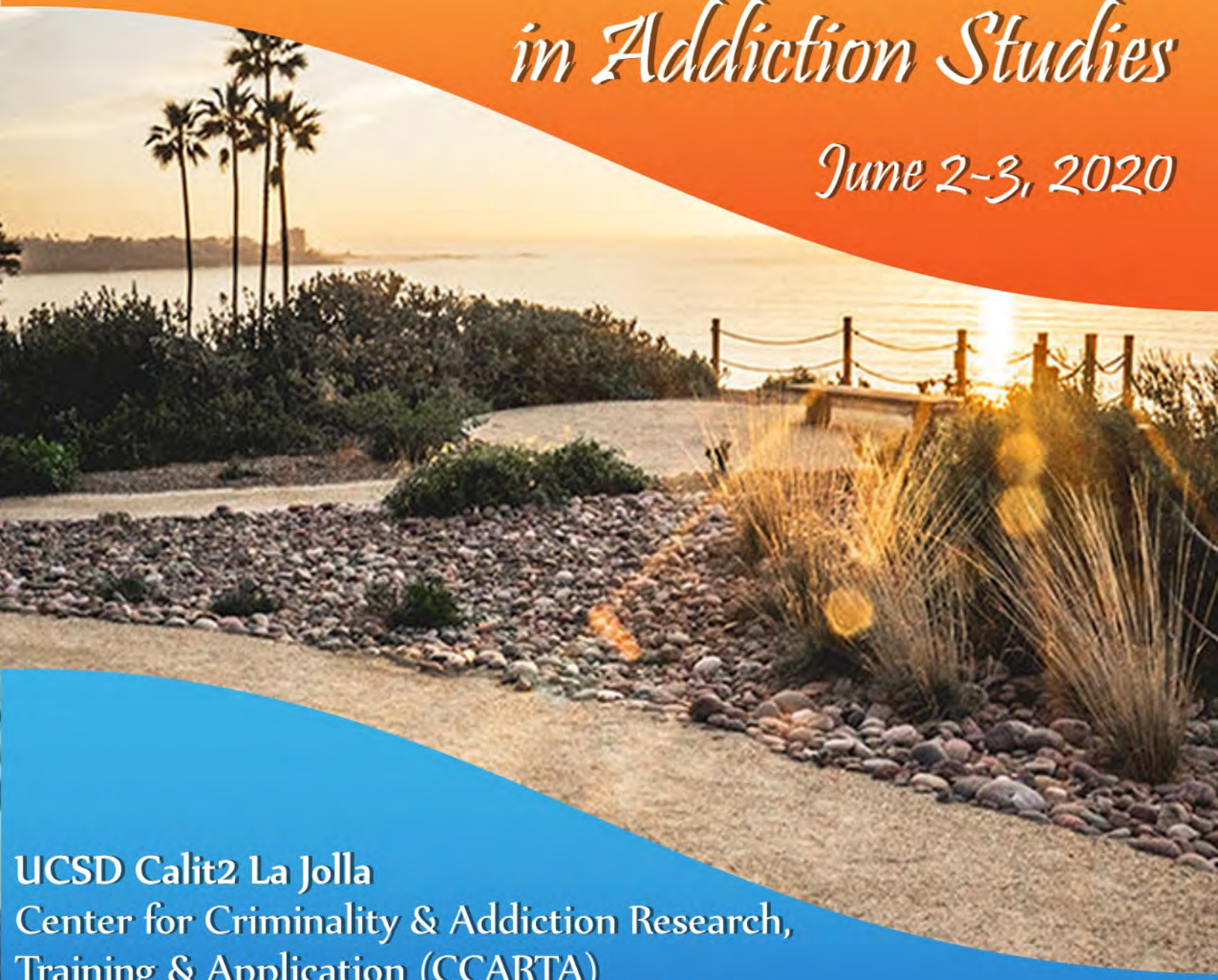
49th Summer Clinical Institute in Addiction Studies

June 2-3, 2020



UCSD Calit2 La Jolla
Center for Criminality & Addiction Research, Training & Application (CCARTA)
Department of Psychiatry | School of Medicine
University of California, San Diego

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SCHOOL OF MEDICINE
DEPARTMENT OF PSYCHIATRY
CENTER FOR CRIMINALITY & ADDICTION RESEARCH, TRAINING & APPLICATION

SANTA BARBARA • SANTA CRUZ

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June 2, 2020

Dear Colleagues and Friends:

I want to welcome you to the 49th UCSD Summer Clinical Institute in Addiction Studies. We all know the challenges and sometimes tragedies caused by the CVID-19 pandemic. Yet, we decided to move on and conduct our Institute, although not exactly the way we would like. So, let me welcome you to our first-ever virtual Summer Clinical Institute in Addiction Studies! We honored that you decided to join us.

Our goal is to keep you informed and equip you with advanced knowledge and skills, and this year's enrollment proves to us, despite the many obstacles we face, that we are meeting your needs at a level that keeps you coming back! Please help us by sharing your ideas with our staff, or in the comments section of the daily evaluations.

Once again, thank you for attending the Institute. We hope that you will be able to implement the knowledge and skills that you will have gained. However, most importantly, thank you for striving to learn and apply the most current science for our patients. I want to thank my UCSD staff, the Qualcomm Institute - Calit2 UCSD Division team, and the Scaife Family Foundation for supporting us.

Good luck, take good care of yourself and each other.

Igor Koutsenok, MD, MS
Professor of Psychiatry
Director, Center for Criminality & Addiction Research, Training & Application
Director, International Addiction Technology Transfer Center - Ukraine
Co-Director, International Addiction Technology Transfer Center - South East Asia
Vice President, International Consortium of Universities for Drug Demand Reduction

Acknowledgments

We would like to thank the following people who helped make our 49th Annual Summer Clinical Institute in Addiction Studies a success:

California Institute for Telecommunications and Information Technology
The Scaife Family Foundation

The SCI 2020 Faculty

Robert M. Anthenelli, MD, UCSD
Christopher KM Blazes, MD, Vista Toas Renewal
Center Annick Borquez, Ph.D., UCSD
Thom Browne, Jr., MA, Colombo Plan
David A. Deitch, Ph.D., UCSD
Ralph Diaz, Secretary, CDCR
Igor Koutsenok, MD, MS, UCSD
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UCSD CCARTA Staff

David A. Deitch, PhD, Emeritus Professor of Clinical Psychiatry, CCARTA Founder
Igor Koutsenok, MD, MS, CCARTA Director
Norman Jackson, MS, Project Coordinator
Tracy Wilson, Fiscal Manager

Agenda at-a-Glance

	TUESDAY, JUNE 2, 2020	WEDNESDAY, JUNE 3, 2020
8:00	**Welcome and Overview** —David Deitch, PhD/ Igor Koutsenok, MD, MS	**Welcome and Review of Day One** —Igor Koutsenok, MD, MS
8:30	**What Works and What Doesn't in Reducing Recidivism: Understanding Risk and Needs** – Edward J. Latessa, Ph.D.	**What Works and What Doesn't in Reducing Recidivism: Understanding How to Change Behavior** – Edward J. Latessa, Ph.D.
9:15	**Neurobiology of Addiction & Recovery** – Christopher KM Blazes, MD	**How Genes Influence Alcoholism (and why we should care)** – Marc Schuckit, MD, UCSD
10:00	**High Susceptibility to COVID-19 Among People with Substance Use Disorders (SUDs)** – Thom Browne, Jr., MA, Colombo Plan	**The Top 10 Clinical Implications from the EAGLES and CATS Trials** – Robert M. Anthenelli, MD, UCSD
10:45	**Mindfulness and Substance Use Disorders** – Douglas Ziedonis, MD, MPH, UCSD	**Predicting Emerging Drug Use Epidemics and Associated Health Harms in the United States** – Annick Borquez, Ph.D., UCSD
11:30	**Whole-Person Care in California Prisons** – Ralph Diaz, Secretary, California Department of Corrections and Rehabilitation	**Evaluations**
	Faculty biosketches can be found at	www.ucsdsci.edu

What Works and What Doesn't in Reducing Recidivism: Understanding Risk and Needs

—— Edward J. Latessa, Ph.D., University of Cincinnati

What Works and What Doesn't in Reducing Recidivism: Understanding Risk and Needs

Presented by:
Edward J. Latessa, Ph.D.
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1

Evidence Based – What does it mean?

There are different forms of evidence:

- The lowest form is anecdotal evidence; stories, opinions, testimonials, case studies, etc - but it often makes us feel good
- The highest form is empirical evidence – research, data, results from controlled studies, etc. - but sometimes it doesn't make us feel good

2

Evidence Based Practice is:

1. Easier to think of as Evidence Based Decision Making
2. Involves several steps and encourages the use of validated tools and treatments.
3. Not just about the tools you have but also *how* you use them

3

Evidence Based Decision Making Requires

1. Assessment information
2. Relevant research
3. Available programming
4. Evaluation
5. Professionalism and knowledge from staff

4

What does the Research tell us?

***There is often a* Misapplication of Research: "XXX Study Says"**

- the problem is if you believe every study we wouldn't eat anything (but we would drink a lot of red wine!)

- **Looking at one study can be a mistake**
- **Need to examine a body of research**
- **So, what does the body of knowledge about correctional interventions tell us?**

5

A Large Body of Research Has Indicated….

….that correctional services and interventions can be effective in reducing recidivism, however, not all programs are equally effective

- The most effective programs are based on some principles of effective interventions. Two of those principles include:
  - Risk (Who)
  - Need (What)

6

Let's Start with the Risk Principle

Risk refers to risk of reoffending and not the seriousness of the offense.

Seriousness usually trumps risk.

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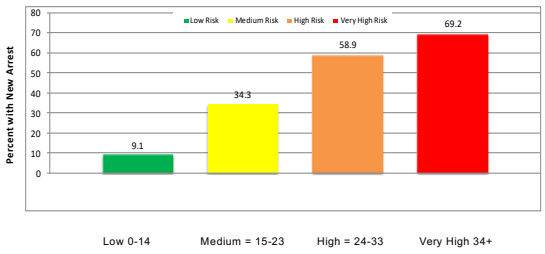
Risk Principle

As a general rule treatment effects are stronger if we target higher risk individuals, and harm can be done to low risk

8

Risk Level by Recidivism for the Community Supervision Sample



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There are Three Elements to the Risk Principle

1. Target those individuals with higher probability of recidivism
2. Provide most intensive treatment to higher risk
3. Intensive treatment for lower risk individuals can increase recidivism

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#1: Targeting Higher Risk

- It is important to understand that even with EBP there will be failures.
- Even if you reduce recidivism rates you will still have high percentage of failures

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Example of Targeting Higher Risk

- If you have 100 High risk individuals about 60% will fail
- If you put them in well designed EBP for sufficient duration you may reduce failure rate to 40%
- If you have 100 low risk individuals about 10% will fail
- If you put them in same program failure rate will be 20%

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Targeting Higher Risk continued:

- In the end, who had the lower recidivism rate?
- Mistake we make is comparing high risk to low risk rather than look for treatment effects

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#2: Provide Most Intensive Interventions to Higher Risk Individuals

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The question is: What does more "intensive" treatment mean in practice?

- Most studies show that the longer someone is in treatment the great the effects, however:
- Effects tend to diminish if treatment goes too long

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Results from a 2010 Study (Sperber, Latessa, and Makarios) of 689 felons

- 100-bed secure residential facility for adult males
- Cognitive-behavioral treatment modality
- Average age 33
- 60% single, never married
- 43% less than high school education
- 80% moderate risk or higher
- 88% have probability of substance abuse per SASSI

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2010 Dosage Study of 689 Offenders

	Moderate	High
0-99	52	0
100-199	45	81
200+	42	57

Sperber,, Latessa & Makarios (2013). Examining the Interaction between Level of Risk and Dosage of Treatment. *Criminal Justice and Behavior, 40(3).*

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Results from 2014 Study

- We expanded sample
- Hours examined by increments of 50
- Looked at low/moderate, moderate, and high

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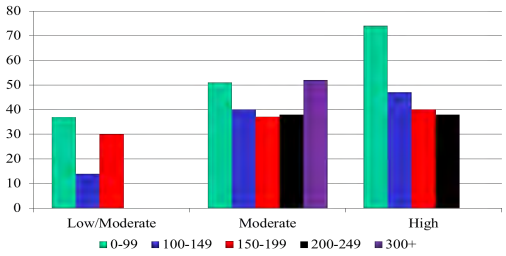
2014 Dosage Study involving 903 offenders



Makarios, Sperber, & Latessa (2014). Treatment Dosage and the Risk Principle: A Refinement and Extension. *Journal of Offender Rehabilitation. 53:334-350.*

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Provide Most Intensive Interventions to Higher Risk Individuals

- Higher risk will require much higher dosage of treatment
  - Rule of thumb: 100-150 hours for moderate risk
  - 200+ hours for high risk
  - 100 hours for high risk will have little effect
  - Does not include work/school and other activities that are not directly addressing criminogenic risk factors

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#3: Intensive Treatment for Low Risk Individuals will Often Increase Failure Rates

- Low risk will learn anti social behavior from higher risk
- Disrupts pro-social networks
- Increased reporting/surveillance leads to more violations/revocations

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STUDY OF COMMUNITY CORRECTIONAL PROGRAMS IN OHIO

- Largest study of community based correctional treatment facilities ever done up to that time.
- Total of 13,221 offenders – 37 Halfway Houses and 15 Community Based Correctional Facilities were included in the study.
- Two-year follow-up conducted on all offenders
- Recidivism measures included new arrests & incarceration in a state penal institution

Lowenkamp, C. T. & Latessa, E. J. (2002). Evaluation of Ohio's Community Based Correctional Facilities and Halfway House Programs. Cincinnati, Ohio: Division of Criminal Justice, University of Cincinnati.

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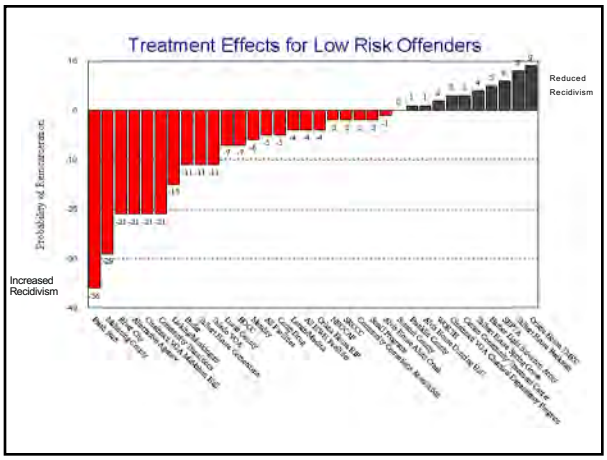

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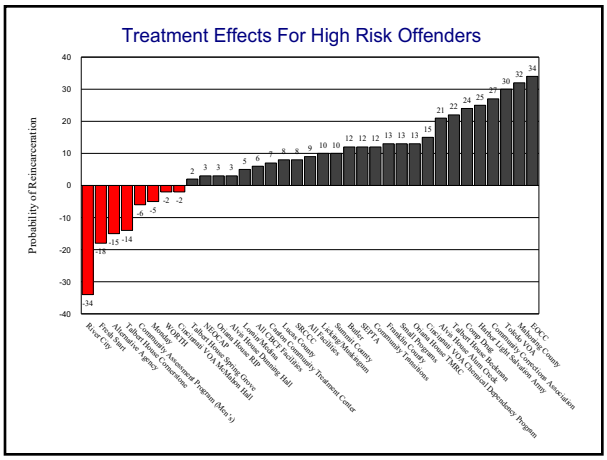

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To understand the Need Principle we need to review the body of knowledge related to risk factors

What are the risk factors correlated with criminal conduct?

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Andrews and Bonta's Major Set of Risk/Need Factors

1. Antisocial/procriminal attitudes, values, beliefs & cognitive emotional states
2. Procriminal associates & isolation from anticriminal others
3. Temperamental and anti social personality patterns conducive to criminal activity including:
   - Weak socialization
   - Impulsivity
   - Adventurous
   - Restless/aggressive
   - Egocentrism
   - A taste for risk
   - Weak problem-solving/self-regulation & coping skills
4. A history of antisocial behavior

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Major Set of Risk/Need Factors

5. Familial factors that include criminality and a variety of psychological problems in the family of origin including Low levels of affection, caring, and cohesiveness
6. Low levels of personal, educational, vocational, or financial achievement
7. Low levels of involvement in prosocial leisure activities
8. Substance Abuse

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Need Principle

By assessing and targeting criminogenic needs for change, agencies can reduce the probability of recidivism

Criminogenic	Non-Criminogenic
• Anti social attitudes	• Anxiety
• Anti social friends	• Low self esteem
• Substance abuse	• Creative abilities
• Lack of empathy	• Medical needs
• Impulsive behavior	• Physical conditioning

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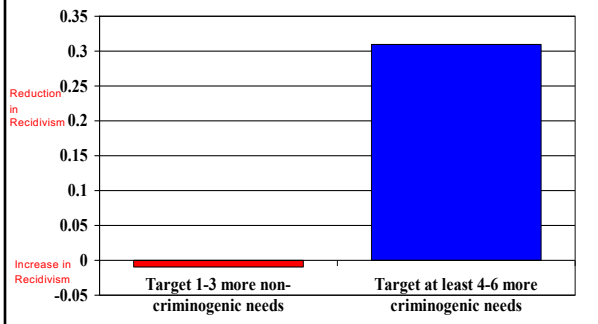
Targeting Criminogenic Need: Results from Meta-Analyses



Source: Gendreau, P., French, S.A., and A.Taylor (2002). What Works (What Doesn't Work) Revised 2002. Invited Submission to the International Community Corrections Association Monograph Series Project.

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Criminal Thinking and Mental Illness*

Morgan, Fisher, Duan, Mandracchia, and Murray (2010) studied 414 adult offenders with mental illness (265 males, 149 females) and found:

- 66% had belief systems supportive of criminal life style (based on Psychological Inventory of Criminal Thinking Scale (PICTS)
- When compare to other offender samples, male offenders with MI scored similar or higher than non-mentally disordered offenders.
- On Criminal Sentiments Scale-Revised, 85% of men and 72% of women with MI had antisocial attitudes, values and beliefs – which was higher than incarcerated sample without MI.

See: Prevalence of Criminal Thinking among State Prison Inmates with Serious Mental Illness. *Law and Human Behavior* 34:324-336, and Center for Behavioral Health Services Criminal Justice Research Policy Brief, April 2010. Rutgers University.

30

Conclusion

- Criminal Thinking styles differentiate people who commit crimes from those who do not independent of mental illness
- Incarcerated persons with mental illness are often mentally ill *and* criminal
- Needs to be treated as co-occurring problems

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Assessment is the engine that drives effective correctional programs

- Need to meet the risk and need principle
- Reduces bias
- Aids decision making
- Allows you to target dynamic risk factors and measure change
- Best risk assessment method is the actuarial (statistical) approach

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To Understand Assessment it is Important to Understand Types of Risk Factors

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Dynamic and Static Factors

- Static Factors are those factors that are related to risk and do not change. Some examples might be number of prior offenses, whether an offender has ever had a drug/alcohol problem.
- Dynamic factors relate to risk and *can change*. Some examples are whether an offender is currently unemployed or currently has a drug/alcohol problem.

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There are two types of dynamic risk factors

- Acute – Can change quickly
- Stable – Take longer to change

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According to the American Heart Association, there are a number of risk factors that increase your chances of a first heart attack

- ✓ Family history of heart attacks
- ✓ Gender (males)
- ✓ Age (over 50)
- ✓ Inactive lifestyle
- ✓ Over weight
- ✓ High blood pressure
- ✓ Smoking
- ✓ High Cholesterol level

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Best Assessments include both Static and Dynamic Factors

- Just because we can't change static factors doesn't mean they are not important
- Dynamic factors are often more difficult to measure, but they are critical to developing case plans, prioritizing targets for change and gauging progress

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Some Examples of Offender Risk Assessment Tools

- Level of Service Inventory (LSI)
- COMPAS
- Ohio Risk Assessment System

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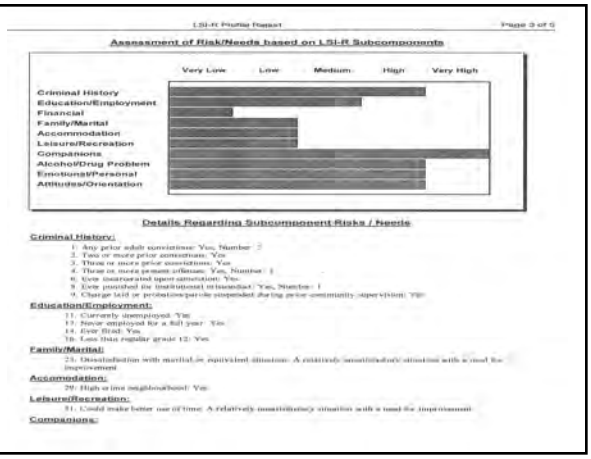

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One Non-Proprietary System is the ORAS

The Ohio Risk Assessment System (ORAS) consists of 6 basic tools:

1. Pre-Trial Tool (ORAS-PAT)
2. Misdemeanor Assessment Tool (ORAS-MAT)
3. Community Supervision Assessment Tool (ORAS-CST)
4. Prison Intake Screening Tool (ORAS-PST)
5. Prison Intake Tool (ORAS-PIT)
6. Reentry Tool (ORAS-RT)

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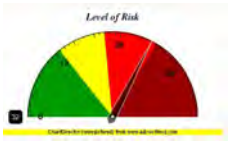
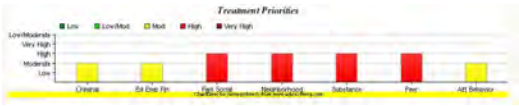
ORAS-CST Intake Assessment





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Some Lessons Learned from the Research

- Who you put in a program is important – pay attention to risk
- What you target is important – pay attention to criminogenic needs

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Neurobiology of Addiction & Recovery

—Christopher KM Blazes, MD, Vista Toas Renewal Center

The Neurobiology of **Addiction & Recovery**

Christopher Blazes, M.D.
ABEM, ABPN, Addiction Psychiatry

1

Disclosures

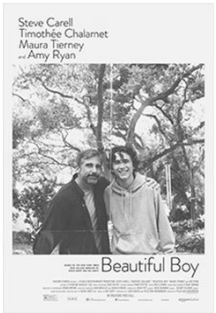
- Consultant for Avisa Group
- Archetype Scientific Consulting
- Medical director Vista Taos Renewal Center

Vista Taos
renewal center

2

Beautiful Boy

- My two big questions are:
  - What is it doing to him?
  - What can I do to help him?

