Not in Control
  - Overwhelmed

**Demand**

**Capacity**

**Gap**

**Volume**

**Time**

- Difficulty relaxing and winding down
- Being touchy or intolerant of things in your way
- Over-reacting to situations
- Feeling jumpy and agitated
- Nervous energy
- Feeling overloaded
- Headaches and muscle pains
- Tiredness

Folkman et al., 1986; McEwen, 2006; American Institute of Stress and Dr. Heidi Hanna
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Dark Power of Cravings

- Brain is wired for safety and survival
- Seductive power of self soothing substances
- Menacing threat with a physiological response
- Need to empower STRESS CONTROL in the moment
  - Resonant breathing (boost heart rate variability 6 breaths-per-minute)
  - Positive affirmations
  - CBT
  - Mindfulness
- It is possible to train your brain to overcome addiction in a virtual, easily accessible world

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Current Methods of Measurement

There lacks a true measurement standard for behavioral health and substance use. Current methods are:

- **Limited in scope** – measure symptoms only
- **Subjective** - patient-reported
- **Inefficient** - for measuring outcomes over a broad population of patients at a single provider

New Standards of Measurement

As the industry moves toward measurement-based care, qualified parties have standardized methods that converge symptoms and cognition.
Deficits in Addiction

Top 3 Cognitive Deficits

1. Stress

2. Emotional Regulation

3. Resilience and Self-Regulation

Importance of Measurement

Key data points gleaned from assessments can help us predict, and proactively counter, treatment challenges. For example:

Program Drop Out

Cognitive impairment is associated with higher risk of program drop out, specifically in the areas of:

- Stress Control
- Memory\(^16\)
- Focus – verbal interference (cognitive flexibility)\(^7\)
- Resilience and Planning (executive function)\(^8\)

Relapse

People with depression or anxiety are at a considerably higher risk of relapsing within the first 12 months after recovery program completion.\(^9\)

This is also true for people with poor resilience skills.\(^20\)
Digital Assessment Solutions

Digital platforms marry neuroscience with cutting edge tech and engaging digital UI to unlock more detailed patient data and enable more personalized treatment. Measure:

- Brain capacities
- Mental health risks
- Stress in-the-moment and continuously

Mental health is the expression of our total brain capacities

4 main functions; 12 core brain capacities
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Measure
12 Brain Capacities

Assess brain capacities with validated neuroscientific tasks (e.g. emotional awareness).

Cognition (planning) task example

Review highest and lowest brain capacities with percentile ranking (age, gender, edu) and trends.

Emotion
Feeling
Cognition
Self-Control

Measure
Stress in the Moment and Continuously via HRV

- Heart Rate Variability (HRV) which measures our stress levels is the best bio-marker to predict wellbeing, physical and mental health (26k publications on the subject).
- This biomarker doesn’t lie, can be measured in little-to-no time by users and it provides tremendous personalized insights into one’s in-the-moment stress and one’s daily mental readiness.

1) Discrete HRV via smartphone camera

Use cases:
- What is my stress level at any given moment?
- Am I abnormally stressed right now?
- Can I short circuit my stress?
- Can I be better prepared for a specific moment?
- What is the pre-post impact of an event or exercise on my stress level?
- Does that event or exercise reduce my level of stress? By how much?

2) Continuous HRV via wearable

Use cases:
- What is my stress right now?
- What increases it?
- What decreases it?
- What is my weekly and monthly trends and how do they relate to life events or behaviors?
- What is good for my health?
- When should I do certain things and avoid others?

Presented by: Evian Gordon, MD, PhD
Use the Assessment to Personalize Recovery Intervention

- A value of the digital assessment is to help personalize each client’s treatment program.
- Re-assessment allows objective tracking of evidence-based outcomes of any treatment and the overall clinic program.

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Personalize Rx and Adjust with Re-Assessment

- Traditional Therapy
- Medication
- Alternative Interventions
- Adjunctive Digital Therapies
- Pillars of Brain-Body Health
- Biofeedback
- Neurostimulation

Deficits and ADT Trainings in Addiction

**Top 3 Cognitive Deficits**

1. Stress
2. Emotional Regulation
3. Resilience/Self-Regulations

**Top 3 ADT Trainings**

1. Resonant Breathing
2. CBT-Thought Tamer
3. Positive Affirmations
New Behavior Change Habits

The Biggest GAP Is Between Knowing & Doing

The Gordon 3-Step Habit Plan
To bridge the gap from knowing to doing!

Step 1) KNOW
Know your Why/What/How and your readiness to change.

Step 2) TRAIN
Generate a non-negotiable routine of using your PARs (Prompts - Actions - Rewards), small steps and deliberate practice.

