

**Neuroscience-Based Treatment of
Addiction, Part II: Interventions**

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Goals

- EXPLORE SEVERAL NEUROSCIENCE-INFORMED METAPHORS FOR SUD TREATMENT
- EXPERIENCE THESE ACTIVITIES AND INTERVENTIONS TO INFORM PRACTICE
- DISCUSS THE STRENGTHS AND LIMITATIONS OF A NEUROSCIENCE-INFORMED APPROACH TO SUD TREATMENT

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Goals

WHAT DO YOU WANT FROM TODAY?

TAKE A MOMENT

- ADDICTION-RELATED LOSSES
- PANDEMIC-RELATED STRESS AND LOSS/COSTS

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THREE CHALLENGES

1. WHAT IS ADDICTION?
2. WHERE IS ADDICTION?
3. HOW CAN WE TREAT IT?

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WHAT IS IT?

Addiction is a neurobiologically-based relational disorder that manifests itself in disordered cognitions, behaviors, emotional processing, social functioning and intimacy.

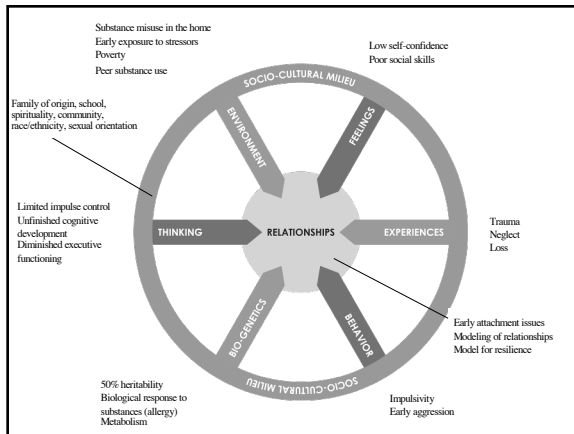
Its origin may be traced to difficulties in receiving nurturance from primary caregivers, resulting in deficits in social and emotional regulation.

These disordered systems lead to compensatory behaviors that limit pain and "outsource" neural regulation to substances, behaviors, or pathological relationships.

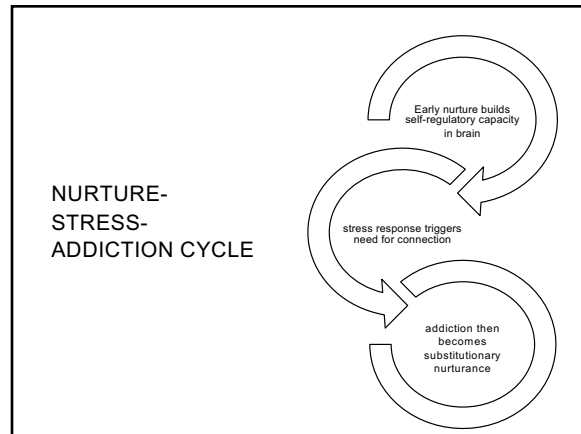
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WHERE IS IT?

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STRESS, ADDICTION, & THE BRAIN

A

Behavior	Striatal Regions Involved	
	Dorsal Striatum	Ventral Striatum
Goal directed learning and memory	DMS	----
Initial rewarding effects/ acquisition of drug taking	DMS	Nac shell
Habitual learning and memory	DLS	----
Drug seeking/ compulsive and habitual drug taking	DLS	Nac core

B

Taylor, S. B., Anglin, J. M., Paode, P. R., Riggert, A. G., Olive, M. F., & Conrad, C. D. (2014). Chronic stress may facilitate the recruitment of habit- and addiction-related neurocircuits through neuronal restructuring of the striatum. *Neuroscience*, 269(1), 231–242. doi.org/10.1016/j.neuroscience.2014.09.029

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STRESS, ADDICTION, & RELATIONSHIPS

~THE MAN TAKES A DRINK (GOAL-DIRECTED BX IN DMS),
 ~THE DRINK TAKES A DRINK (HABITUAL BX IN DLS),
 ~THE DRINK TAKES THE MAN (STRESS-INDUCED DEPENDENCE)

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Chicken or Egg

CRITICS ARGUE THAT THE BDMA HAS NOT CLEARLY ESTABLISHED WHETHER DISORDERED BRAINS LEAD TO ADDICTION OR IF ADDICTION LEADS TO DISORDERED BRAINS.