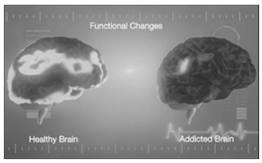


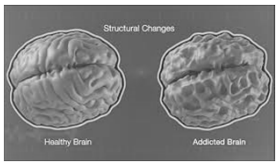
Personality Change
"This is not us. This is not who we Are"

3

Summary of Theory

- **Neuroplasticity** (the brain's capacity to change)
  - **Leads to creation of dysfunctional Reward Circuits in Addiction**
- **Neuroplasticity**
  - We can take advantage of the Brain's capacity to build these neural networks in the path to recovery





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Theories Attempting to Explain Addiction

- Cognitive-Behavioral
  - Operant conditioning – cue-induced
- Psychoanalytic
  - Oral Phase arrest
- Object Relations
  - ETOH/Drugs as a soothing and stable object
- Legal/Criminal
  - 'Bad People and/or Bad Choices'
- Personality d/o
  - 'Can't control their impulses or Antisocial'
- Self Medication Model

All are partially Right---none complete

5

Summary Version # 2

Eric Nestler

Mount Sinai

Terry Robinson, Kent Berridge

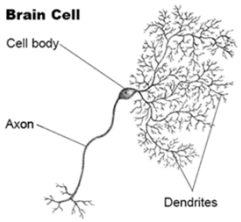
MICHIGAN

初心

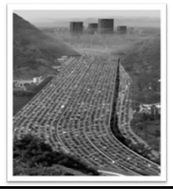
Beginners Mind

6

Summary Version #3



- Excessive Dopamine in the reward circuit leads to neural superhighways that bypass the frontal cortex



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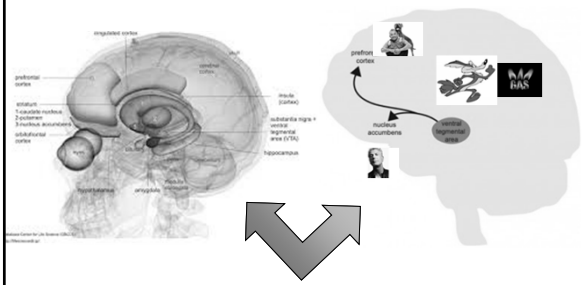
Readiness to Reconsider

- Remember!
- These are all Theories only!

8

Brain Reward Circuits



Which Lecture Do You Want today?

9

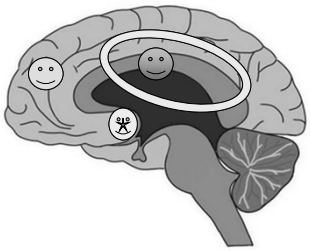
Let's Review Vocabulary

- But the Terminology confused Me for the longest time

You will do this and you will like it

10

Some Important Structures in The Reward Pathway



Limbic System

Nucleus Accumbans

Striatum, Basal Ganglia

Prefrontal Cortex

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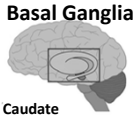
Basal Ganglia

Striatum

Nucleus Accumbans



Caudate
Putamen
Substantia Nigra
Nucleus Accumbens
Subthalamic Nucleus

Caudate
Putamen
Nucleus Accumbans

Dorsal Striatum

Ventral Striatum

Nucleus Accumbans

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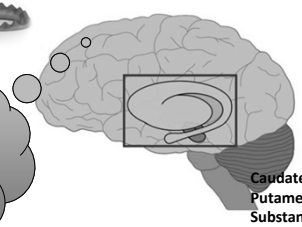
Basal Ganglia



Primitive part of brain primarily tasked with **voluntary movement and motivation**

Billions of Years old

Caudate
Putamen
Substantia Nigra
Nucleus Accumbens
Subthalamic Nucleus

13

Action - Voluntary Movement - Will

Striatum - Basal Ganglia

"Area by which motivation gets translated into action"
(**Mogenson**, 1980).

Addiction has DysFx in this Reptilian part of the Brain (BG, Striatum)

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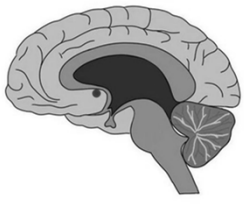
Nucleus Accumbens

- Where **Dopamine** is released in the Reward pathway
  - **All Drugs of abuse cause dopamine release in the Nucleus Acc.**



What Defines a drug of abuse

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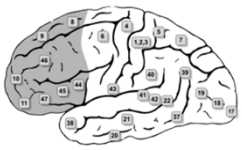
The Prefrontal Cortex

Many Functions including--**Impulse Control**



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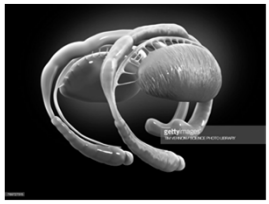
Limbic System



Functional System of Multiple Structures Mixed in throughout the Brain with a Unified Function

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Limbic Functions

Oversimplified
Five "F's"
- Feeding
- Fighting
- Fleeing
- Feeling
- "sex"-

18

Limbic Grizzly is Formidable and Dysfunctional in Addiction

Five "F's"
-Feeding
-Fighting
-Fleeing
-Feeling
-"Sex"

Fernando Rodríguez de Fonseca & Miguel Navarro (1998) Role of the limbic system in dependence on drugs, Annals of Medicine, 30:4, 397-405

Simona Gardini, AnnalenaVenneri, Reduced grey matter in the posterior insula as a structural vulnerability or diathesis to addiction. Brain Research Bulletin Volume 87, Issues 2–3, 10 February 2012, Pages 205-211

Rodríguez de Fonseca F[1], Navarro M, **Role of the limbic system in dependence on drugs,** Ann Med. 1998 Aug;30(4):397-405.

Many of our interventions are cognitive, this big Grizzly is hard to tame with just cognition

19

Introducing!

I Will Make multiple Appearances throughout this lecture

The Ego

The Conductors (The Unconscious Governor of our Physiology & Psychology)
Our own personal Darwin, constantly endeavoring to best utilize our mental and physical processes to create a competitive advantage.

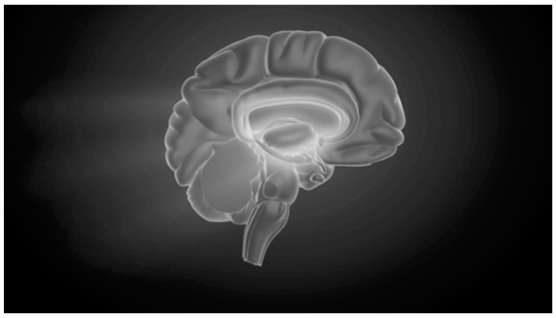
20

These All Add Up To?

21

Reward Circuit

"Seek Pleasure and Avoid Pain"

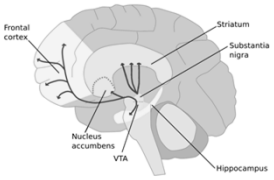


22

Reward Circuit

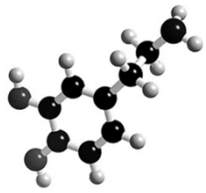
"Seek Pleasure and Avoid Pain"

- Reward Circuit is **necessary and Normal**
  - We are Hard Wired to seek pleasure and avoid pain
    - Because in most circumstances it gives us a competitive advantage for survival
- **Many Psychiatric Disorders can be seen as exaggerated examples of normal functions**



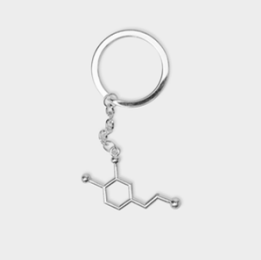
23

What's The Main Neurotransmitter in the Reward Circuit?



24

What Happens When Dopamine Is released in the reward Circuit?



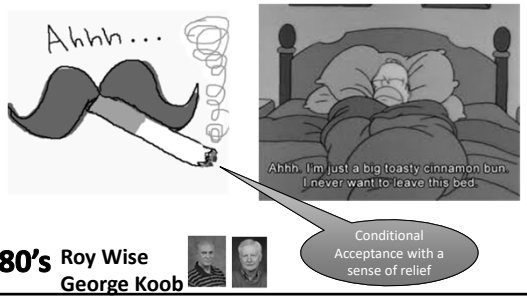
25

It's Actually Still Controversial

26

Dopamine "The Pleasure Molecule"

Ahhhhhhhhhhhh.....



1980's **Roy Wise**
George Koob

27

But this may not be True?

- Something else is happening.

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Dopamine Also Has -- **Incentive Salience**

29

Dopamine Also Has -- **Incentive Salience**

MECHANISMS OF ACTION OF ADDICTIVE STIMULI

Incentive-sensitization and addiction

TERRY E. ROBINSON & KENT C. BERRIDGE

Department of Psychology (Biopsychology Program), The University of Michigan, Ann Arbor, MI, USA

MICHIGAN **1993**

- **Incentive salience** is a cognitive process that confers a "desire" or "want" attribute, which includes a motivational component, to a rewarding stimulus.

This Definition was confusing to me

30

I Reverse the Words to Better Understand

- Salience
  - the quality of being particularly noticeable or important; prominence
- Incentive
  - a thing that motivates or encourages one to do something.

Something Stands Out

And

It Motivates Me to Act

31

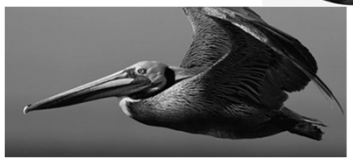
Archetypes for Incentive Salience

That Acorn really **stands out** &
It really **motivates the squirrel to act**

Exotic Foods

32

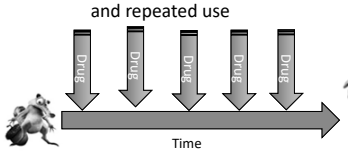
We all Have Our own Sirens
Incentive salience is normal



33

Weird Fact # 1

- **Incentive Salience**
  - Unlike the tolerance that happens to Drug "Liking", This Compulsion towards a behavior (Incentive Salience) **Grows** after time and repeated use



34

As We All Know…

- Too Much of a good thing can lead to problems….
  - **Including Incentive salience**

35

Sensitization & Tolerance

36

- **Tolerance**
  - Repeated drug administration results in diminished activity or effect
- **Sensitization**
  - Repeated Drug Administration Results in increased activity or effect

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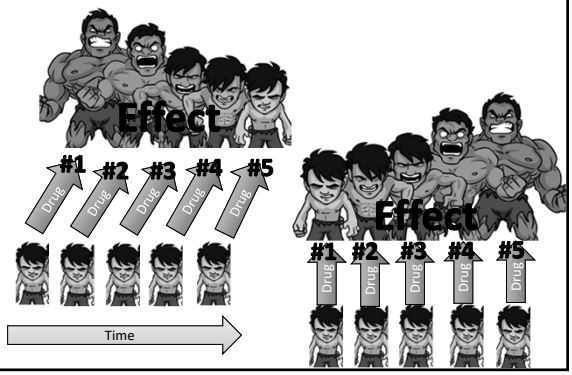
Tolerance & Sensitization



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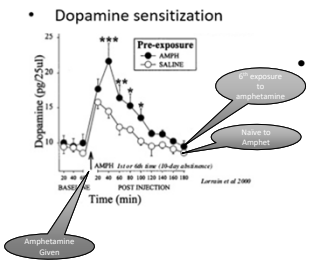
The More times you Take Amphetamine, the more dopamine is released

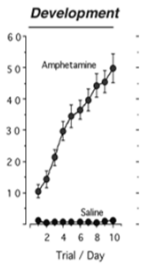
- Dopamine sensitization



- **X axis** –time in minutes of a single exposure to amphetamine
- **Y axis**--measuring release of DA in the NA of a Rat

39

Behavioral Response to Repeated Doses of Amphetamine in Rats



- Locomotor activity in response to amphetamine
  - With the same dose of amphetamine repeatedly—the locomotor activity increases after repeated doses
  - In other words the capacity of dopamine to cause a behavioral response increases with repeated doses

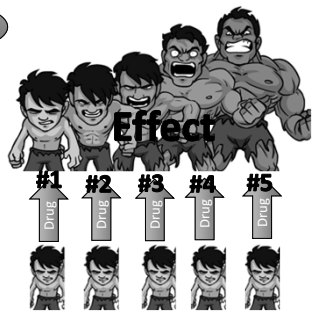
This sounds like Addiction

Anagnostares and Robinson 1996

40

Dopamine Activity Gets **Sensitized** with Drugs of Abuse

Incentive Salience



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Here's the Big Paradox

MECHANISMS OF ACTION OF ADDICTIVE STIMULI

Incentive-sensitization and addiction

TERRY E. ROBINSON & KENT C. BERRIDGE

Department of Psychology (Biopsychology Program), The University of Michigan, Ann Arbor, MI, USA

- Drug **"Liking"** diminishes
  - Most Addicted people know that the amount that they "Like" the drug wanes after repeated use
- Drug **"Wanting"** increases
  - with repeated use

Initially Published 1993

-Gaining acceptance over time

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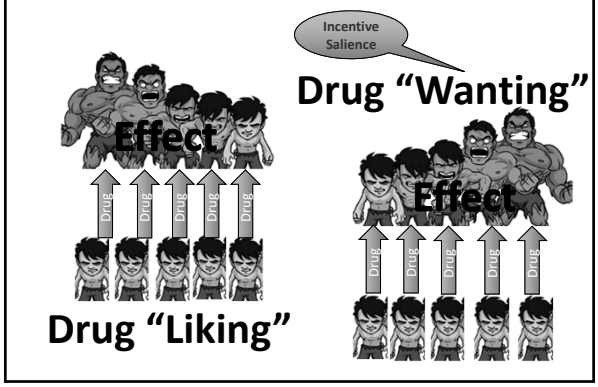
Here's The "Trap" In Addiction



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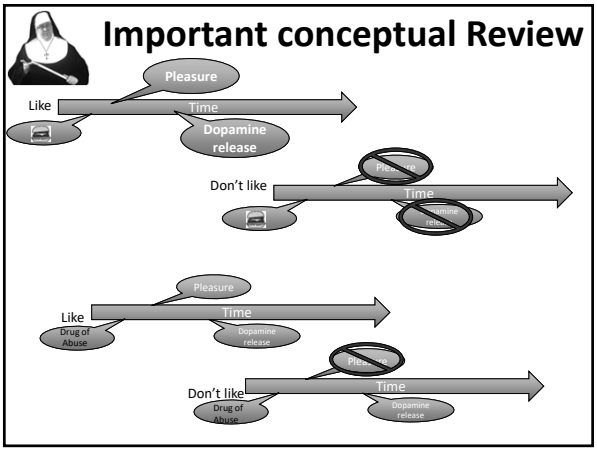
Important conceptual Review



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So How Did We End Up In this Pickle?

- **Its ΔFosB's Fault**

This may see, like esoteric knowledge….bear with me

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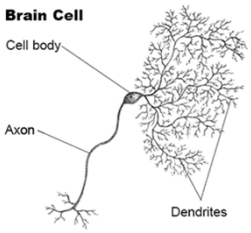
Review

- Dopamine release in NA causes <u>ΔFosB</u> to be formed
-
- <u>ΔFosB</u>
  - **Transcription factor that strengthens dendritic connections** & builds the "Wanting" neural superhighways



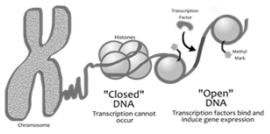
Robison AJ, Nestler EJ. Transcriptional and Epigenetic Mechanisms of Addiction. Nature Reviews Neuroscience. 2011;12(11):623-637.

46

Epigenetics

Potential Mechanism for Cause of addiction

- Much of our genes can't be expressed—too tightly packed—"Closed DNA"
- Environmental cues—(like drugs) can unravel these latent genes
  - "Open DNA"—can be expressed
- Repetitive Drug use
  - Causes expression of latent genes in a vulnerable population
  - **Once unraveled, always unraveled**



Cannabis psychosis

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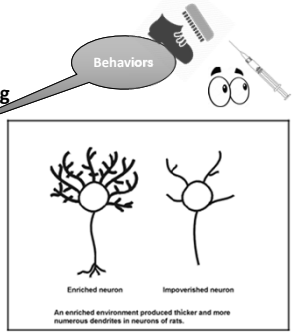
Dopamine & <u>ΔFosB</u>

Paves the superhighways by strengthening synaptic connections

- **Creates a type of unconscious memory**
- **Neurologically Associating the stimulus to the circumstances** that happened **at the time surrounding the surge.**

#1 Slide

- **Weakens** synapses not utilized at time of **surge**



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Addictive Behaviors?

- So does all this esoteric Knowledge lead to any practical understanding of people with Addictions?

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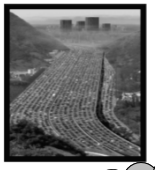
Dopamine

Paves the superhighways by strengthening synaptic connections

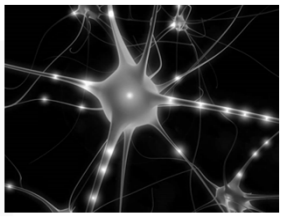
- Some of these Dopamine induced Superhighways, Grow so much,



- **And** the highways going through the prefrontal cortex shrink so much….
  - **Go straight from stimulus to action**

50

From a NeuroAnatomy Lens



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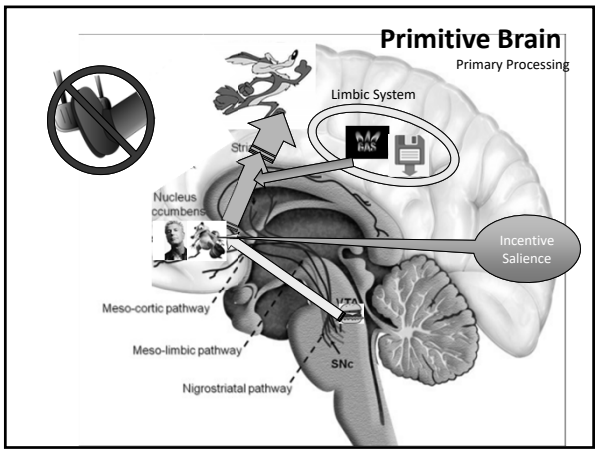
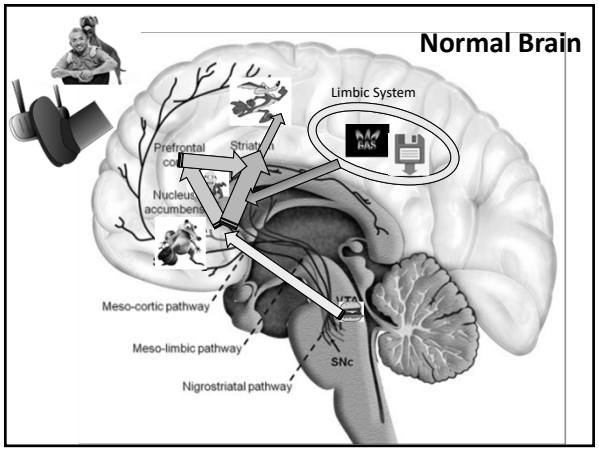
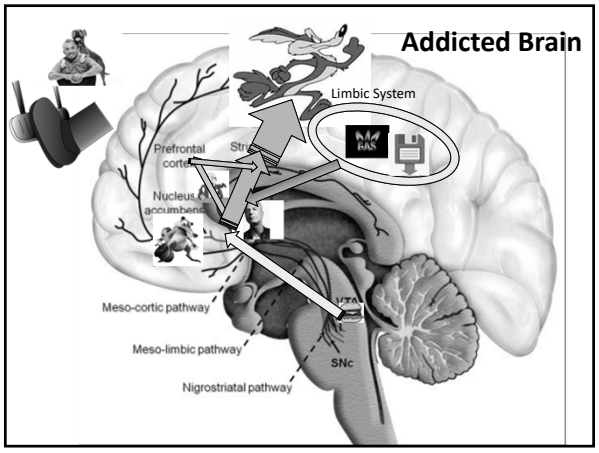

Primitive Brain
Primary Processing
Limbic System
Incentive Salience
Meso-cortic pathway
Meso-limbic pathway
Nigrostriatal pathway
SNc

52


Normal Brain
Limbic System
Meso-cortic pathway
Meso-limbic pathway
Nigrostriatal pathway
SNc

53


Addicted Brain
Limbic System
Meso-cortic pathway
Meso-limbic pathway
Nigrostriatal pathway
SNc

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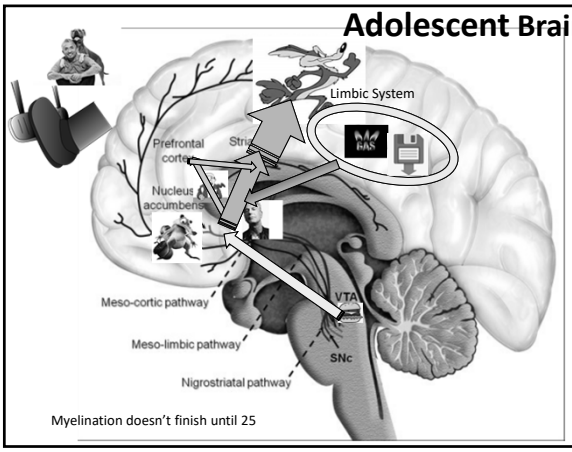
Adolescent Brain

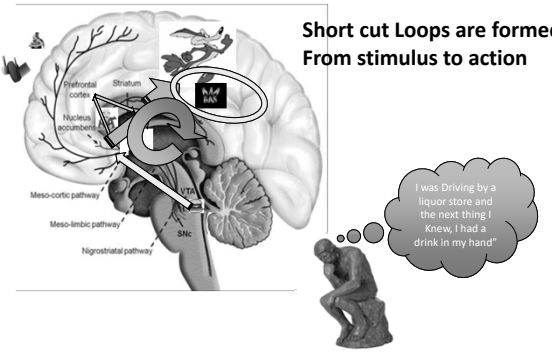


Myelination doesn't finish until 25

55

Addicted Brain

Short cut Loops are formed From stimulus to action



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Need to Review some More Basics

- How Does The Conductor Communicate?