Step 3) TRANSFER
Measure it to manage it. After a “30 Day Challenge” to establish any habit, remain vigilant to transfer it into your daily life.

Adjunctive Digital Therapy to Reduce Stress

- RESONANT BREATHING
- MEDITATION
- ENTRAINMENT MUSIC
- COGNITIVE TRAINING
Stress Reduction from Resonant Breathing Self-Care

Users who completed 2 assessments showed significantly reduced stress if they trained with Resonant Breathing for over 2 hours.

Mean Stress Score at Baseline and after 2 Hours

<table>
<thead>
<tr>
<th>Stress Score Categories</th>
<th>0-14</th>
<th>15-18</th>
<th>19-25</th>
<th>26-33</th>
<th>34+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>normal</td>
<td>mild</td>
<td>moderate</td>
<td>severe</td>
<td>very severe</td>
</tr>
</tbody>
</table>

Baseline | 6 weeks
---|---

0 | 15
20 | 10
25 | 5

Adjunctive Digital Therapy to Enhance Emotions

IMPROVE EMOTION AWARENESS

EMOTION BOOSTING

EMOTION IDENTIFICATION

POSITIVE PSYCHOLOGY

Improve Self-Insight and Action with CBT and DBT

CBT

DBT

Reframe

Thought Tamer

Positivity

Emotion Booster
Biofeedback Technologies

SCL (AROUSAL) BF  HRV BIOFEEDBACK  EEG NF

EEG MEDITATION  EEG STIMULATION

2 hours of training delivers results (10 minutes a day, 3 times a week; 4 weeks)

.....once you have that switch wired in your brain, you can transfer the new habit into your daily life.

Effort to Benefit Outcome

In “30 Day Training Challenge”

2 Hours

2 hours of training delivers results (10 minutes a day, 3 times a week; 4 weeks)

.....once you have that switch wired in your brain, you can transfer the new habit into your daily life.
Impact: 2 Hours of Self-Care Training on Symptoms

Population diagnosed with and treated for addiction with targeted exercises in a “30-day Program”

Level of addiction symptoms, depressed mood and anxiety are lower at discharge for those who train self-regulation, impulsivity and positivity skills.

- **39%** improvement in depressed mood
- **28%** improvement in anxiety

1. Among users who completed 2 or more hours of training, a 39% improvement in depressed mood was found.
2. Among those flagged as at risk for depression or anxiety, a 28% improvement in anxiety levels was found for those who completed 2 or more hours of training.

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Track Evidenced-Based Outcomes

Digital platforms allow tracking of what is working along each phase of the continuum of care.

Platform tools provide a framework for success regardless of the level of care: Residential, Partial Hospitalization or Intensive Outpatient Programs.

Success Criteria
- Standardized Tools
  1. CAGE-AID
  2. PHQ9
  3. GAD7
  4. PTSD
  5. Total Brain Assessment 12 Capacity scores.
  6. Total Brain Mental Health flags.
  7. Clinical Improvement

- Symptom/Capacity Improvement
  - Reduce Use
  - Impulsivity
  - Cravings
  - Stress reduction
  - Positivity
  - Self Regulation and Resilience
  - CBT
  - Extent of alignment per week with Clinic Treatment Plans

Track
- TRACK trending progress on assessments
- TRACK use of tools
- Number of communications read or watched: daily brain tips, videos watched, webinars attended, articles read, group communications about “What Works To Reduce Cravings”.
- TRACK clinical improvement contained in the assessment capacity scores

Track Outcomes

Digital platforms can provide clinicians with invaluable data to enable risk monitoring and drive health outcomes:
- All patients’ info in one place
- Monitor risk and capacity trends for patients over time
- Flag for newly identified risk or sudden changes
- Offer aggregate analytics for administrators to assess overall outcomes and quality of care
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Measure, Rx/Train, Track Outcomes in Addiction

Measure

Rx and Train

Track Outcomes

Medications-MAT
Suboxone
Naltrexone
Buprenorphine

Adjunctive Therapy
Brain Entrainment

Biofeedback
Neurofeedback
Q & A

THANK YOU
References


15. Folkman et al., 1986; McEwen, 2006; American Institute of Stress and Dr Heidi Hanna


21. EFFORT TO BENEFIT RATIO: 20 Training Sessions has a SIGNIFICANT Benefit, Gordon et al., Journal of Technology and Innovation 2015; See Total Brain Science Manual, PART TWO, 2019

22. Among Total Brain users who completed 2 or more hours of training, a 39% improvement in depressed mood was found

23. Among those flagged as at risk for depression or anxiety, a 28% improvement in anxiety levels was found for those who completed 2 or more hours of training

24. General Population TB Data n: 85,908 for 2018-19 period; Also See Total Brain Science Manual, PART TWO, 2019