HOW DOES THE "ANSWER" TO THIS DILEMMA AFFECT THE WAY TREATMENT IS IMPLEMENTED?

Hall W, Carter A, Forlini C. The brain disease model of addiction: is it supported by the evidence and has it delivered on its promises? *Lancet Psychiatry*. 2015 Jan;2(1):105-10. doi: 10.1016/S2215-0366(14)00126-6. Epub 2015 Jan 8. PMID: 26359616.

Heilig M, Augier E, Pfarr S, et al. Developing neuroscience-based treatments for alcohol addiction: A matter of choice?. *Transl Psychiatry* 9, 255 (2019). https://doi.org/10.1038/s41398-019-0591-6

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HOW DO WE TREAT IT?

PEOPLE FALL PREY TO ADDICTION WHEN THEY ARE OVERWHELMED BY HOW IMPERFECT, FRUSTRATING, BORING, EMPTY, AND LONELY LIFE AND HUMAN RELATIONSHIPS CAN APPEAR.

TREATMENT CAN BE A BASE WHERE THE INDIVIDUAL WITH AN ADDICTION CAN RELEARN STRESS TOLERANCE AND EMOTIONAL REGULATION, AND WHERE THEY CAN BOTH CONSCIOUSLY AND UNCONSCIOUSLY EXPERIENCE HOW RELATIONSHIPS CAN PROVIDE REWARDS FOR THEM.

IT CAN ALSO PROVIDE GLIMMERS OF REWARD THAT MAY HELP ADDICTED INDIVIDUALS TO TOLERATE THESE NEGATIVE ASPECTS, SO THAT THEY ARE ABLE TO EXPERIENCE OTHER, EQUALLY AUTHENTIC AND REAL ASPECTS OF HUMAN LIFE AND HUMAN EXPERIENCES— LAUGHTER, UNDERSTANDING, COMPASSION, AND CONNECTION.

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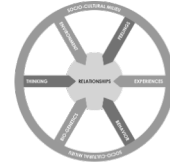
How is it treated? Metaphoric* Model

METAPHOR: UNDERSTANDING ONE LESSER-KNOWN IDEA IN TERMS OF A BETTER KNOWN ONE.

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Challenge #3: How is it Treated?

EMPATHY
ENGAGEMENT
EXPECTATIONS
EDUCATION
EXPERIMENTATION



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HEBB'S RULE - EMPATHY

HEBB'S RULE - TWO DIMENSIONS

- FIRE AND WIRE (GOOD AND BAD)
- MORALITY OF ADDICTION

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Astigmatism - Empathy

THE LENS IS SHAPED MORE LIKE A FOOTBALL THAN A BASKETBALL AND DISTORTS ALL INCOMING SIGNALS

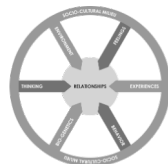
MORALITY OF ADDITION VERSUS THE MORALITY OF THE INDIVIDUAL

Moves from blame to responsibility for next behavior

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Engagement

NBT ASKS,
"WHAT IF YOUR ADDICTION IS NOT YOUR FAULT, BUT IT IS NOW YOUR RESPONSIBILITY?"



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Engagement - Amblyopia

- [HTTPS://YOUTU.BE/GGAU1Z0URPA](https://youtu.be/gGAU1Z0URPA)
- USE IT OR LOSE IT (GOOD AND BAD)
- FOCUS ON CORTEX OVER CHARACTER

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Engagement

REASON TO HOPE:
DELAY DISCOUNTING REFERS TO THE DECREASE IN VALUE OF A REWARD AS A FUNCTION OF THE DELAY TO ITS RECEIPT.

AN INDIVIDUAL'S RATE OF DISCOUNTING CAN BE MEASURED BY ASSESSING PREFERENCES BETWEEN A SOONER, SMALLER REWARD OR A LATER, LARGER ONE.