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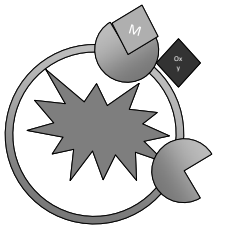
Neurophysiology

How do Neurons Communicate

- Each neuron has a ***Pulse*** or ***tempo*** at rest
  - 8-30 firings/second
- Its "Baton" –Messenger
  - **Neurotransmitters**
  - They can Change the firing rate
- **Drugs of Abuse cause changes in neurotransmitters**
  - **Dopamine +**



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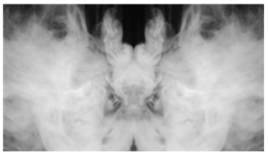
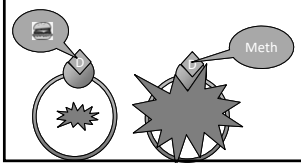
Dopamine Release

- Cheeseburger – 150% baseline firing
- Nicotine----------200%
- Cocaine----------300%
- Methamphetamine-?



Demons in Meth Smoke Youtube



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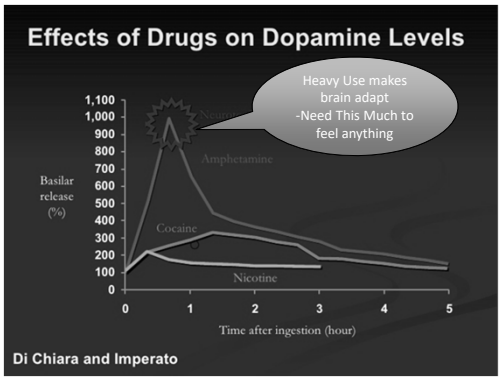


60

Some Drugs of Abuse Are So Powerful

- May No Longer be able to appreciate subtlety
  - In the extremes, an addict doesn't feel the normal reward signals of natural rewards—food, sex, social interaction
- Trap of needing such intensity to feel at all
  - A drug of abuse is required to feel normally rewarded

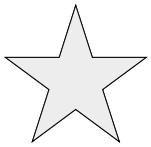
It can seem impossible to simply enjoy a walk in a park unless using

61

Quick Review

Most Neuroscientist Agree

- Normal brain
  - Dopamine is released **in response to** pleasure in order to form associations that will encourage similar activities in the future
- If you're eating a tuna Sandwich, and you enjoy the taste, dopamine will be released to **place a marker**, reminding the conductor that should seek out a tuna sandwich in the future.
- If you don't like the tuna, no dopamine is released



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Very Interesting Theory Here

- Bundles form

  - **So whatever is happening in your world when you're using drugs**
    - **Through neuroplasticity gets Bundled together (Associated)**

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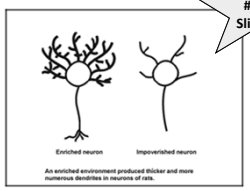
Dopamine is a Big Matchmaker

- It uses **ΔFosB** To make associations and link things together by forming neural networks

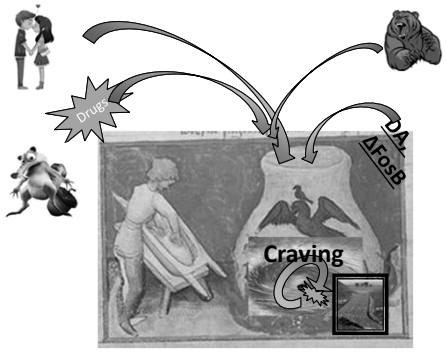


#1 Slide

- This Might explain:
  - "I was polishing my shoes and was wearing a blue shirt when I Used Heroin for the first time, Every time I wear my blue shirt, I want heroin"
  - "I Feel better already when I'm drawing up the Heroin"

64

This Theory helps us understand Anatomy of a Trigger, Craving



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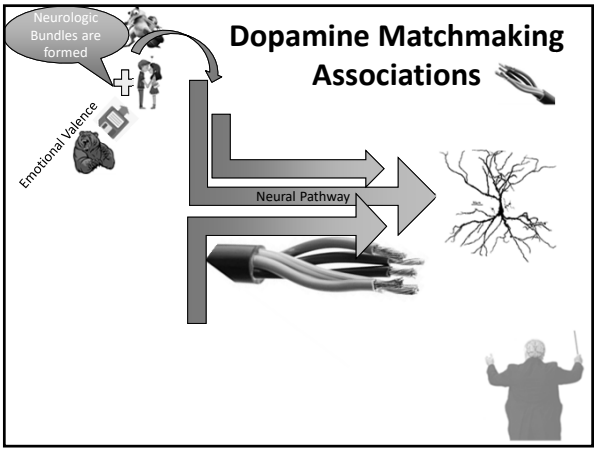

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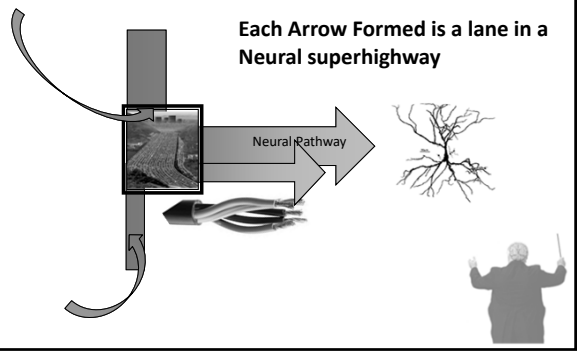
Basic Anatomy & Physiology of a Superhighway

Each Arrow Formed is a lane in a Neural superhighway



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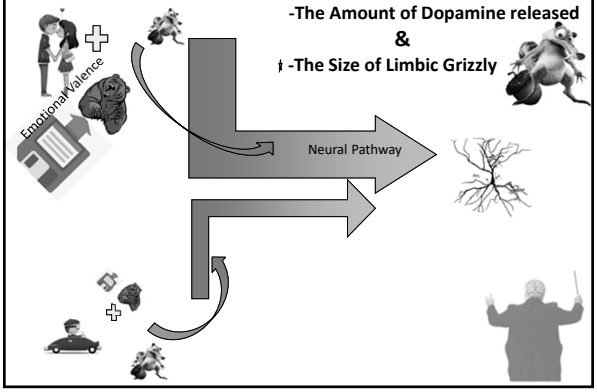
The Width of the Arrow Formed is Proportional to:

-The Amount of Dopamine released

&

-The Size of Limbic Grizzly

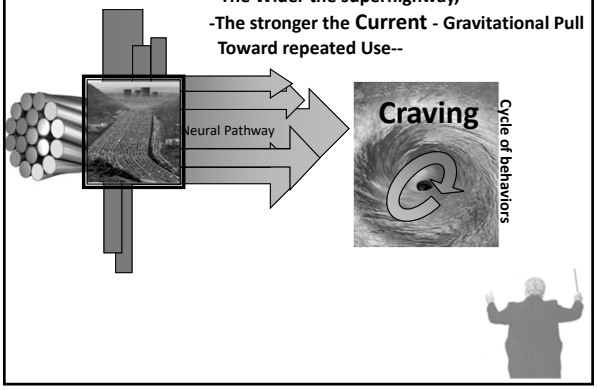


68

The More Arrows that get added

-The Wider the superhighway,

-The stronger the Current - Gravitational Pull Toward repeated Use--



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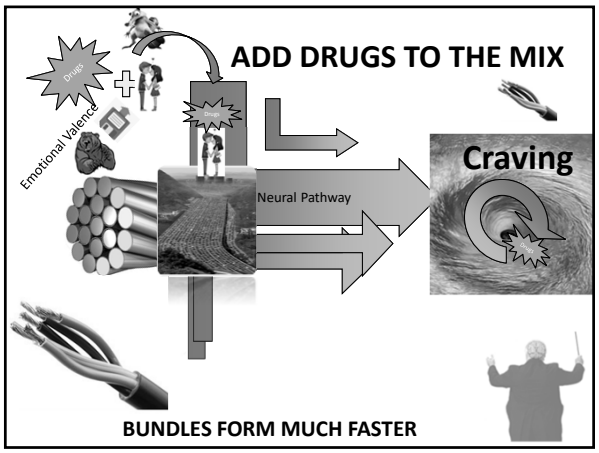
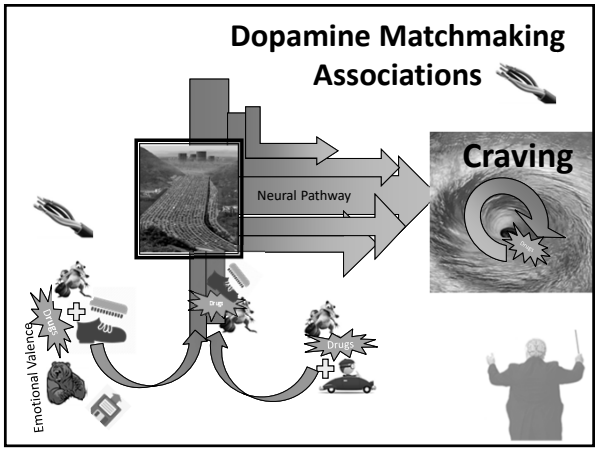
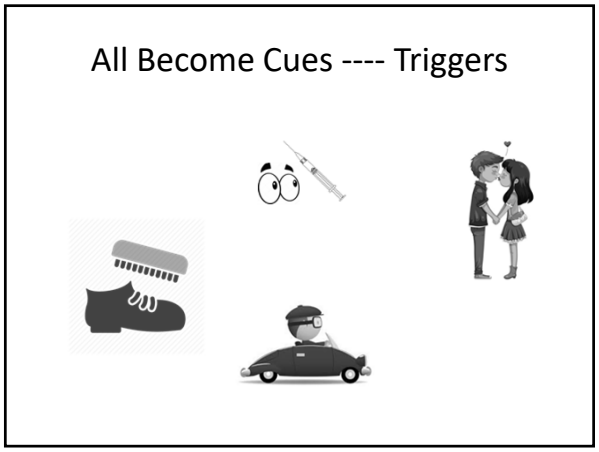

ADD DRUGS TO THE MIX
Drugs
Emotional Valence
Craving
Neural Pathway
BUNDLES FORM MUCH FASTER

70

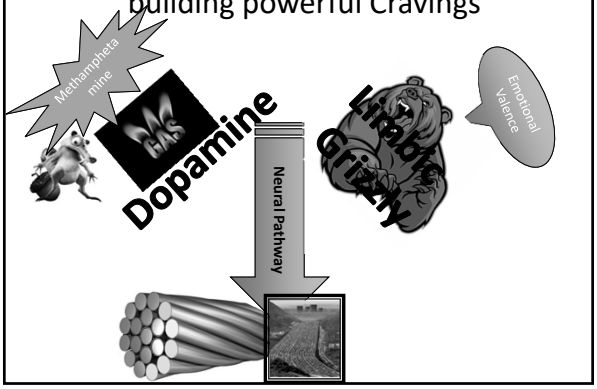

Dopamine Matchmaking
Associations
Craving
Neural Pathway
Emotional Valence

71


All Become Cues ---- Triggers

72

This Combination is really effective at building powerful Cravings



73

Scary Effective…….

- Cravings can be more powerful
  - Can overcome the fear of death or
  - No longer care for personal safety, health
  - Need for shelter
  - Desire for food
  - No longer Give a #@!& about loved ones

74

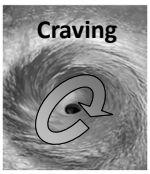
Dopamine
Changes what you are interested in, or care about

Philosophical Question:
Do we have control over what we have interest in?

75

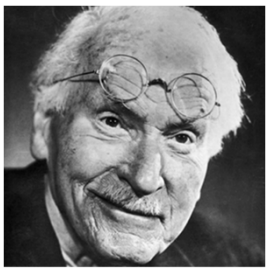
What we care about makes up a major part of our Personality

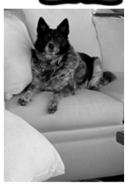
- Major Parts of your personality get linked to drugs.



76

"Persona" may be a more useful word





77

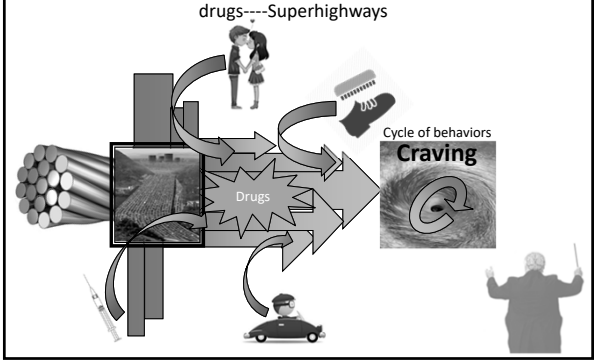
Addiction

- Addiction can be seen as a dominant persona

78

When Someone Uses A Lot of Drugs

-Almost everything they do gets neurologically associated to the drugs----Superhighways



79

End Result

- Personality Change
  - "This is not us. This is not who we Are"
    - Beautiful Boy
- "Habit Circuitry"
  - The Scientific term for this bypass process that results in….

That Kid you don't even recognize
We now know scientifically why this happened

80

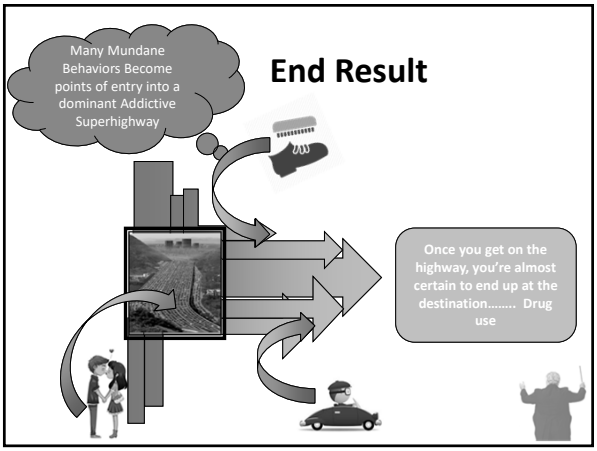
Bottom Line -Epic Fail

- In Late Addiction, the Conductor's messages (Cravings) are false alarms
  - He thinks he's signaling you to polish your shoes again but it ends up (because of the messed up neural networks)—resulting in you using drugs

81

Addiction is Drug induced Neuroplasticity

82



83

That Was A Lot-- Regroup

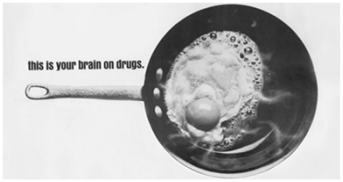
84

Let's Not Ignore the Neurobiology of Recovery

85

Many Drugs Damage the Brain

- Early Science Proved it
  - 1980s



86

The Brain Can in Most circumstances Recover

- More Recent Science
  - Brain Metabolism measured by Glucose uptake
    - 10 Days after abstinence
    - 100 days after abstinence

Nora Volkow, Ph.D. Long-term frontal brain metabolic changes in cocaine abusers. Synapse 11:184-190, 1992; Volkow ND. Decreased dopamine D2 receptor availability is associated with reduced frontal metabolism in cocaine abusers. Synapse 14:169-177, 1993.

87

We can assist in that Brain Recovery Process

- Step 1
  - Stabilize the System
    - From the toxicity of use

- Step 2
  - Work on new "Recovery" superhighways

88

Meds are an Important Part of the Answer

Phenobarbitol
Clonidine
Buprenorphine
ETC…

89

Pharmacology in Early Recovery

- **Can Help create stability amongst the chaos.**
- **Can help provide space for new highways to be built**

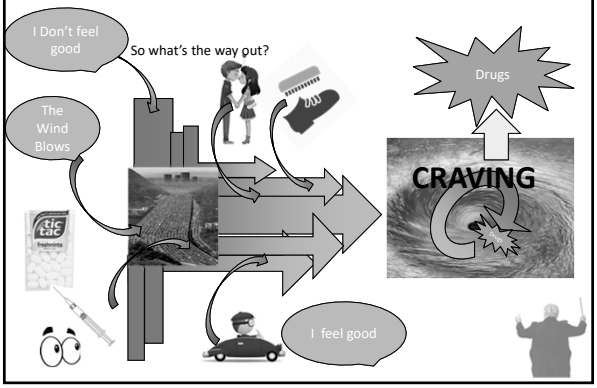
90

Lets give attention to Another Big Piece of the Puzzle

- Psychosocial, Behavioral Interventions
  - Today We discuss a **theory** which might explain why these work from a neuroscience lens

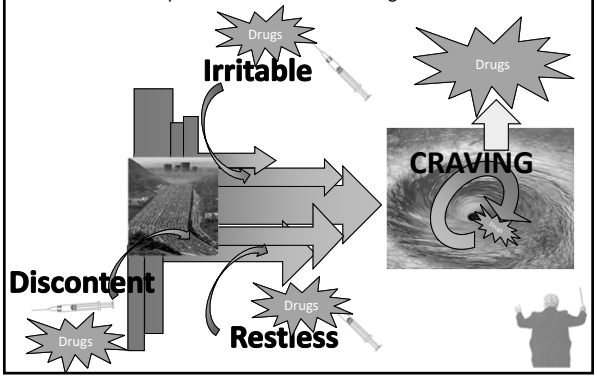
91

In Late Stage Addiction, Everything is an on-Ramp



92

Withdrawal Symptoms Turn into Triggers—On Ramps
If You Use to escape an intolerable reality
The Dopamine Matches the two together

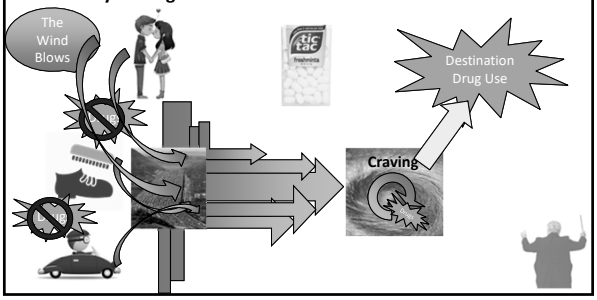


93

Hell On Earth

Even When People Want to Stop, everything just leads them Back

Mundane, Everyday activities even when done without drugs, become cues **to induce them into the associated, preprogrammed activity of drug use.**



94

It seems like there's no way out?

95

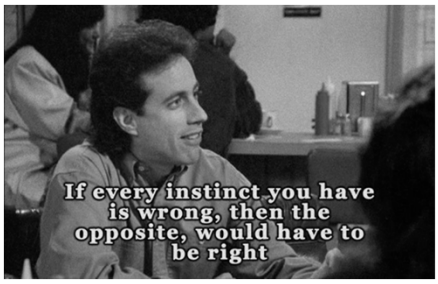
This Theory

$$E=mc^2$$

Works Best to Describe Late stage addiction – Less so mild Use disorders

96

One Potential Way out



97

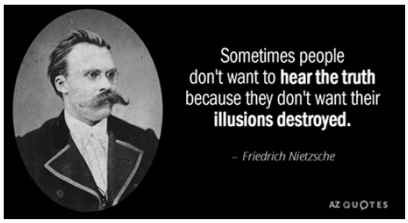
Dopamine

- According to this theory---
  - Dopamine was involved with the development of your original personality
- Just as dopamine was involved with the development of your addictive personality

98

Treatment

- **Change your whole personality (Persona)**



99

The Birth of “Opposite George”

“I always have tuna on toast.
I want the complete opposite of tuna on toast. I want chicken salad on rye”

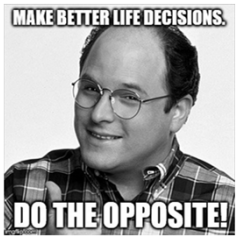
https://youtu.be/1Y_6fZGSOQI

100

101

Bridging the Gap

- A Scientific Theory that May Explain How repetition inherent in some pathways to recovery might work
  - 12 step programs
  - Structured residential setting
- If the Same old behaviors, activities, or cues just end up reinforcing the addictive superhighways, have to change all your behaviors
  - **“there’s only one thing you have to change, and that’s everything”**



102

But Most People like their personalities

…Don't want to change

- "Job one is get out of the cave. A lot of people do get out but don't **change…..**"

"Out of the Crucible, Forged into a new metal"

103

Trick #1

Transform like the Phoenix

Patients Like this idea

Sense of Purpose

If there's a purpose to their pain, it seems easier to endure
The heat of the alchemical process

104

Trick #2

Work on the word Surrender…..

For Many, its hard to transform without taking a leap of faith

- Need to "Just let Go"
  - Of old patterns and ideas
- Surrender to the Unknown
  - allows opportunity to build new superhighways
- If your Cup is already full…….
  - There's no space for anything new

105

Trick #2
Surrender

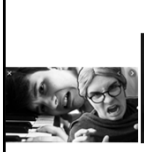
- Assertiveness is Necessary and Revered in the Western World
  - **Idea of Surrender Rubs a lot of People the wrong way**
- These Ideas Prevent significant % of addicted people from engaging in 12 step programs
  - which for some, may be an important piece of the puzzle

Having Willingness to Change can be a very assertive act

106

Surrender doesn't have to be a bad word

- One can Surrender to anything



As long as it's not the old you

107

What we're really talking about here is…
Using Neuroplasticity to our Advantage

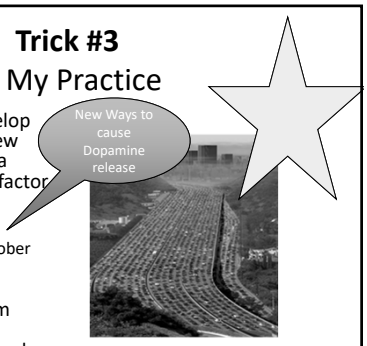
- Induce Dopamine release through different stimuli

108

Trick #3

In My Practice

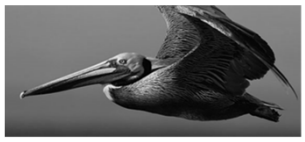
- When patients develop capacity to enjoy new things, it becomes a Positive prognostic factor
  - New Hobby
  - New Friends
  - New Community (Sober living, AA)
- We've seen today a scientific mechanism (through Dopamine activity) why this may be true



Use endogenous dopamine to our advantage. Create new, functional motivators, cues, triggers.

109

- Help them find their own pelicans



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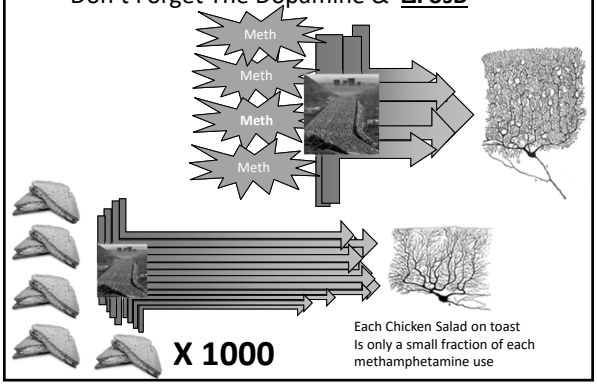
Recovery Requires Repetition

Don't Forget The Dopamine & **ΔFosB**

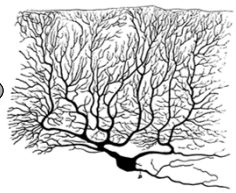


Each Chicken Salad on toast
Is only a small fraction of each methamphetamine use

111

Pun Intended

- What I've noticed from my practice is that people who do well in recovery are those who **establish new connections**, and find new ways to feel contented, **over** and **over** and **over** again.



This Sounds like the conductors formula for Creating a new superhighway

112

Argument for Residential Treatment

- People with advanced, late stage addiction, may benefit from being separated from all their cues of normal life to have the best chance.

Opposite George

May Take many Months

113

Oldies

Therapeutic Communities vs Methadone Maintenance

A Prospective Controlled Study of Narcotic Addiction Treatment: Design and One-Year Follow-up

Richard N. Baic, PhD; William W. Van Stone, MD; John M. Koldas, MD; Thomas M. J. Engelsing, BS; Robert M. Flushoff, PhD; Vincent P. Zarcone, Jr, MD

- **Daytop Village NYC**
  - Employment rates as high as 90% at 1-2 years post-graduation from residential community
  - Collier WV, Hijazi MA: A follow-up study of former residents of a therapeutic community. Int J Addict 9:805-826, 1974
- **Eagleville Hospital PA**
  - **55% of patients in treatment for 6 months or more, had a period of voluntary abstinence from narcotics for 6 months or more upon discharge.**

Barr HL, Ottenberg DJ, Rosen A: Two year follow-up study of 724 drug addicts and alcoholics treated together in an abstinence therapeutic community. Read before the Fifth National Conference on Methadone Treatment, Washington, DC, April, 1973.

- **Phoenix house NYC**
  - High Success rates
    - Nash G, Waldorf D, Foster K, et al: The Phoenix House program: The results of a two year follow-up, in DeLeon G (ed): Phoenix House: Studies in a Therapeutic Community (1968-1973). New York, MSS Information Corp,1974
- **Mandel- Johns Hopkins**
  - 56% of 673 "changed positively" with respect to heroin use
  - 65% changed positively with respect to criminality
  - 33% changed positively with respect to employment from pretreatment to posttreatment

114

Review Article

Therapeutic Communities for Addictions: A Review of Their Effectiveness from a Recovery-Oriented Perspective

Scientific World Journal **2013**

Wouter Vanderplasschen,[1] Kathy Colpaert,[1] Mieke Autrique,[1] Richard Charles Rapp,[2] Steve Pearce,[3] Eric Broekaert,[1] and Stijn Vandevelde[4]

Review article of 30 studies

Therapeutic communities were effective and promoted change toward:

- -Recovery in reinsertion in society
- -Better substance use and legal outcomes
- -Superior employment and psychological functioning
- -Success was proportionate to length of stay.

115

ELSEVIER

2010

Journal of Substance Abuse Treatment 38 (2010) 356–365

Journal of Substance Abuse Treatment

Regular article

Sober living houses for alcohol and drug dependence: 18-Month outcomes

Douglas L. Polcin, (Ed.D.)[a,*], Rachael A. Korcha, (M.A.)[a], Jason Bond, (Ph.D.)[a], Gantt Galloway, (Pharm.D.)[b]

[a]Alcohol Research Group, Public Health Institute, Emeryville, CA 94608-1010, USA
[b]California Pacific Medical Center, St. Lukes Hospital, San Francisco, CA 94110, USA

Received 8 November 2009; received in revised form 11 February 2010; accepted 11 February 2010

"**Despite research showing that living environments supportive of recovery are associated with better outcome** (e.g., Braucht, Reichardt, Geissler, & Bormann, 1995; Hitchcock, Stainback, & Roque, 1995; Schinka, Francis, Hughes, LaLone, & Flynn, 1998), **SLHs have been largely overlooked by policymakers and researchers**."

Sober Living Houses

Improvements were noted on:

- ASI scales (alcohol, drug, and employment)
- Psychiatric severity on the BSI
- Arrests, and alcohol and drug use

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Oxford Houses

RECOVERY
RESPONSIBILITY
REPLICATION

- Democratically run, community based recovery residences
  - house members self-organize under basic principles of sobriety and peer support.
- Are known to decrease the likelihood of relapse when residents stay for 6 months
  - (Jason, Olson, et al., 2007)

Huge variability, no regulation… some really bad, some really good

117

Be Very Mindful

- There are a lot of Bad ones out there
- Just looking to make a buck.
- Part of our responsibility as addiction specialists, in my opinion, is to know some good ones.

118

2020 Cochrane Review on AA

- 27 studies containing 10,565 participants
  - 21 RCTs/quasi-RCTs,
  - 5 non-randomized,
  - 1 purely economic study
- AA/TSF was compared with psychological clinical interventions, such as MET and CBT, and other 12-step program variants.
- "There is high quality evidence that manualized AA/TSF interventions are more effective than other established treatments, such as CBT, for increasing abstinence."
- "Non-manualized AA/TSF may perform as well as these other established treatments"

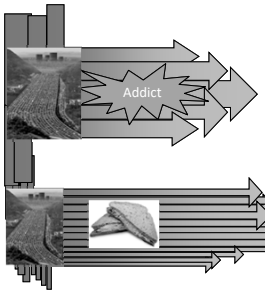
KellyJF, HumphreysK, FerriM. Alcoholics Anonymous and other 12-step programs for alcohol use disorder. Cochrane Database of Systematic Reviews 2020, Issue 3. Art. No.: CD012880. DOI: 10.1002/14651858.CD012880.pub2.

119

Remember!!!!

Long Term Recovery, Relapse

Tuna on Toast lives next to Chicken Salad on Rye



Most Likely Once the Superhighways are Built, they are there for a very long time, maybe permanently

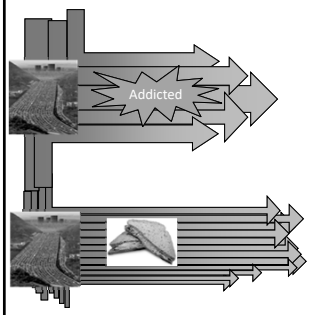
That's why Recovering people need vigilance to prevent falling back into old attitudes

Opposite George

120

Both Superhighways Persist

So after relapse—don't lose all the work you've done

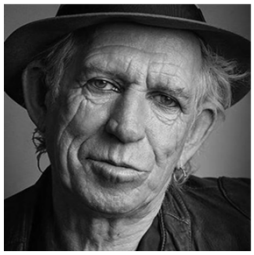


All the work done to build the recovery super highways Persists too!!!

121

Keep in Mind

- Not Everybody that Uses Drugs, develops these Neuro-physiologic changes
- Genetic and epigenetic factors



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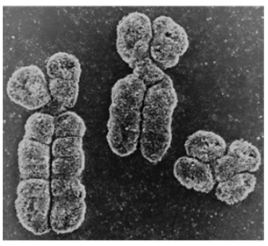
Genetics Umbrella

- Newer Evidence:
  - Estimated that 40-60% of vulnerability to addiction is genetic
  - Very complicated
    - 100s of genes involved
    - Each contributing a small amount



123

Other Factors Involved

- **ΔJunD** Might be the antidote to **ΔFosB**
- Genetic or viral overexpression of δ JunD in the nucleus accumbens directly opposes many of the neural and behavioral alterations mediated by δ FosB in chronic drug use.
  - Robison AJ, Nestler EJ. Transcriptional and Epigenetic Mechanisms of Addiction. Nature Reviews Neuroscience. 2011;12(11):623-637.

124

The Future

- **Theory is that Social Connection can Limit compulsive use of Drugs**

Rat Park Experiments

125

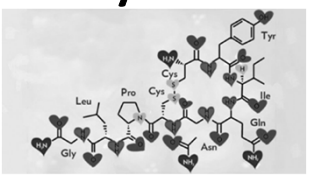
Future

- Studying the Use of Oxytocin to improve the feeling of connection
  - Staufer Lab UCSF

  - Dopamine encourages
    - Excitement, separation, adventure, Novelty
    - "Excited, Anxious & Depressed"

  Oxytocin encourages
    - Attachment, contentment, social connection

Oxytocin



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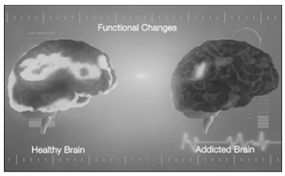
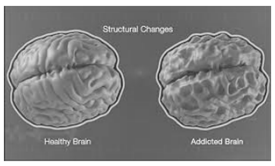
Summary

- Addiction changes the brain
  - Builds new neural connections
  - Creates a Dominant "Persona"
- According to this Theory,
  - An important part of The Healing Process involves abandoning the dysfunctional neural pathways
  - Building more functional new ones





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Summary

- All Drugs of abuse cause dopamine release in the nucleus accumbans regardless of circumstances—desirable or not
- Dopamine is a matchmaker that couples drugs to activities.
- Too much Dopamine (**ΔFosB**) creates superhighways, shortcuts, that bypass the frontal cortex
  - Creator of triggers, cravings, Cues
- Recovery needs to include mechanisms to build new, more functional superhighways.
  - Use endogenous dopamine to our advantage
- Pharmacologic interventions can help create stability in the lives of these patients to maximize the likelihood all this good stuff can happen

128

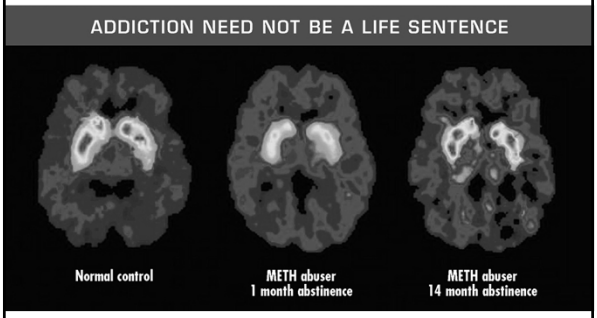
Beautiful Boy

- My two big questions are:
  - What is it doing to him?
  - What can I do to help him?

- The world of active addiction is scary for patients and families
  - Sometimes what makes the most difference is a little added understanding.
- In the modern world, many often look to science for faith.
- I think there's enough science here to add a sprinkle of hope.

129

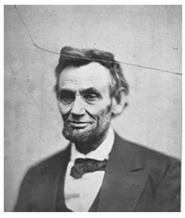
People Can get Better



Recovery of Brain Dopamine Transporters in Chronic Methamphetamine (METH) Abusers

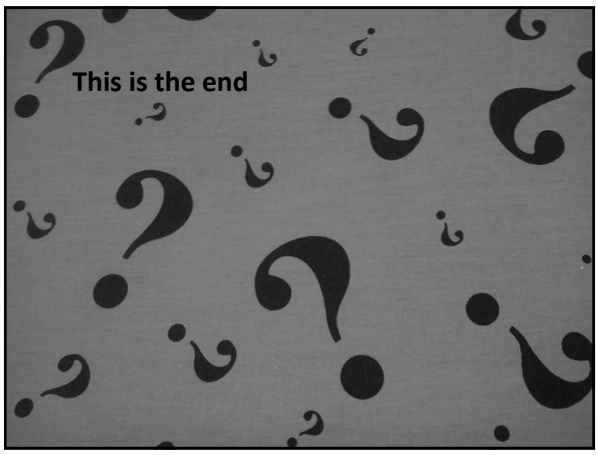
Volkov 2001

130



- "I believe if we take habitual drunkards as a class, their heads and their hearts will bear an advantageous comparison with those of any other class. "
  - Abraham Lincoln

131



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High Susceptibility to COVID-19 Among People with Substance Use Disorders (SUDs)

—Thom Browne, Jr., MA, Colombo Plan

High Susceptibility to COVID-19 Among People with Substance Use Disorders (SUDs)

UCSD Summer Clinical Institute in Addiction Studies

Thom Browne Jr.
President & CEO
Colombo Plan Secretariat
Rubicon Global Enterprises
May 2020

1

Chemical Profile of Cocaine Samples in the Southern Cone - 2012

	Brazil	Chile	Paraguay	Uruguay	Argentina
No. Samples Tested:	40	20	20	9	15
Average Purity (Range)	(29.7% -89.6%)	(15.8% - 92.2%)	(4.6% – 84.6%)	(35.8% - 82.4%)	(17.4% - 18.4%)
Number (%) with Adulterants	30 (75%)	8 (40%)	17 (85%)	9 (100%)	15 (100%)
Phenacetin	26 (65%)	1 (5%)	13 (65%)	2 (22%)	15 (100%)
Levamisole	1 (3%)		1 (5%)	2 (22%)	
Other	3 (7%)	7 (35%)	3 (15%)	5 (55%)	
Aminopyrine + Phenacetin	16 (40%)	-	8 (40%)	1 (11%)	

2

2016 Drug Adulterant Testing Results

Argentina

Paco (cocaine paste base)

-- *Phenacetin* and *Metamizole*

-- *Phenacetin* and *Aminopyrine*

Ecuador

"H" (new street drug)
-- Heroin cut with *diltiazem*, *phenacetin*, and *cocaine*

Cocaine HCl
-- cut with *levamisole* and *lidocaine*

3

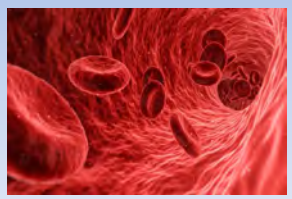
Chemical Profile of Drug Samples in South Africa – May 2017 (50 samples each)

Adulterants	Cocaine	Heroin
Phenacetin	94%	32%
Acetaminophen	--	18%
Levamisole	16%	--

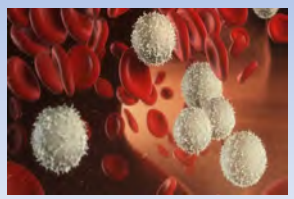
4

Adulterant Effects on Health

Phenacetin Depletes Red Blood Cells, Damages Kidneys



Levamisole & Aminopyrine Deplete White Blood Cells



5

Severe Health Problems Accelerated with Adulterated Drugs versus Adulterated Aspirin

Health Problems from Aspirin Containing Phenacetin Took Years to Appear. Aspirin was Taken as needed for Pain in the 1960s

Crack Used 15 X day X 7 days/week X 6 months Today Health Problems Appear within Months

6

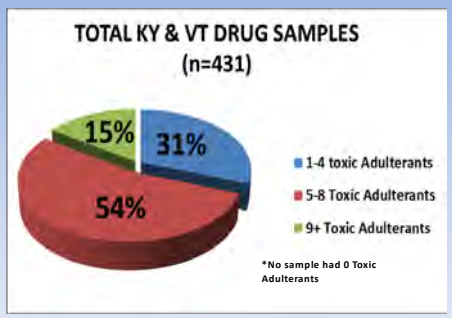
Adulterant Testing in the United States

- A 2016 CDC study found that fentanyl was detected in over half (**56%**) of the 5,152 opioid overdose deaths in ten states between July – December 2016.*
- However, in 2017 there were an estimated 72,306 drug overdose deaths according to CDC, of which 29,406 (**41%**) were due to synthetic opioids such as fentanyl.**
- Thus, fentanyl is undoubtedly contributing to overdose rates, but it is far from their only cause.

*O'Donnell JK, Halpin J, Mattson CL, Goldberger BA, Gladden RM. Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 — 10 States, July–December 2016. MMWR Morb Mortal Wkly Rep 2017;66:1197–1202. DOI: http://dx.doi.org/10.15585/mmwr.mm6643e1.

**NIDA, Overdose Death Rates, revised August 2018

7



8

Vermont & Kentucky Street-level Drug Samples (2016 - 2017)

VT #156	VT #160	KY #26	KY #105
Heroin	Heroin	Heroin	Heroin
Cocaine	Cocaine	Cocaine	Cocaine
Tramadol	Fentanyl	Tramadol	Fentanyl
Ketamine	Levamisole	Fentanyl	4-ANPP
Fentanyl	Acetaminophen	4-ANPP	Acetaminophen
Aminopyrine	Quinine	Aminopyrine	Diphenhydramine
Diltiazem	Lidocaine	Diphenhydramine	Levamisole
Quinine	Procaine	Quinine	Phenacetin
Quetiapine	Caffeine	Lidocaine	Quinine
Caffeine	Acetylcodeine	Dipyrone	Caffeine
Acetylcodeine	6-MAM	Caffeine	Acetylcodeine
6-MAM	Papaverine	Acetylcodeine	6-MAM
Noscapine	Noscapine	6-MAM	Papaverine
Papaverine		Papaverine	Noscapine
Morphine		Noscapine	

Legend:

Black = controlled drugs

Purple = fentanyls

Red = adulterants

Green = impurities from heroin manufacturing process

9

Super Speedball Effect
[Quintuple Depressant / Double Stimulant]

KY100	Franklin	3/20/2017	Methamphetamine (0.57, 21175) Cocaine (1.12, 2315) Morphine (0.57, 181) Acetylcodeine (0.75, 32444) 6-MAM (0.56, 15581) Heroin (0.78, 933919) Papaverine (1.53, 8458)

10

Health Consequences of Illicitly Manufactured Heroin Impurities

- ***Acetylcodeine*** – **potentiates the convulsant effects of heroin** suggesting a mechanism for some of the heroin-related deaths reported in human addicts
- ***6-Monoacetylmorphine (6-MAM)*** - found in significant amounts of black tar heroin or heroin exposed to moisture. Thirty (30) percent more active than heroin. Can cause **CNS depression**.
- ***Papaverine*** - comprises 0.5 to 2.5% of opium. Toxic at high doses. Taken with other drugs that make one drowsy, it can worsen the effect. Relaxes muscles & **lowers blood pressure**. Can cause **CNS depression**.
- ***Noscapine*** - comprises 4 to 8% of opium. A non-controlled opium alkaloid that is byproduct of heroin production and is usually discarded as processing waste. Some heroin manufacturers process the waste to make noscapine enriched powder, which has reportedly been used as a cutting agent for heroin and identified as a substance adulterated with fentanyl and sold as 'heroin.' **Toxic at high doses**. Side effects include **increased heart rate**.
- ***Morphine*** - unreacted morphine is present in poorly processed heroin, which may bring about adverse reactions in users, especially when the drug is injected intravenously. Can cause **neurodegeneration** (loss of nerve structure and function). Can cause **respiratory distress** and death when taken in high doses or combined with other substances, including alcohol
- ***Codeine*** - unreacted codeine is present in some poorly processed heroin, which may bring about adverse reactions in users, especially when the drug is injected intravenously. Can cause **CNS depression**. Can cause **respiratory distress** and death when taken in high doses or combined with other substances, including alcohol.

11

- The VT and KY adulterants include, but are not limited to, **banned pharmaceuticals, veterinary products, analgesic pain relievers, sedatives, antihistamines, opioid pain medications, muscle relaxants, antiarrhythmics, and impurities from the heroin manufacturing process**.
- These compounds have been associated with severe health effects, including **decreased production of red and white blood cells due to bone marrow damage, multifocal inflammatory leukoencephalopathy, hemolytic uremic syndrome, renal failure, multiple malignancies, and life-threatening cardiac arrhythmias**.*
- Variation in the substances used to adulterate street drugs and their concentrations contributes to the unpredictability of the drug's effects, and the potential for unknown, unexpected, and potentially life-threatening effects.**

---

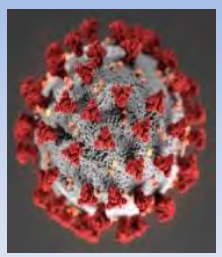
*Mark Gold. Deadly Adulterants: New Dangers of Illicit Drugs. The Sober World Magazine – July 2017.

*Phillips et al. Cardiac complications of unwitting co-injection of quinine/quinidine with heroin in an intravenous drug user. J Gen Intern Med 27(12): 1722-5.