MEMORY TRAINING HELPS

Bickel and colleagues, 2001; 2011; 2016

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EXPECTATIONS

ICE CREAM IS GOOD

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EXPECTATION

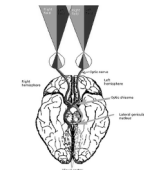
TLIDEAT

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Perception - Education

Optic Chiasm - flips image and projects is upside down in occipital lobe - we see with our brain, not our eyes

Optic pathways in human brain, ventral aspect



640px-Optic processing human brain.jpg

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Myopia - Education

SEEING THE FOREST AND THE TREES:

LEFT HEMISPHERE IS LIKE A MICROSCOPE
RIGHT HEMISPHERE IS LIKE A WIDE-ANGLE LENS

BOTH ARE VITAL - IT'S A VERY DIFFERENT THING TO RUN INTO A FOREST THAN TO RUN INTO A TREE!

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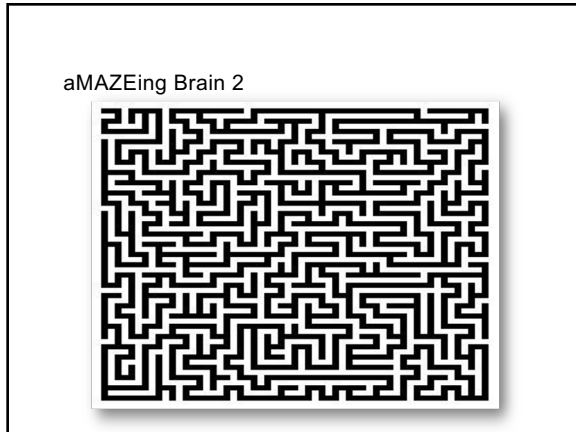
aMAZEing Brain 1 - Experimentation

Enter

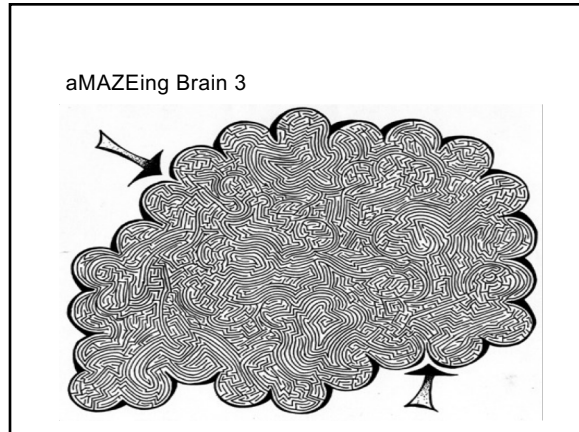


Exit

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Resolution - Experimentation

720p or 8k (harm reduction)
 Taking away or adding in?

- Insight Timer
- Pulse Oximeter
- Wearables

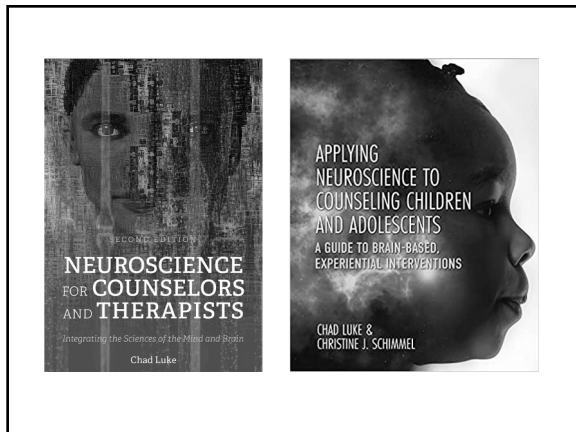
(caveat: <https://www.sciencedirect.com/science/article/pii/S0896627319302892>)

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CULTURAL CONSIDERATIONS

- WHAT MAY MEET THE CRITERIA FOR ALCOHOL USE DISORDER MAY NOT BE SEEN AS A PROBLEM BY MEMBERS OF A PARTICULAR CULTURE
- MAY OCCUR AS THE RESULT OF INTERPERSONAL VIOLENCE AND SYSTEMIC OPPRESSION
- GENETIC DIFFERENCES ACROSS RACIAL/ETHNIC GROUPS IN THE ABILITY TO METABOLIZE ALCOHOL ENZYMES

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