**Cole et al. Adulterants in illicit drugs: a review of empirical evidence. Drug Testing Analysis 2011, 3, 89 – 96.

12

High-Risk for Coronavirus



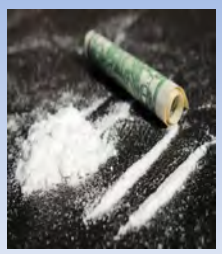
- Although COVID-19 is usually mild and most people recover quickly, it can be very serious for certain groups of people (elderly, stressed immune systems, HBP, diabetes, heart problems).
- People with addictions have numerous co-occurring health problems that make them more susceptible to Covid-19. * (respiratory, pulmonary, and cardiovascular diseases, in addition to suppression of the immune system & chronic obstructive pulmonary disease, **all high-risk factors for acquisition of COVID-19 infection**).
- Compromised lung function from COVID-19 places users of opioids, methamphetamine, and other psychostimulants like cocaine at risk for mortality and severe complications from the virus. **

*Marsden J, et al. Mitigating and learning from the impact of COVID-19 infection on addictive disorders. Addiction. Editorial. doi:10.1111/add.15080

**Volkow N. Collision of the COVID-19 and Addiction Epidemics. Annals of Internal Medicine. Ideas and Opinions. 2 April 2020. https://doi.org/10.7326/M20-1212

13

Cocaine is Toxic



- Toxic effects of cocaine are well documented, most of which are due to adverse effects on the cardiovascular system*
- Cocaine greatly influences the cardiovascular system and is a well-known trigger of acute coronary syndromes**
- Cocaine causes transient increases in blood pressure, respiratory rate, and heart rate***

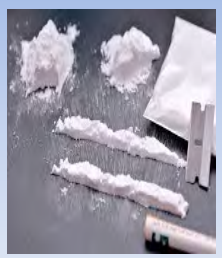
*Havakuk O, Rezkalla SH, Kloner RA (2017) The cardiovascular effects of cocaine. J Am Coll Cardiol 70(1):101–113

**Kloner RA & Rezkalla SH. Cocaine and the Heart. New Engl J Med 2003;348(6):487-8.

***Katarzyna M, et al, Acute coronary syndrome after levamisole-adulterated cocaine abuse. Journal of Forensic & Legal Medicine, 21 (2014) 48-52.

14

Cocaine is Toxic



- Its abuse most often results in cardiopulmonary symptoms*
- Toxic effects of cocaine include arterial vasoconstriction**
- Vasoconstriction occurs through contraction of the muscular walls of vessels and results in increased blood pressure, a high-risk factor for Covid-19

*Restrepo CS, Carrillo JA, Martinez S, Ojeda P, Rivera AL, & Hatta A. Pulmonary Complications from Cocaine and Cocaine-based Substances: Imaging Manifestations. RadioGraphics. Vol. 27, No. 4. Jul 1, 2007.

**Katarzyna M, et al, Acute coronary syndrome after levamisole-adulterated cocaine abuse. Journal of Forensic & Legal Medicine, 21 (2014) 48-52.

15

Crack Cocaine

- Smoking cocaine irritates and inflames the lungs
- Prolonged crack use may result in lung damage and causes a number of pulmonary conditions, including ***severe respiratory problems.**** a high-risk factor for COVID-19
- Smoking crack can cause various forms of pneumonia, pulmonary hypertension and pulmonary edema**
- Crack users are prone to more severe COVID-19 infections due to the greater inflammation and damage of long tissue resulting from smoking cocaine***

*Haim DY, Lippmann ML, Goldberg SK, & Walkenstein MD. The pulmonary complications of crack cocaine. Chest 1995;107:233-240

**Katzung M, et al. Aortic coronary syndrome after levamisole-adulterated cocaine abuse. Journal of Forensic & Legal Medicine, 21 (2014) 48-52.

***Marsden J, et al. Mitigating and learning from the impact of COVID-19 infection on addictive disorders. Addiction. Editorial. doi:10.1111/add.15080

16

Methamphetamine

- Methamphetamine users may be vulnerable to COVID-19 due to the drug's effect on the respiratory and pulmonary system*
- Meth causes pulmonary damage, pulmonary hypertension, and chronic disease of the heart muscle,** high-risk factors for COVID-19
- Methamphetamine constricts blood vessels, one of the causes for pulmonary damage and pulmonary hypertension in people who use it.*

* Nora Volkow Blog. COVID-19: Potential Implications for Individuals with Substance Use Disorders, NIDA, March 24, 2020.

** Zhao SX, Kwong C, Swaminathan A, et al. Clinical characteristics and outcome of methamphetamine-associated pulmonary arterial hypertension and dilated cardiomyopathy. JACC Heart Fail. 2018;6: 209-218. (PMID: 29496022) doi:10.1016/j.jchf.2017.10.006

17

Marijuana/Vaping

- Both marijuana smoke* and e-cigarette vapor** are associated with inflammation of the airways similar to that observed in patients with COPD and with the development of bronchitis and asthma, all of which are shown to increase risk of severe complications and mortality from COVID-19

*Tashkin DP, Baldwin GC, Sarafian T, Dubinett S, Roth MD. Respiratory and immunologic consequences of marijuana smoking. J Clin Pharmacol. 2002 Nov;42(S1):71S-81S

**Gotts, J. E., Jordt, S. E., McConnell, R., &Tarran, R. (2019). What are the respiratory effects of e-cigarettes? BMJ, 366(l5275)

18

Heroin/Opioids

- The most well-known complications of opioid use and misuse include respiratory and central nervous system depression*
- Opioids have also been reported to affect the immune system, and place users at increased risk for many different infectious complications* **(including CV-19)**
- Lung diseases such as abscesses, pneumonia, and tuberculosis are usual among heroin abusers**

* Radke JB, Owen KP, Sutter ME, Ford JB, Albertson TE. The effects of opioids on the lung. Clin Rev Allergy Immunol. 2014 Feb;46(1):54-64.

**Hind CRK. (1990) Pulmonary complications of intravenous drug misuse. 1. Epidemiology and non-infective complications. Thorax, 45, 891-896

19

Heroin/Opioids

Because opioids like heroin slow breathing, people with opioid use disorder (OUD) may suffer from diminished lung capacity that could become fatal with the onset of COVID-19*

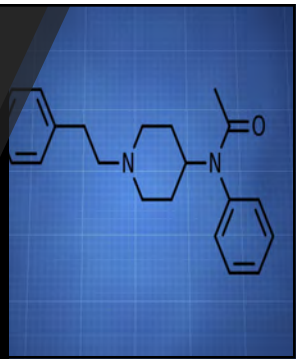
Slowed breathing due to opioid use can also result in a low concentration of oxygen in the blood (hypoxemia), which can lead to pulmonary and cardiac complications*

*Nora Volkow Blog. COVID-19: Potential Implications for Individuals with Substance Use Disorders, NIDA, March 24, 2020.

20

Fentanyl

- Fentanyl is a ***highly potent*** synthetic opioid
- Fentanyl is 80 to 100 times stronger than morphine and 50 times more potent than heroin
- Carfentanil is estimated to be 10,000 X more potent than morphine
- Fentanyl's effects include ***respiratory depression*** and ***arrest***



21

Quinine

- Quinine is a medication used to treat malaria and is used to cut heroin
- Quinine has been related to cardiovascular toxicity including abnormal heart rhythms and hemolysis (reduction of red blood cells)*
- Quinine can cause prolongation of the QT interval, which can lead to a life-threatening cardiac arrhythmia called Torsades des Pointes (TdP)**

_____

* Nora Volkow Blog. COVID-19: Potential Implications for Individuals with Substance Use Disorders, NIDA, March 24, 2020.

** Zhao SX, Kwong C, Swaminathan A, et al. Clinical characteristics and outcome of methamphetamine-associated pulmonary arterial hypertension and dilated cardiomyopathy. JACC Heart Fail. 2018;6: 209-218. [PMID: 29496022] doi:10.1016/j.jchf.2017.10.006

22

Levamisole is Toxic

- Withdrawn from the Canadian (2003) and USA (1999) markets due to **toxicity**
- Results in a decrease of white blood cells that can **lower immunity and increase opportunist infections (e.g., CV-19)**
- Associated with inflammation of blood vessels that can cause **severe skin necrosis**
- Known to provoke **hypersensitivity reactions**
- Chronic exposure to levamisole-contaminated cocaine is associated with **broad cognitive and neuroanatomical impairments**
- Levamisole is also linked to **neurotoxic effects** with regular use

23

Phenacetin

- Phenacetin induces hemolytic anemia, a disorder in which red blood cells are destroyed prematurely, affecting oxygen transfer*
- The chronic use of phenacetin is associated with nephrotoxicity and analgesic nephropathy (kidney damage)**

_____

*Millar J, et al, Phenacetin-induced hemolytic anemia. Can Med Assoc J (1972) Apr 8; 106(7): 770–775

** C. Cole, Liverpool John Moores University, Centre for Public Health, CUT: A Guide to Adulterants, Bulking Agents and Other Contaminants Found in Illicit Drugs, Centre for Public Health, Faculty of Health and Applied Social Sciences, Liverpool John Moores University, Liverpool, 2010

24

Acetaminophen

- Acetaminophen is an over-the-counter pain relief medication responsible at high chronic doses for liver damage
- When mixed with heroin, it can dramatically depress heart rate and breathing
- When cut into cocaine, it can increase hepatoxicity (liver damage)

25

Diphenhydramine

- When mixed with heroin, it can dramatically depress heart rate and breathing
- Can cause prolongation of the QT interval, which can lead to a life-threatening cardiac arrhythmia called Torsades des Pointes (TdP)*
- The combination of cocaine and H1-antihistamines like diphenhydramine can be synergistic in terms of super-additive reinforcing effects with regard to potency**

*Husain Z, Hussain K, Nair R, Steinman R. Diphenhydramine induced QT prolongation and torsade de pointes: an uncommon effect of a common drug. Cardiol J 2010;17(5):509–11

**Wang Z, Woolverton WL (2007) Self-administration of cocaine-antihistamine combinations: super-additive reinforcing effects. Eur J Pharmacol 557: 159–160.

26

Diltiazem

- Diltiazem is a medication belonging to a class of calcium-channel blockers and it is commonly used to treat high blood pressure
- Double-depressant effect with heroin
- As an adulterant, it can cause severe adverse cardiovascular reactions, including angina, bradycardia, hypotension, and arrhythmia*
- Potentiates cocaine toxicity & toxic cardiac effects

*Brunt T. Monitoring illicit psychostimulants and related health issues. Oisterwijk, The Netherlands: BOXPress, 2012.

27

Caffeine

- The mixture of caffeine and cocaine enhances cocaine's stimulant effects and produces additive effects between the two drugs*
- Caffeine is also addictive and chronic use can lead to cardiac injury **

* Duffau BE, Rojas SA, Ayala SA. A decade of analysis of illicit street cocaine in Chile. J. of Pharmacy & Pharmacognosy Research, 2020, 8(2), 146-154.

** Mehta MC, Jain AC, Billie M (2004) Effects of cocaine and caffeine alone and in combination on cardiovascular performance: An experimental hemodynamic and coronary flow reserve study in a canine model. Int J Cardiol 97(2): 225–232.

28

Xylazine

- Xylazine is commonly used as an adulterant in heroin
- It is only approved as an animal tranquilizer and used as a sedative, analgesic and muscle relaxant*
- The most common side effects in humans associated with xylazine administration include bradycardia, respiratory depression, hypotension, and other changes in cardiac output**

*Ruiz-Colón K, Chavez-Arias C, Díaz-Alcalá JE, Martínez MA (July 2014). "Xylazine intoxication in humans and its importance as an emerging adulterant in abused drugs: A comprehensive review of the literature". Forensic Science International. 240: 1–8.

**Reyes JC, Negrón JL, Colón HM, Padilla AM, Millán MY, Matos TD, Robles RR (June 2012). "The emerging of xylazine as a new drug of abuse and its health consequences among drug users in Puerto Rico". Journal of Urban Health. 89 (3): 519–26.

29

Metamizole/Dipyrone

Metamizole is a pain reliever, fever reducer, and spasm reliever

Side effect of agranulocytosis (a dangerously suppressed immune system that places user at very high risk for serious infections due to a severely lowered white blood cell count)*

Combining dipyrone with opiates like heroin results in analgesic potentiation and produces supra-additive effects**

* Brack A, Rittner HL, Schäfer M (March 2004). "Nichtopioidanalgetika zur perioperativen Schmerztherapie" [Non-opioid analgesics for perioperative pain therapy. Risks and rational basis for use]. Der Anaesthesist (in German). 53 (3): 263–80.

** Hernandez-Delgadillo G & Cruz S. (2006). Dipyrone potentiates morphine-induced antinociception in dipyrone-treated and morphine-tolerant rats. Eur. J. of Pharmacol. 501, 67-73.

30

Aminopyrine

Banned analgesic & anti-inflammatory

Dramatic decrease in white blood cells, leading to increased susceptibility to infection, suppressing immune function and the body's ability to fight off even minor infections*

People who smoke coca paste or crack cocaine contaminated by aminopyrine can experience overwhelming, rapidly-developing, life threatening infections* (e.g., CV-19)

*Gilman AG, et al (eds.). Goodman and Gilman's *The Pharmacological Basis of Therapeutics*. 8th ed. New York, NY. Pergamon Press, 1990., p. 655.

31

Lidocaine

- Lidocaine, a common local anesthetic, is often used as a cocaine adulterant
- Cardiovascular problems like myocardial depression, hypotension, bradycardia, and arrhythmias have been reported*
- Additional side effects of lidocaine also include respiratory depression and hypertension,** (CV-19 risk factors)

*T. Brunt, Monitoring Illicit Psychostimulants and Related Health Issues, BOXPress, 2012.

**Pawlik E, Mahler H, Hartung B, PIŒasser G, Daldrup T. Drug-related death: adulterants from cocaine preparations in lung tissue and blood. Forensic Sci Int 2015;249:294–303.

32

Increased Phenacetin/Levamisole Combos Seen in the U.S.

VT174	Drug Task Force	2/28/2017	Levamisole (0.56, 441991) Phenacetin (1.83, 916049) Cocaine (1.02, 2837098)
VT175	Drug Task Force	2/28/2017	Levamisole (0.57, 376319) Phenacetin (1.83, 578256) Cocaine (1.24, 2004026)
VT275	Washington	4/12/2017	Levamisole (0.56, 247441) Phenacetin (1.82, 735525) Codeine (1.29, 1526700)
VT147	Washington	2/3/2017	Phenacetin (1.81, 709968) Cocaine (1.08, 1616172) Levamisole (0.56, 248922)
VT285	Washington	4/12/2017	Levamisole (0.56, 305458) Heroin (0.93, 1588) Phenacetin (1.82, 809732) Cocaine (1.21, 1758922)
VT286	Washington	4/12/2017	Levamisole (0.56, 293267) Codeine (1.06, 1766536) Heroin (0.97, 1136) Hydroxyzine (2.21, 686443) Phenacetin (1.83, 195528) Lidocaine (0.71, 5301)

33

Cardiovascular Threat of Phenacetin/Levamisole Combinations

Phenacetin

- Phenacetin induces hemolytic anemia, a disorder in which red blood cells are destroyed prematurely, affecting oxygen transfer*

*Millar J, et al, Phenacetin-induced hemolytic anemia. Can Med Assoc J (1972) Apr 8; 106(7): 770–775

Levamisole

- Humans metabolize levamisole to aminorex*
- Aminorex ingestion responsible for Idiopathic Pulmonary Hypertension (IPH)**
  - IPH: arteries in the lungs become blocked or narrowed, making it harder for the heart to pump blood through them

*Hofmaier T, et al, Aminorex, a metabolite of the cocaine adulterant levamisole, exerts amphetamine like actions at monoamine transporters. Neurochem Int (2014) Jul; 73(100): 32-41

**Karch SB, et al, Aminorex poisoning in cocaine abusers. Int J Cardiol (2011);158(3):344-6

34

Multiple Drugs/Adulterants/Impurities (12)

KY159	Jessamine	5/3/2017	Acetaminophen (0.55, 50242) Caffeine (0.59, 105451) Diphenhydramine (2.04, 225665) Cocaine (1.11, 11312) Quinine/Quinidine (0.88, 421766) 6-MAM (0.56, 12828) Papaverine (1.55, 21837) Heroin (0.17, 958644) Noscapine (1.64, 334002) Acetylcodeine (0.73, 23106) Methamphetamine (0.57, 10477) Amphetamine (0.58, 23824)

35

Many drug users reside in geographical areas characterized by:

- social deprivation
- high population densities
- poor-quality housing
- homelessness
- reduced access to healthcare

Putting them at high-risk for **CV-19**

36

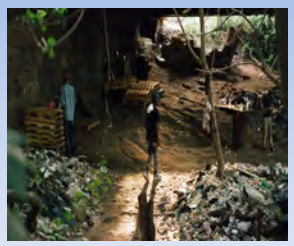
Open Air Drug Markets: Overseas

Sao Paulo: Crackolandia

Durban: Whoonga Park

37

Open Air Drug Markets: United States (Philadelphia)



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Mindfulness and Substance Use Disorders

—Douglas Ziedonis, MD, MPH, UCSD

Mindfulness and Substance Use Disorders

Douglas Ziedonis, M.D., M.P.H.
Associate Vice Chancellor for Health Sciences
Professor, Department of Psychiatry
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UCSD Center for Mindfulness

1

Learning Objectives:

- Participants will learn about specific mindfulness based interventions, techniques, and assessments that can help their SUD Treatment practice as well as own resilience
- Participants will learn 3 brief mindfulness & self-compassion practices for clinical practice & self-care
  - Purposeful Pauses, Meditations, and Reflections
- Participants will learn the key components of Mindfulness Based Stress Reduction & how this approach is modified:
  - Mindfulness Based Relapse Prevention (for addiction)
  - Mindfulness Based Cognitive Therapy (for depression),

2

Substance Use Disorder Pivotal Moments

- Engagement & Staying Present
- Stress Reduction & Sleep difficulties and Anxiety symptoms
- Awareness of Body Sensations
- 12-Steps' 11th Step – Meditation
- Manage Cravings – an alternative strategy
- Mindfulness Based Relapse Prevention
- Stage II Recovery – Wellness & TUD
- Co-Occurring Disorders
  - MBCT – Depression
  - MBI for Anxiety

3

Mindfulness-Based Relapse Prevention (MBRP):

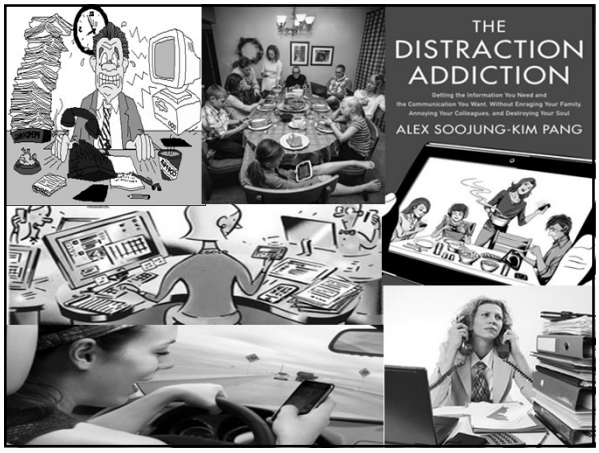
4 key goals

1. Develop awareness of personal triggers and habitual reactions, and learn ways to create a pause in this seemingly automatic process
2. Change our relationship to discomfort, learning to recognize challenging emotional and physical experiences and responding to them in skillful ways
3. Foster a nonjudgmental, compassionate approach toward ourselves and our experiences
4. Build a lifestyle that supports both mindfulness practice and recovery

- Fee MP3s: www.mindfulrp.com/For-Clinicians.html

4

5



6

Many Feel Overworked and Overstressed

Schumann JH. http://www.npr.org/sections/health-shots/2013/08/13/211698062/doctors-look-for-a-way-off-the-medical-hamster-wheel.

7

Framework for Professional Fulfillment: System Change & Personal Resilience

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8

Culture of Health:
Mental, Physical, & Spiritual Health; Compassion, Wisdom, & Happiness

9

10

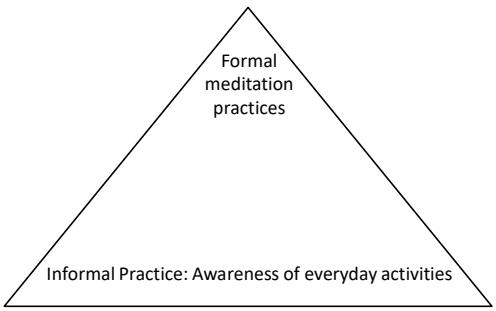
Mindfulness: What is it?

- "The awareness that emerges through **paying attention** on purpose, in the **present moment**, and **non-judgmentally** to the unfolding of experience moment to moment"
- – Jon Kabat-Zinn

- Self-regulation of attention
- Attitude / Particular Orientation
- With Empathy & Compassion
- Not to produce change like progressive muscle relaxation

11

Mindfulness practices



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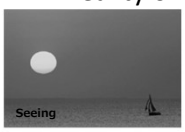
Coming to our senses in the reality of the moment



13

Purposeful Pause Practice

- Short – few minutes – no additional time
- Allows us to "reset" and build resiliency
- "Mini-Trainings"
- Aiming and Sustaining Attention - Noticing
- Two Types
  - 1. Routine Things – No Extra Time – You do already
    - Brush teeth, drive to work, drink coffee, etc
    - But being more attentive – what notice?
  - 2. Stressful Moments – Notice your tension swirling
    - Just be present

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Purposeful Pauses – Other Examples

- Upon Awakening
  - notice sensations / breath before the rush of the day
- Shower, Breakfast, Cup of Coffee, etc
- Use Transitions wisely
  - Ex. Driving – choose no music or phone
  - Ex. Get to location – take a few moments
- Mindful Walk between meetings (short / long)
  - Zoom (ZUD) – even at home
- Sitting at your desk – STOP - notice your body

15

Mindful Movement / Body Scan

16

Purposeful Pause @ ZOOM meeting

17

UCSD Center for Mindfulness

mindfulness practices for clinicians

1	**A brief breath to begin your day.** In the morning when turning on your computer, before launching into your activity of the day, take a few moments to close your eyes and focus on your breathing.
2	**Mindful Driving.** When driving, pay attention to actually driving. Focus on the feel of the steering wheel, the traffic around you and remember to breathe. Consider turning off the radio.
3	**"Where are my feet?"** When in a conflict situation, notice the sensations in your fee right now to ground you and calm your nervous system.
4	**S.T.O.P. at the Doorknob.** When you grasp the doorknob before meeting with a patient or colleague: 1. STOP what you're doing. 2. Take a Breath. 3. Observe what is present for you. 4. Proceed with intention & choice.
5	**Mindful washing.** When washing your hands, focus on the warm water and the soap, pay attention to scrubbing and notice the sensations in your hands and fingers.
6	**Clear some breathing space with a Mindful Check-In.** Set an alarm to remind you to take 3-5 minutes to refocus and recharge.
7	**Mindful emailing.** Before hitting send on an emotionally charged email, stop and take 10 breaths. Notice any sensations in your body and identify the cause. Then re-read your email before sending.

18

Applied mindfulness: RAIN

Cravings, Anxiety, Anger, etc

- RECOGNIZE
  - "I'm feeling anxious"
- ACCEPT/ALLOW
  - See if you are resisting the experience
- INVESTIGATE
  - "What's happening in my body right now?"
- NOTE
  - Label or mentally note the body sensations from moment to moment

- Craving to Quit App
- Judson Brewer, MD, PhD – Brown University

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8	**Uni-task.** Do just one thing at a time and really pay attention to doing that one task, be it drinking coffee, writing an email, meeting with a patient, or filling out paperwork.
9	**Eat a meal mindfully.** Choose one meal to eat slowly and with attention to all of the textures, flavors and sensations that accompany it. Consider where the components of the meal came from and the journey from production to plate. Savor it.
10	**Take a Mindful Walk.** Notice your body as you walk. Feel your breath and your feet. Notice your surroundings and take in the full sensory experience of the walk.
11	**Mindful Listening.** A caregiver who listens fully is the greatest gift and can potentially provide the best insights into the patient's entire story, including body language, tone of voice as well as words. Practice being fully present and open in the conversation.
12	**Mindfully Hug someone special.** Fully experience this hug. Notice them, feel their embrace, appreciate their aliveness. Notice if your mind wanders off, and just kindly come back.
13	**Download an app. And use it.** There are many tech options to help us improve our attention. (And even to help us manage our relationship with that tech!)
14	**Label your emotions.** As they happen, labeling emotions helps us manage them and regain a bit of objectivity, so we don't get lost in them and react on auto-pilot.

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https://medschool.ucsd.edu/som/fmph/research/mindfulness/Documents/14%20Mindfulness%20Practices%20for%20Clinicians.pdf

20

Suporting Self: Small Steps

- Breath Awareness – 5 to 10 to 20 minutes / day
  - GUIDED MEDITATIONS – live or pre-recorded
    - Headspace app, UCSD CFM, or UCLA Mindful Awareness)
      - https://bit.ly/UCSDMindfulCompassion
- Plan 2 purposeful pauses in the day
- Do a Reflective Exercise (Self-Compassion, Calender, etc)
  - Examples in Finding the Space to Lead
- Find a mentor – get a UCSD CFM Personalized Consult
- Readings on Mindfulness & Compassion
- Attend a Mindfulness Training (shorter or longer)

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Supporting a Peer or Client:

- **Way you mindfully engage and listen matters**
- **Share your experiences & what helps you:**
  - STOP – Take a deep breath and notice
  - Self-Soothing (rub hands, hand washing, heart)
  - Purposeful Pause - Mindful Walking - anything
  - Breath Awareness Training (4-7-8)
- **Provide Links for Resources - Guided Meditations**
- **Create Buddy Systems** – Finding Support
  - **Facilitate a Brief Moment** (1-5 minutes)

22

Attitudinal Foundations of Mindfulness

- Jon Kabat-Zinn

Non-judging
Patience
Beginner's Mind
Trust
Non-Striving
Acceptance
Letting Go
Generosity
Gratitude

23

Stress Reaction & Mindful Self-Compassion

Stress Reaction	Stress Response turned inwards	Self-Compassion
Fight	Self-Criticism	Self-Kindness
Flight	Isolation	Common Humanity
Freeze	Rumination	Mindfulness

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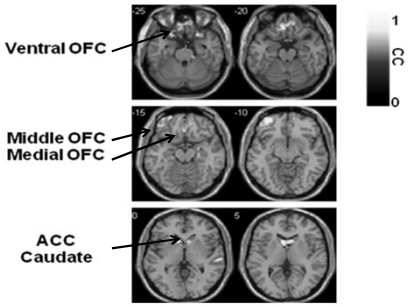
Mindfulness correlates with Amygdala connectivity – neuroimaging research



Fulwiller C, et al

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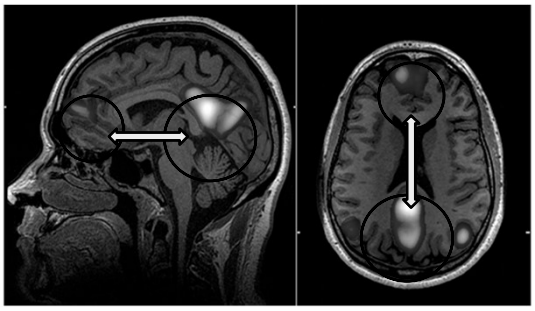
Default Mode Network



One study showed that our minds wander approximately 47% of the time and that mind wandering predicts subsequent unhappiness (Killingsworth and Gilbert, 2010)

26

fMRI Decreased Default Mode Network activity during meditation in experienced meditators

DMPFC & PCC

Brewer et al *PNAS* (2011)

27

Compassion & Mindfulness-Based Research:

28

REFLECTIONS - PRACTICE

- Brief Mindful Meditation "settling" to start
  - Focus on breath
- Focus on a topic
  - compassion, your calendar, great leader, etc
- Notice what comes up?
  - body sensations, thoughts, & feelings
- Notice when mind distracted – Redirect back
- Write down list of what you noticed
- Relate to focus of Reflection
  - question status quo and be more intentional

29

Reflection Exercise: How Would You Treat a Friend?

30

Integrating Mindfulness into Clinical Practice

- Developing your own practice
  - Enhanced Presence & Listening
  - Brief 5 minute Moments
- Mindfulness-Based Stress Reduction (MBSR)
  - Mindfulness-Based Cognitive Therapy (MBCT)
  - Mindfulness Based Relapse Prevention (MBRP)
  - Mindfulness Based Eating Awareness Training (MB-EAT)
  - Mindful Self Compassion/MSC &Cultivating Compassion Training/ CCT
- MBI – Specific disorders & problems –many
  - Dual Recovery Therapy (DRT)
  - Dialectical Behavior Therapy (DBT)
  - Acceptance and Commitment Therapy (ACT)
- Apps & websites & mp3s

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Mindfulness Based Stress Reduction (MBSR)

- 8 week program (2.5 hrs / week) & 6 hour weekend retreat
- Explore mindfulness practice & discussion of topics related to stress in daily life (50%)
  - Living on automatic-pilot
  - Learning to stop
  - Coming back to the breath
  - Relationship of stress to illness
  - Problem focus and emotion focus coping
  - Assertiveness in communications
- Learn Formal & Informal Practices (50%)
- Homework

32

MBSR Formal & Informal Practices

- **Informal Practice : many opportunities all day to enhance awareness**:
  - Any moment
  - Pleasant experiences & Unpleasant experiences
  - Reactivity to stressful situations or events
  - While communicating with others
- **Formal Practices of Meditation & Gentle Yoga Exercises:**
  - Awareness of Breathing
  - Sitting Meditation
  - Slow Walking Meditation
  - Body-scan
  - Raisin Exercise (mindful eating)
  - Gentle Yoga Exercises
  - Loving-kindness Meditation, etc
- **Homework**
  - Consider journal / log of your experiences.
  - Doing formal / informal practices

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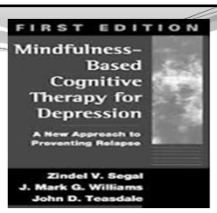
MBCT



Segal, Williams, & Teasdale. (2002).

- Class 1: Automatic Pilot
- Class 2: Dealing with Barriers
- Class 3: Mindfulness of the Breath
- Class 4: Staying Present
- Class 5: Allowing and Letting Be
- Class 6: Thoughts are Not Facts
- Class 7: How Can I Best Take Care of Myself
- Class 8: Using What's Been Learned to Deal with Future Moods.

- www.mbct.com

* Body Scan
* 3 minute breathing space
* Mindfulness of the breath

Segal ZV, Williams MG, Teasdale JD. Mindfulness-Based Cognitive Therapy for Depression. New York, NY 2002

34

Mindful Self-Compassion (MSC)

- 8-week program (3 hrs / week) & 4-hour weekend retreat
- Explore mindfulness and self-compassion practice & discussion of topics and exercises related to mindfulness and compassion (50%)
  - How to stop being so hard on yourself
  - How to handle difficult emotions with greater ease
  - How to motivate yourself with encouragement rather than criticism
  - How to transform difficult relationships, both old and new
  - How to become your own best teacher
- Learn Formal & Informal Practices (50%)
- Home Assignment

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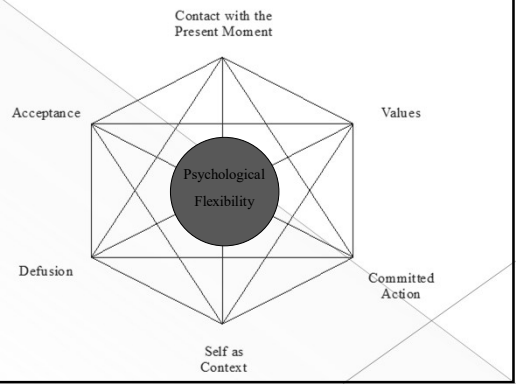
ACT MODEL OF TREATMENT



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Goals of ACT

- Reduce the domination of evaluative language
  - Decrease experiential avoidance
  - Live in the present moment
  - Become less focused on the importance of being "right"
- Focus more on values and actions linked to values
- ACT uses the strategies of acceptance, mindfulness, and commitment to action and behavior change to produce greater psychological flexibility

37

Discussion

- **Personal Next Steps**
- **How help others**
- **Tobacco Use**

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Mindful Music Drumming & Flute

- Simple Repetitive rhythms
- Can use drum or body
- Sound Meditation
  - Notice silence and sound

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Mindful Leadership Program -MPLP

- **Leadership Excellence**:
  (1) connect well with others, and
  (2) skillful at initiating & guiding change
- **Mindful Leadership**
  - Embodies presence
  - Prioritize what's important in service of others
- **3 Key Practices (3 one year programs)**
  - **Purposeful Pauses, Meditations, & Reflections**
- **Findings:**
  - Recapturing joy in medicine
  - More innovating at work
  - Enhanced compassion, Emotional intelligence
  - Feeling connected

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The Two-minute Ask, Advise, and Refer Model

- Ask about Tobacco use & Motivation to Quit (Are you interested in quitting now?)
- Advise to quit or prepare to quit
- Refer (Use Handout Visual Aide)
  - Community resources
  - Lower motivated – do Importance / Confidence Ruler (s) and / or Pros/Cons & provide educational handout
  - Higher motivated –discuss med options & psychosocial treatments, provide handout, and discuss quit date
- ADD TO TREATMENT PLAN

41

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42

What's the Evidence? Systematic Reviews of the Literature

- Mindfulness Based Interventions
  - Goyal et al. Meditation programs for psychological stress and well-being: a systematic review and meta-analysis.[1]
  - 18,753 citations, we included 47 trials with 3,515 participants
- MBRP
  - www.mindfulrp.com/Research.html
- MBCT
  - www.mbct.org
- Mindful Eating (MB-EATS and others)

Goyal M. et al. *JAMA Intern Med*. 2014 Mar;174(3):357-68.

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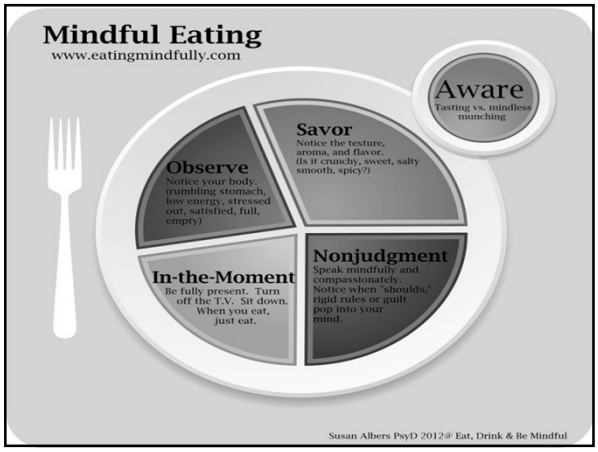

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Loving-Kindness Meditation:

Compassion / Metta Meditation

- **MANTRA: picture yourself and then others:**
  - ***May I (you) be happy,***
  - ***May I (you) be safe,***
  - ***May I (you) be healthy,***
  - ***May I (you) live with ease***
    - ***Sharon Salzberg, Jack Kornfield, Gil Fronsdal, etc***
- **PROCESS: Begin with yourself in saying the mantra**;
  - then someone you love;
  - then someone you know at work;
  - then someone you don't know that well;
  - then someone you have difficulties with and perhaps dislike

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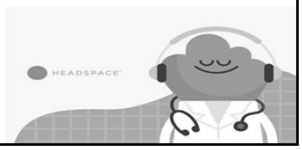
Apps & Live / Pre-Recorded Sessions

- **Headspace**
  - https://www.headspace.com/health-covid-19
- **Insight Timer or Calm**
- **UCSD CFM Live & Pre-Recorded Sessions:**
  - https://soundcloud.com/ucsdmindfulness/sets/short-meditation-sessions
  - https://bit.ly/UCSDMindfulCompassion



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One & Three Minute Practices:

- **One Minute:**
  - https://soundcloud.com/ucsdmindfulness/1-min-mindful-moment-by-marta-patterson?in=ucsdmindfulness/sets/short-meditation-sessions
- **Three Minute:**
  - https://soundcloud.com/ucsdmindfulness/3-min-mindful-moment-by-marta-patterson

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Whole-Person Care in California Prisons

—Ralph Diaz, Secretary, California Department of Corrections and Rehabilitation

Secretary Ralph Diaz

California Department of Corrections and Rehabilitation

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Proposition 57

The Public Safety and Rehabilitation Act of 2016

- Passed overwhelmingly by voters in November 2016, 64% to 35%
- Intent is to enhance public safety, stop the revolving door of crime by emphasizing rehabilitation, and prevent federal courts from releasing inmates due to overcrowding
- Proposition 57 incentivizes inmates to take responsibility for their own rehabilitation with credit-earning opportunities for sustained good behavior, as well as in-prison program and activities participation.
- Moves up parole consideration of nonviolent offenders who have served the full term of the sentence for their primary offense and who demonstrate that their release to the community would not pose an unreasonable risk of violence to the community.
- These changes will lead to improved inmate behavior and a safer prison environment for inmates and staff alike, and give inmates skills and tools to be more productive members of society once they complete their incarceration and transition to supervision.

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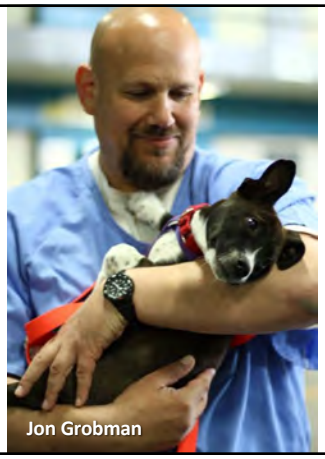

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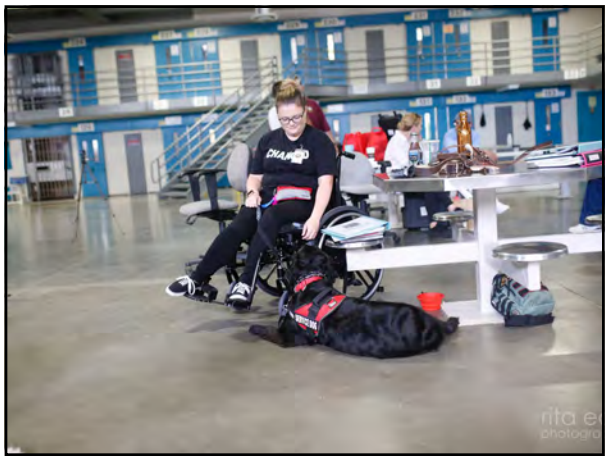

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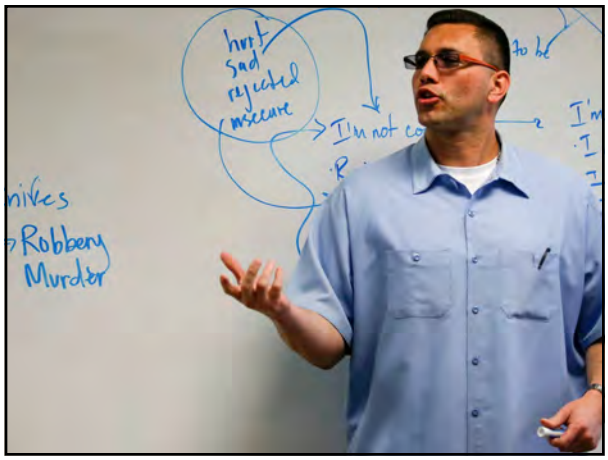

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What Works and What Doesn't in Reducing Recidivism: Understanding How to Change Behavior

— Edward J. Latessa, Ph.D., University of Cincinnati

What Works and What Doesn't in Reducing Recidivism: Understanding How to Change Behavior

Presented by:
Edward J. Latessa, Ph.D.
School of Criminal Justice
University of Cincinnati
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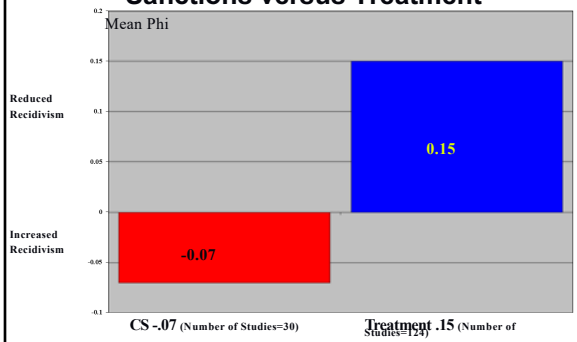
1

FROM THE EARLIEST REVIEWS:

- Not a single reviewer of studies of the effects of official punishment alone (custody, mandatory arrests, increased surveillance, etc.) has found consistent evidence of reduced recidivism.
- At least 40% and up to 60% of the studies of correctional treatment services reported reduced recidivism rates relative to various comparison conditions, in every published review.

2

Results from Meta Analysis: Criminal Sanctions versus Treatment



Andrews et al. (2000). Clinically relevant and psychologically informed approaches to reduced reoffending: A meta-analytic study of human service, risk, need, responsivity and other concerns in justice contexts. Unpublished Manuscript. Ottawa, Canada: Carleton University.

3

People Who Appear to be Resistant to Punishment

- Psychopathic risk takers
- Those under the influence of a substance
- Those with a history of being punished

4

So what are the Principles of Effective Intervention?

- Risk – the "who" to target
- Need – the "what to target"
- Responsivity (or treatment) – the "how"
- Fidelity – the "how well" - Biggest challenge is implementation

5

Risk Principle

- Focus on higher risk
- Make sure needed dosage is provided
- Do not increase risk

6

Need Principle

- Remove barriers but stay focused on criminogenic needs i.e. attitudes, peers, lack of self control, substance abuse etc.
- Develop multimodality programming

7

The Responsivity (Treatment) Principle

- General
  - Most people respond to programs that are based on *cognitive behavioral/social learning* theories
- Specific
  - People learn differently and have certain barriers that should be addressed so that they are more likely to succeed in programs

8

Specific Responsivity

What gets in the way of benefiting from treatment?

- Must take individual learning styles into account
- Must consider possible barriers to interventions
- Assessing and addressing responsivity factors can be important to maximize benefits of treatment

9

Responsivity areas can include:

- Motivation to change
- Anxiety
- Levels of psychological development
- Maturity
- Cognitive functioning
- Mental disorders
- Housing
- Transportation
- Gender/Ethnicity/Race

10

Prioritizing Interventions: What to Change and Why

- Criminogenic targets – reduce risk for recidivism
- Non-criminogenic targets: may reduce barriers but NOT risk

11

- List three speeches that have changed your life

12

- List three people who have changed your life

13

General responsivity Principle (Treatment)

The most effective interventions are behavioral:

- Focus on current factors that influence behavior
- Action oriented
- Staff follow “core correctional practices”

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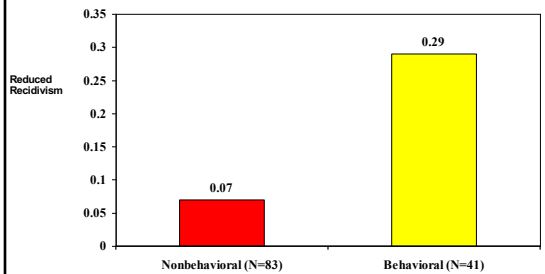
Results from Meta Analysis: Behavioral vs. NonBehavioral



Andrews, D.A. 1994. An Overview of Treatment Effectiveness. Research and Clinical Principles, Department of Psychology, Carleton University. The N refers to the number of studies.

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Most Effective Behavioral Models

- Structured social learning where new skills and behaviors are modeled
- Cognitive behavioral approaches that target criminogenic risk factors

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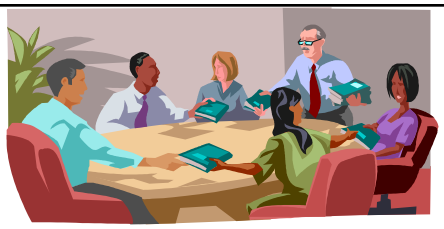


Social Learning

Refers to several processes through which individuals acquire attitudes, behavior, or knowledge from the persons around them. Both modeling and instrumental conditioning appear to play a role in such learning

17

The Four Principles of Cognitive Intervention

1. **Thinking affects behavior**
2. **Antisocial, distorted, unproductive irrational thinking can lead to antisocial and unproductive behavior**
3. **Thinking can be influenced**
4. **We can change how we feel and behave by changing what we think**

18

Meta-Analysis of Cognitive Behavioral Treatment for Offenders by Landenberger & Lipsey

- Reviewed 58 studies:
  - 19 random samples
  - 23 matched samples
  - 16 convenience samples
- Found that on average CBT reduced recidivism by 25%, but the most effective configurations found more than 50% reductions

Landenberger N., Lipsey, M. (2005). The positive effects of cognitive-behavioral programs for offenders: a meta-analysis of factors associated with effective treatment. Journal of Experimental Criminology. 1:451–476.

19

Significant Findings (effects were stronger if):

- Sessions per week (2 or more) - RISK
- Implementation monitored - FIDELITY
- Staff trained on CBT - FIDELITY
- Higher proportion of treatment completers – SPECIFIC RESPONSIVITY
- Higher risk offenders - RISK
- Higher if CBT is combined with other services - NEED

20

Some Examples of Cognitive Behavioral Correctional Curriculums

- Aggression Replacement Training (ART)
- Criminal Conduct and Substance Abuse Treatment
- Thinking for a Change (non-proprietary)
- UC's Cognitive Behavioral Interventions for Offenders Seeking Employment (non-proprietary – pilot underway)
- Changing Offender Lives (Specifically for MDOs – Non-proprietary)
- UC's Cognitive Behavioral Interventions for Substance Abuse (non-proprietary)
- Moving On (Female Offenders)
- UC's Cognitive Behavioral Treatment for Sex Offenders (non-proprietary)
- UC's Cognitive Behavioral Interventions for Offenders - A comprehensive curriculum (non-proprietary. Also adaptable for MDOs.

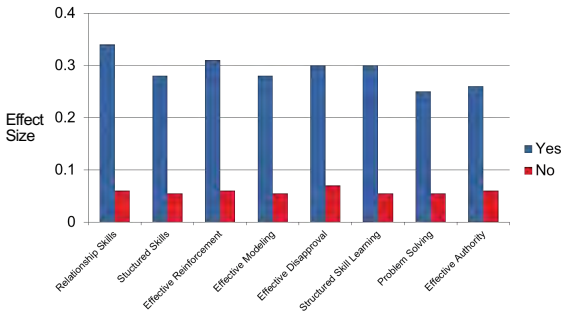
21

Core Correctional Practices

1. Effective Reinforcement
2. Effective Disapproval
3. Effective Use of Authority
4. Quality Interpersonal Relationships
5. Cognitive Restructuring
6. Anti-criminal Modeling
7. Structured Learning/Skill Building
8. Problem Solving Techniques

22

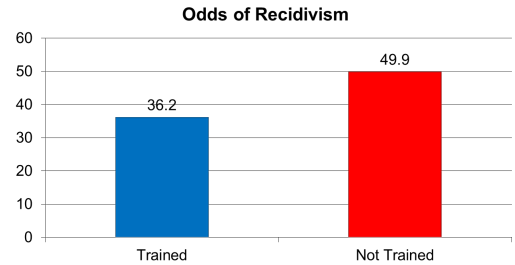
Core Correctional Practices and Recidivism



Gendreau (2003). Invited Address. APA Annual Conference. Toronto.

23

Meta Analysis: POs and Case Managers Trained in Core Correctional Practices Effects on Recidivism



Chadwick, DeWolf and Serin (2015). Effectively Training Community Supervision Officers, *Criminal Justice and Behavior, 20*: 1-13

24

Coaches vs. Referees

- Many staff take on the role of a referee not a coach
  - Referees enforce rules, apply penalty, impersonal authority figure, warning and sanctions, and control. They don't care who wins.
  - Coaches teach new skills, reinforce, know what needs to be improved and then teaches correct way, authority figure who is authoritative
- No one remembers the referee but we remember the good coaches
- We need more coaches

Lovins, B. K, Cullen, F. T. Latessa, E. J., and Jonson Lero, C. (forthcoming) Probation Officer as a Coach: Building a New Professional Identity. *Federal Probation.*

25

How do we make this Transformation?

- Hire people who believe that people can change
- Train on Core Correctional Practices
  - Effective Reinforcement
  - Effective Disapproval
  - Effective Use of Authority
  - Quality Interpersonal Relationships
  - Cognitive Restructuring
  - Anti-criminal Modeling
  - Structured Learning/Skill Building
  - Problem Solving Techniques
- Recruit and train "influencers" – develop pro-social network with some actual skills to help offenders avoid risky situations
- Challenge the status quo – remove barriers and focus on changing behavior

26

What Doesn't Work with Offenders?

27

Lakota tribal wisdom says that when you discover you are riding a dead horse, the best strategy is to dismount. However, in corrections, and in other affairs, we often try other strategies, including the following:

- Buy a stronger whip.
- Change riders
- Say things like "This is the way we always have ridden this horse."
- Appoint a committee to study the horse.
- Arrange to visit other sites to see how they ride dead horses.
- Create a training session to increase our riding ability.
- Harness several dead horses together for increased speed.
- Declare that "No horse is too dead to beat."
- Provide additional funding to increase the horse's performance.
- Declare the horse is "better, faster, and cheaper" dead.
- Study alternative uses for dead horses.
- Promote the dead horse to a supervisory position.

28

Ineffective Approaches

- Programs that cannot maintain fidelity
- Programs that target non-criminogenic needs
- Drug prevention classes focused on fear and other emotional appeals
- Shaming
- Drug education programs
- Non-directive, client centered approaches
- Bibliotherapy
- Talking cures
- Self-Help programs
- Vague unstructured rehabilitation programs
- "Punishing smarter" (boot camps, scared straight, etc.)

29

Fidelity Principle

Biggest Challenge: Making sure the program is delivered as designed and with integrity:

- Ensure staff are modeling appropriate behavior, are qualified, well trained, well supervision, etc.
- Make sure barriers are addressed but target criminogenic needs
- Make sure appropriate dosage of treatment is provided
- Monitor delivery of programs & activities, etc.
- Reassess offenders in meeting target behaviors

30

Successful Staff

- Successful staff are modeling appropriate behavior, qualified, well trained, well supervised, and committed
- Staff should be trained, coached, and evaluated regularly in key service delivery skills

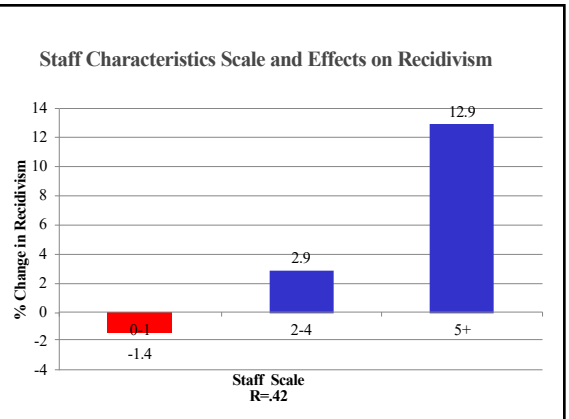
31

Study Conducted by UC Examined Staff Characteristics

- Qualified and Experienced
- Selected for skills and values consistent with offender rehabilitation
- Regular staff meetings
- Assessed on service delivery
- Receive clinical supervision
- Training (initial and ongoing)
- Staff input into the program
- Staff support treatment goals
- Ethical guidelines in place

Follow-up Evaluation of Ohio's Community Based Correctional Facility and Halfway House Programs—Outcome Study (2010). Latessa, E., Lovins, L, and Smith. P. Center for Criminal Justice Research, University of Cincinnati.

32



33

Studies Show…

Competent Staff → Better Quality Implementation

↓ Re-offending

Less competent Staff → Poorer Quality Implementation

↑ Re-offending

34

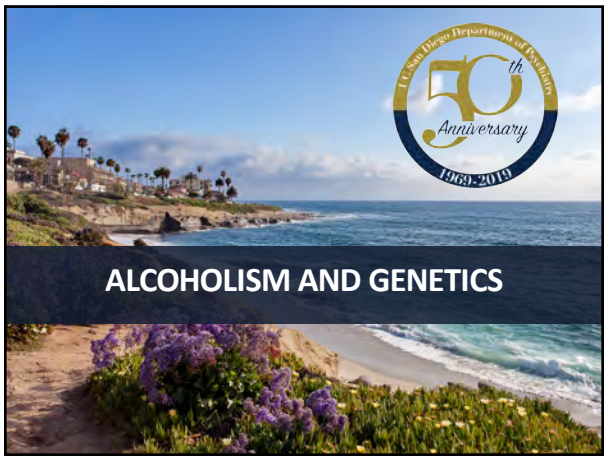
Some Lessons Learned from the Research

- How you target offender for change is important – use behavioral approaches
- Program Integrity makes a difference - Service delivery, training/supervision of staff, support for program, QA, evaluation, etc.

35

How Genes Influence Alcoholism (and why we should care)

—Marc Schuckit, MD, UCSD



1

LECTURE COVERS

- Background
- Do genes affect the risk?
- What is inherited?
- Low alcohol response
  - How environment contributes
  - Searching for genes
- How to use the information

2

LECTURE COVERS

- Background
- Do genes affect the risk?
- What is inherited?
- Low alcohol response
  - How environment contributes
  - Searching for genes
- How to use the information

3

SUBSTANCE USE DISORDER Dx

In same year 2+ of:

Failed roles

Hazardous use

Social problems

Tolerance

Withdrawal

Use longer/more

Unable to ↓

Lots time use

↓ activities

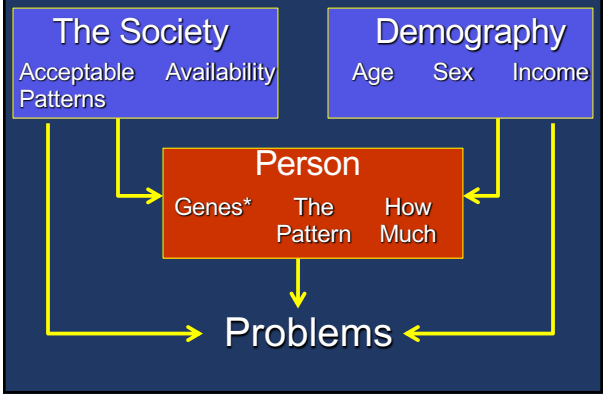
Use despite probs

Craving

If alcohol, is AUD, etc.

4

ALCOHOL USE & PROBLEMS



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LECTURE COVERS

Background

Do genes affect the risk?

What is inherited?

Low alcohol response

How environment contributes

Searching for genes

How to use the information

6

GENES AND AUDs

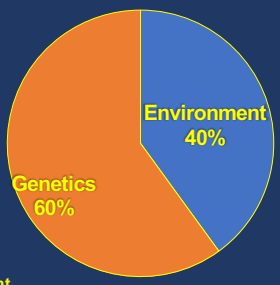
4 x ↑offspring risk

4 x ↑ if adopted out

Risk > for MZ vs DZ twins

7

ALCOHOLISM RISK



Multiple Characteristics

Each with Genes & Environment

8

PREDISPOSING RISK FACTORS

Alcohol metabolizing enzymes

Impulsivity

Psychiatric disorders

Sensitivity / Level of Response (LR)

9

ALCOHOL METABOLISM

~10% excreted via lungs/urine/sweat

90% metabolized by stomach & liver enzymes:

alcohol → acetaldehyde (ADH)

acetaldehyde → CO_2 and H_2O (ALDH)

AMSP 2018 10

10

PREDISPOSING RISK FACTORS

Alcohol metabolizing enzymes

Impulsivity

Psychiatric disorders

Sensitivity / Level of Response (LR)

11

LECTURE COVERS

Background

Do genes affect the risk?

What is inherited?

Low alcohol response

- How environment contributes
- Searching for genes

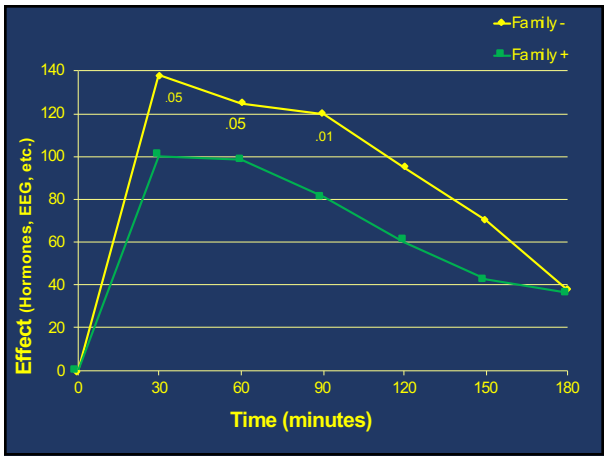
How to use the information

12

LR RATIONALE

Youth drink for effects
If need more for effect
will drink more
Then heavy drinking affects
Peers
Expectations
Stress

13



14

SELF REPORT OF EFFECTS

	1st 5 Times	Recent 3 Months	Heaviest
Feel Effect			
Feel Dizzy or Slur Speech			
Stumble			
Fall Asleep			

15

SRE CORRELATES: AGE 12*

Maximum drinks	.49
Frequency	.11
Problems	.28

* Avon Longitudinal Study of Parents and Children

16

LR PREDICTS OUTCOMES

San Diego Prospective Study

San Diego Prevention Study

Collaborative Study of Genetics AUDs

Avon Longit Study Parents & Children

Plus Australian twins, Danish cohort

17

ENVIRONMENT/ATTITUDE MEASURES

LR: Self Report of Effects of alcohol

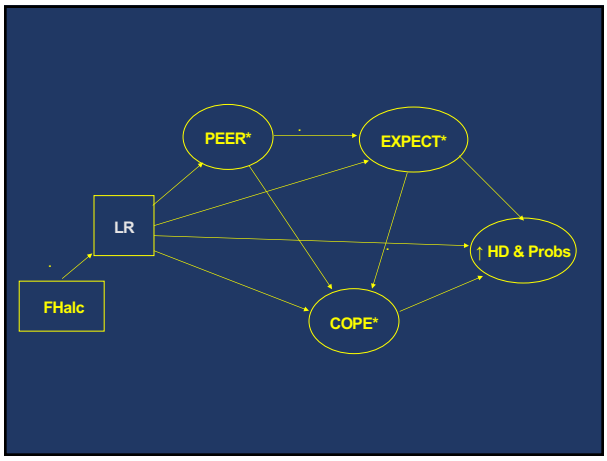
Alcohol challenge

Peer drinking: Important People Scale

Expectancies: Alcohol Expect Questionnaire

Coping: Drinking to Cope

18



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Genes: Alcohol Sensitivity

Metabolizing

ALDH2,2*
ALDH1B*
CYP2E1*

Opioids

OPRM1
OPRK1

Serotonin

5-HTTLPR -L*

GABA

GABRA2
GABRA1
GABRA6
GABRG1
SLC6A11

Cholinergic

CHRNA5/CHRNB2

More Genes

PRMT3*
HTATIP2*
DBX1*
SLC6A5*
AFDN*
KIF25*

20

LECTURE COVERS

- Background
- Do genes affect the risk?
- What is inherited?
- Low alcohol response
  - How environment contributes
  - Searching for genes
  - How to use the information

21

PREVENTION STUDY (N=500)

Questionnaire to students
- ~73% response
- Select matched low and high LR

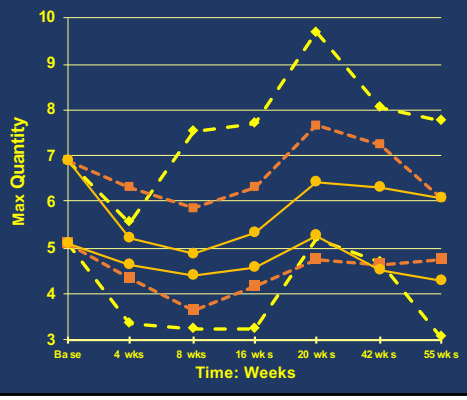
3 prevention groups
- LR-Based (LRB)
- State of the Art (SOTA)
- Control

Four 45-min Internet videos

Follow for 55 weeks

22

Maximum Drinks



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The Top 10 Clinical Implications from the EAGLES and CATS Trials

—Robert Anthenelli, MD, UCSD

The Top 10 Clinical Implications From the EAGLES and CATS Trials

Robert M. Anthenelli, M.D.

Professor and Interim Chair
Director, Pacific Treatment and Research Center
Department of Psychiatry
University of California, San Diego, Health Sciences

1

Acknowledgements

- Dr. Anthenelli's research is supported by:
  - National Institute on Alcohol Abuse and Alcoholism (NIAAA) Award # R21AA027634
  - University of California Office of the President (UCOP) Tobacco-Related Disease Research Program Award # T29IPO379
  - National Institute on Drug Abuse (NIDA) Award # UO1 DA041731
  - …and thanks to Lindsay Gomez and Lauren Brooks for help with slides and visuals

2

Disclosures

- *Consulting Agreements:* Astraea Therapeutics; Pfizer
- *Other Research Support:* Pfizer (drug supply for UCOP TRDRP Award # T29IPO379)
- The opinions expressed in this talk are Dr. Anthenelli's own and do not necessarily reflect the views of the University of California

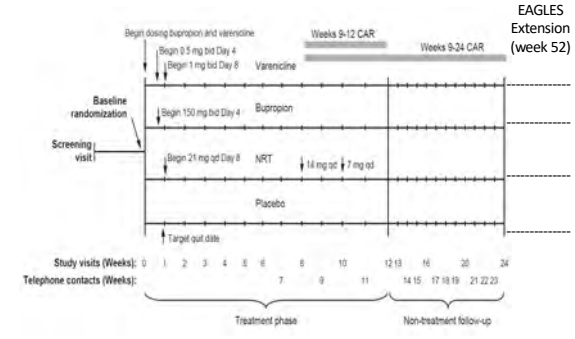
3

Evaluating Adverse Events in a GLobal Smoking CEssation Study (EAGLES)

- Anthenelli RM et al. *Lancet* 2016;387:2507–2520
  - Multicenter, double-blind, randomized, controlled trial
  - 140 centers; 16 countries
  - Psychiatric and Non-Psychiatric Cohorts
  - Varenicline vs. bupropion vs. NRT (patch) vs. placebo
    - triple dummy design
  - 1000 subjects per treatment arm and cohort (total *N*= >8000)
  - Balanced by diagnostic group within Psychiatric Cohort
  - Brief smoking cessation counseling at all visits/contacts

4

EAGLES Study Design



Anthenelli et al., Lancet 2016
CAR, continuous abstinence rate; NRT, nicotine replacement therapy (transdermal nicotine patch)

5

EAGLES Continues to Produce New Findings

1. Anthenelli et al. *Lancet* 2016
2. West et al. *Addiction* 2018
3. Benowitz et al. *JAMA Internal Medicine* 2018 aka "CATS"
4. Evins et al. *Journal of Clinical Psychopharmacology* 2019
5. Anthenelli et al. *Journal of General Internal Medicine* 2019
6. Heffner et al. *Journal of Affective Disorders* 2019
7. Ayers et al. – *Depression & Anxiety* 2019
8. Evins et al. – Psychotic Disorders
9. Cinciripini et al. – Major Depressive Disorder
10. Gaznick et al. – Lifetime History of Suicidality
11. Correa et al. – Comorbidity/Multimorbidity
12. West et al. – Bayesian Analysis

6

#1: Incidence of clinically significant NPSAEs is low in smokers w/o MHCs

- About 1 in 50 (2%) smokers without a mental health condition (MHC) experience a moderate-to-severe neuropsychiatric adverse event (NPSAE) when making a medication-assisted quit attempt.
- These rare events occur regardless of which medication (NRT, bupropion, varenicline, placebo) is used and they seldom manifest as serious adverse events.

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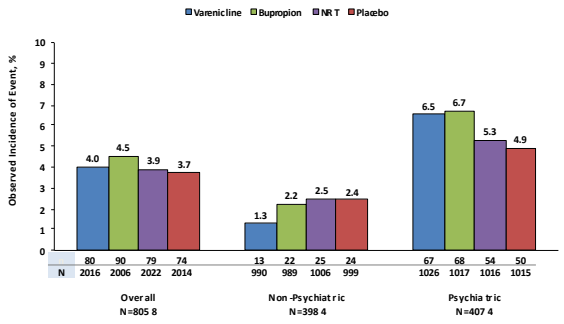
#2: Incidence of clinically significant NPSAEs is higher in smokers with MHCs

- While still relatively infrequent (~6% overall), the incidence of moderate-to-severe NPSAEs in smokers with MHCs is ~3-times higher regardless of the medication/placebo used
- The incidence of moderate-to-severe NPSAEs appears highest in individuals with serious mental illness such as bipolar disorder and schizophrenia

8

Primary Neuropsychiatric AE Composite Endpoint

Observed Incidence



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#2: Smokers with MHCs more likely to experience moderate to severe NPSAEs when trying to quit; however, vast majority do not, and risk does not appear related to any particular treatment

Bipolar Disorder: Risk Difference (RD)* = 7.7; 95% CI = 4.2-11.3
Schizophrenia Spectrum Disorders: RD* = 4.0; 95% CI = 1.6 – 6.3
Panic Disorder: RD* = 4.0; 95% CI = 0.3 – 7.6
PTSD: RD* = 3.8; 95% CI = -1.0 – 8.5
GAD: RD* = 3.3; 95% CI = -0.5 – 7.2

(Risk Difference [RD]* across all treatments compared with same in the non-psychiatric cohort)

- Reassure
- Know the risk factors
- Monitor for moderate-to-severe NPSAEs and adjust treatment accordingly

10

#3: FDA revises description of mental health side effects of the stop-smoking medicines Chantix (varenicline) and Zyban (bupropion) to reflect clinical trial findings

- **[12-16-2016]** Based on a U.S. Food and Drug Administration (FDA) review of a large clinical trial that we required the drug companies to conduct,[‡] we have determined the risk of serious side effects on mood, behavior, or thinking with the stop-smoking medicines Chantix (varenicline) and Zyban (bupropion)[*] is lower than previously suspected….The results of the trial confirm that the benefits of stopping smoking outweigh the risks of these medicines.
- As a result of our review of the large clinical trial, **we are removing the *Boxed Warning*,** FDA's most prominent warning, for serious mental health side effects **from the Chantix drug label**. The language describing the serious mental health side effects seen in patients quitting smoking will **also** be **removed from the *Boxed Warning* in the Zyban label**.[†]
- Similar regulatory actions taken by European Medicines Agency, Health Canada, and in Israel and France

http://www.fda.gov/Drugs/DrugSafety/ucm532221.htm

11

#4: Several Characteristics Predict Risk of Experiencing Moderate-to-Severe NPSAEs Regardless of Treatment

- In both smokers with and without mental health conditions
  - Current symptoms of anxiety
  - Past history of suicidal ideation or behavior
  - Being of White race
- In smokers with histories of mental health conditions
  - Being younger and of female sex
  - Having a history of comorbid psychiatric and substance use disorders
  - Greater smoking duration
  - Higher severity of nicotine dependence

Anthenelli et al. Predictors of neuropsychiatric adverse events with smoking cessation medications in the randomized controlled EAGLES trial. *Journal of General Internal Medicine*, 2019

12

#5: Since SI/SB predicts risk, screen for this, especially among smokers with MHCs

- Having a past history of SI/SB is common among smokers with MHCs especially among individuals with MHCs marked by mood lability (e.g., borderline personality, bipolar disorder, recurrent MDD) and pathological rumination (PTSD, OCD)
- Since past h/o SI/SB predicts moderate-to-severe NPSAEs, inquire about such history and monitor these smokers more carefully

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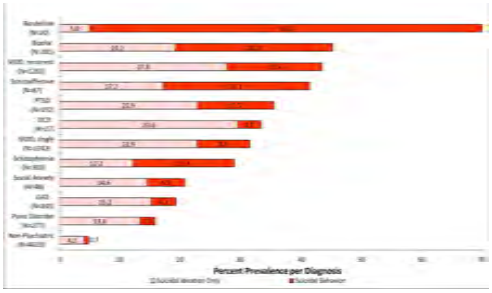
Lifetime Prevalence of Suicidal Ideation/ Behavior in Smokers with and without Mental Health Conditions



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#6: In general, regarding relative effectiveness-- Varenicline > bupropion = mono NRT > placebo

- Varenicline is the most effective smoking cessation monotherapy in smokers with and without MHCs
- In most instances, except for PTSD and Panic Disorder, where NRT's effects were similar to varenicline's, varenicline was superior to both bupropion and NRT
- In almost all instances, except for bipolar disorder, all 3 medications were more effective than placebo

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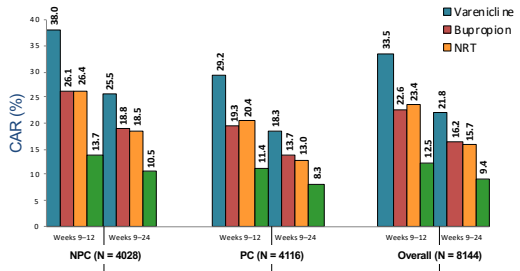
Relative Efficacy of 1st–Line Smoking Cessation Aids



OR (95% CI)						
Primary comparisons						
Varenicline vs. placebo	4.00 (3.20, 5.00)	2.99 (2.33, 3.83)	3.24 (2.56, 4.11)	2.50 (1.90, 3.29)	3.61 (3.07, 4.24)	2.74 (2.28, 3.30)
Bupropion vs. placebo	2.26 (1.80, 2.85)	2.00 (1.54, 2.59)	1.87 (1.46, 2.39)	1.77 (1.33, 2.36)	2.07 (1.75, 2.45)	1.89 (1.56, 2.29)
Secondary comparisons						
NRT vs. placebo	2.30 (1.83, 2.90)	1.96 (1.51, 2.54)	2.00 (1.56, 2.55)	1.65 (1.24, 2.20)	2.15 (1.82, 2.54)	1.81 (1.49, 2.19)
Varenicline vs. NRT	1.74 (1.43, 2.10)	1.52 (1.23, 1.89)	1.62 (1.32, 1.99)	1.51 (1.19, 1.93)	1.68 (1.46, 1.93)	1.52 (1.29, 1.78)
Bupropion vs. NRT	0.98 (0.80, 1.20)	1.02 (0.81, 1.28)	0.94 (0.75, 1.16)	1.07 (0.83, 1.39)	0.96 (0.83, 1.11)	1.04 (0.88, 1.24)
Varenicline vs. bupropion	1.77 (1.46, 2.14)	1.49 (1.20, 1.85)	1.74 (1.41, 2.14)	1.41 (1.11, 1.79)	1.75 (1.52, 2.01)	1.45 (1.24, 1.70)

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Summary of EAGLES Efficacy Odds Ratios (ORs) Compared With Placebo in Smokers with Various MHCs

	VAR	BUP	NRT
PTSD	3.2	1.2	3.1
GAD	**4.5**	2.4	2.4
PD	**8.5**	3.3	**7.4**
MDD (single)	**2.5**	1.8	1.7
MDD (recurrent)	**3.7**	**2.1**	**2.1**
SSD	**7.4**	3.2	3.7
BD	2.6	1.3	0.7

Bolded ORs reflect 95% CIs > 1.
ORs and 95% CIs are for Continuous Abstinence Rates (CAR) during weeks 9-12.
Caveat: Non-significant values may reflect limited power in these EAGLES subcohorts.

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#7: Smokers with MHCs have lower odds of quitting compared with smokers w/o MHCs

- This varies by type of primary diagnosis:
  - Schizophrenia Spectrum Disorder ↓ 54%
  - Panic Disorder ↓ 47%
  - PTSD ↓ 42%
  - Bipolar Disorder ↓ 35%
  - Generalized Anxiety Disorder ↓ 28%
  - Major Depression ↓ 20%

  Partly relates to greater nicotine dependence severity, but other factors at play

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#8: Although effective, medications are underused, especially among smokers with MHCs

Prior Treatment With Smoking Cessation Meds

	BD	SSD	PTSD	GAD	PD	MDD single	MDD recurrent	**NPC**
NRT	25%	15%	25%	28%	25%	29%	32%	**25%**
BUP	12%	4%	11%	11%	9%	12%	14%	**9%**
VAR	14%	8%	14%	16%	17%	20%	17%	**14%**

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9: Younger age, higher levels of cigarette dependence, and having a MHC independently predict failure to achieve smoking abstinence

Odds of Successful Quitting

+ Associations	- Associations
Older age	U.S. enrollment site
Higher BMI	Black (versus White) race
Older age started smoking	Mood disorder
	Anxiety disorder
	Psychotic disorder
	Taking psychotropic meds
	FTCD score
	Prior use of NRT

- No treatment x covariate interactions
- Pharmacotherapy efficacy not affected by prior use of that treatment

West et al. Addiction 2018

20

#10: "CATS" found no evidence that any of the smoking cessation medications were associated with increased risk of serious cardiovascular events

- EAGLES Extension Study (CATS) found no evidence that any of the smoking cessation medications were associated ↑ risk of cardiovascular events (Benowitz et al. 2018)
- Supports other studies finding no such association

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Summary and Conclusions

- Varenicline, bupropion and nicotine patch are well tolerated and effective in adult smokers with and without mood, anxiety, and psychotic disorders
- Their relative effectiveness (varenicline > bup = patch > placebo) did not vary across psychiatric diagnoses
  - Bipolar Disorder: Bupropion and NRT effect sizes descriptively lower
  - PTSD & Panic Disorder: Varenicline and NRT had similar effect sizes
- Smokers with MHCs have higher risk of NPSAEs and are less likely to quit overall than smokers without MHCs
- Smoking cessation medications do not increase the risk of serious cardiovascular events in the general population of smokers
- Study results apply to those with stable psychiatric disorders and no current active substance use disorders

22

Predicting Emerging Drug Use Epidemics and Associated Health Harms in the United States

—Annick Borquez, Ph.D., UCSD

UC San Diego

PREDICTING EMERGING DRUG USE EPIDEMICS AND ASSOCIATED HEALTH HARMS IN THE UNITED STATES

Summer Clinical Institute in Addiction Studies 2020

Annick Borquez, PhD
Assistant Professor
Division of Infectious Diseases and Global Public Health
Department of Medicine, UCSD
aborquez@health.ucsd.edu

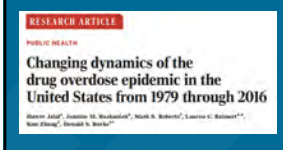
1

OVERVIEW

- ❑ Epidemiological perspective on drug use epidemics in the United States
- ❑ Current challenges
- ❑ Can we better anticipate and respond to these epidemics?

2

Drug overdose mortality in the U.S.

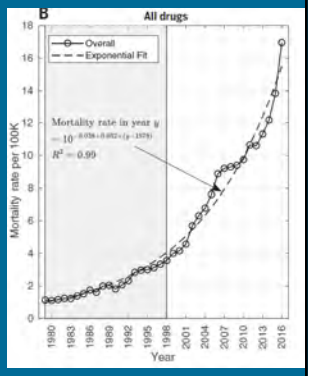

RESEARCH ARTICLE

PUBLIC HEALTH

Changing dynamics of the drug overdose epidemic in the United States from 1979 through 2016

Hannes Juhl[a], Jasmine M. Buckmaster[b], Mark S. Roberts[c], Lauren C. Balmert[a,*], Xue Zhong[a], Donald S. Burke[a]

Over 500,000 overdose deaths since 1999



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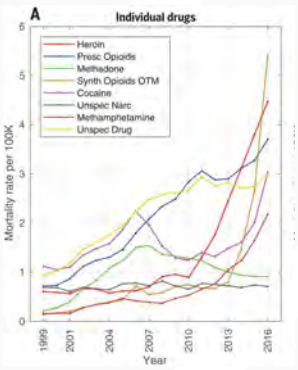
OVERDOSE DEATHS BY DRUG



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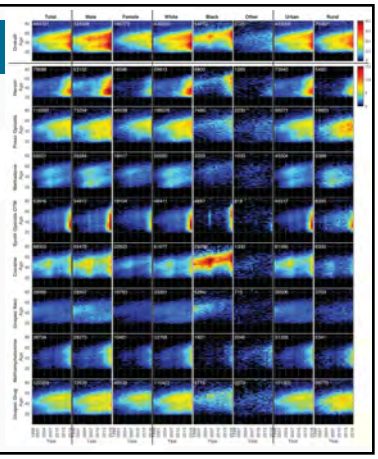
OVERDOSE DEATHS

Age-adjusted mortality rates per 100,000 people over time

- by age
- sex
- race
- location



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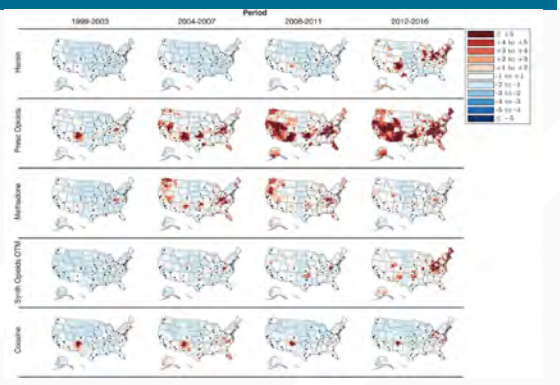
5

OVERDOSE DEATHS THROUGH SPACE



6

INFECTIOUS DISEASES: HIV

Morbidity and Mortality Weekly Report (MMWR)

Community Outbreak of HIV Infection Linked to Injection Drug Use of Oxymorphone – Indiana, 2015

Weekly

May 1, 2015 / 64(16);443-444

HIV Outbreaks among people who inject drugs (PWID):

- Lawrence and Lowell, Massachusetts: 166 cases in 2017
- Seattle, Washington: 27 cases in 2018

HIV outbreak among men who have sex with men and PWID

- West Virginia: 57 cases in 2017

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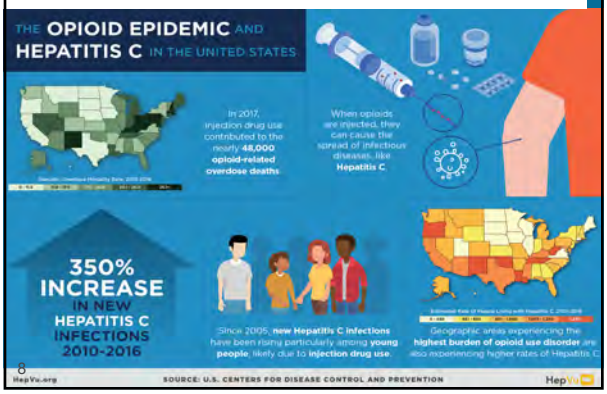
INFECTIOUS DISEASES: HEPATITIS C



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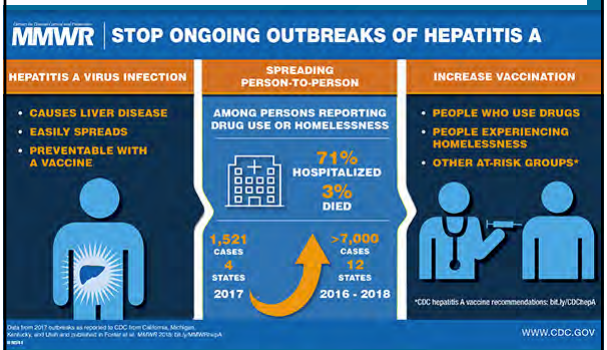
INFECTIOUS DISEASES: HEPATITIS A



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Mental health

Figure 53. Past Year Substance Use Disorder (SUD) and Mental Illness among Adults Aged 18 or Older: 2018

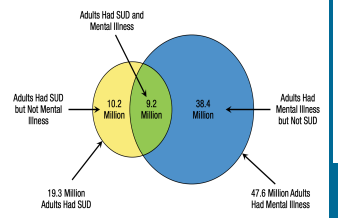
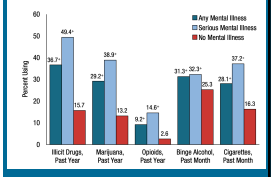


Figure 56. Substance Use among Adults Aged 18 or Older, by Mental Illness Status: 2018



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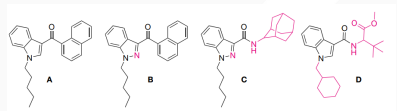
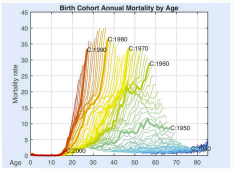
Exacerbating conditions for drug use outbreaks and collateral harms





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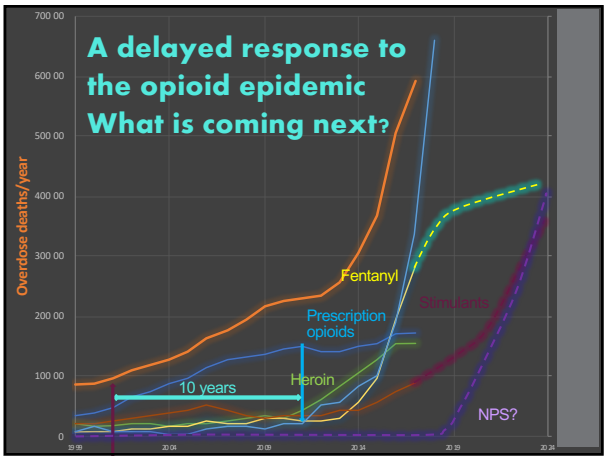
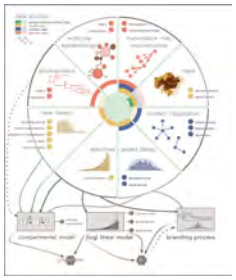


CAN WE BETTER UNDERSTAND DRUG USE EPIDEMICS AND ANTICIPATE THEM?

INFECTIOUS DISEASE EPIDEMIC RESPONSE PLAN AND ANALYTIC TOOLS

Disease Surveillance, Early Warning and Response in Crisis Situations

Risk assessment	Public Health Risk Assessment, Displacement Tracking Matrix (DTM), Population Mobility Mapping (PMM) for health risk profiling
Prevention	Risk communication, community mobilization, vaccination at border spaces/ mobility hotspots/ migrant dense areas
Detection	Community-based Event Surveillance (CEBS) and links to established Disease Surveillance and Early Warning System at border spaces, Points of Entry (POEs) and mobility hotspots
Control	PMM for disease containment, case management, Emergency Operations Centers (EOC)



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Public health preparedness to drug use outbreaks

Dynamically Modeling SARS and Other Newly Emerging Respiratory Illnesses
Past, Present, and Future

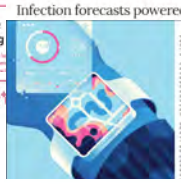
Spread of yellow fever virus outbreak in Angola and the Democratic Republic of the Congo 2015–16: a modelling

Potential for Zika virus introduction and transmission in resource-limited countries in Africa and the Asia-Pacific region: a modelling study

Infectious Disease Modeling Methods as Tools for Informing Response to Novel Influenza Viruses of Unknown Pandemic Potential

nature

Infection forecasts powered by big data



Using search engine big data for predicting new HIV diagnoses

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EMeRGenS

Epidemic **M**odeling of **R**eal-time **G**eneration and **S**pread of **S**ubstance use

NIDA Avenir Award in HIV/AIDS research

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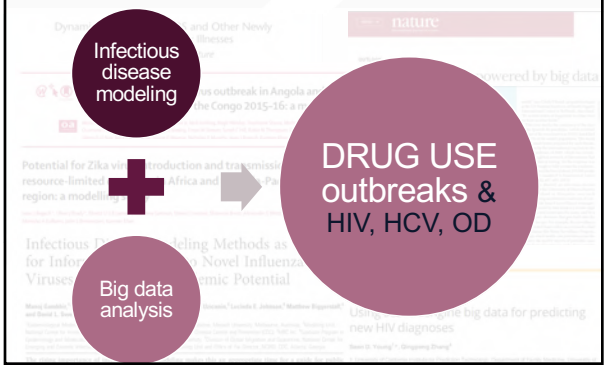
Public health preparedness to drug use outbreaks



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SUSCEPTIBILITY TO DRUG USE DISORDERS

Individual level

- ❑ Mental health disorders
- ❑ Genetic factors
- ❑ No access to healthcare (self medication)
- ❑ History of trauma
- ❑ Exposure to drugs
- ❑ Stress: unemployment, marginalization

Community level

- ❑ Social marginalization (e.g. ethnicity)
- ❑ Community trauma, violence
- ❑ Current/previous community experience of drug use harm

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GEOGRAPHICAL SPREAD: DRUG MARKETS

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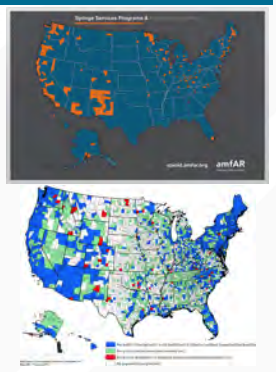
HEALTHCARE/DRUG USE SERVICES ACCESS

- ❑Access to healthcare services
- ❑Access to evidence-based drug use treatment
- ❑Access to harm reduction services



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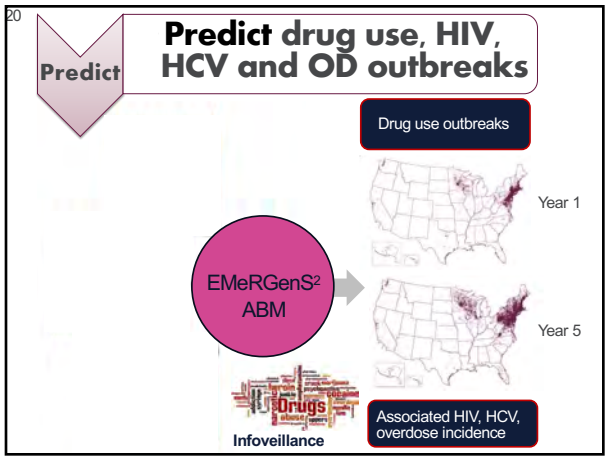

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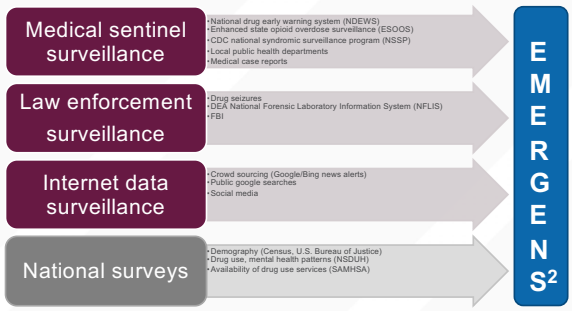
Data: Infoveillance



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Real time monitoring of drug use trends: Internet data and outbreak prediction

Drug and Alcohol Dependence

Short communication

Internet searches for opioids predict future emergency department heroin admissions

Sean D. Young, Kai Zheng, Larry F. Chu, Keith Humphreys

PLOS ONE

RESEARCH ARTICLE

Using search engine big data for predicting new HIV diagnoses

Sean D. Young, Qingpeng Zhang

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Predict drug use, HIV, HCV and OD outbreaks

- Future drug use trends and associated HIV, HCV, overdose incidence
- Geographical spread
- Demographic distribution

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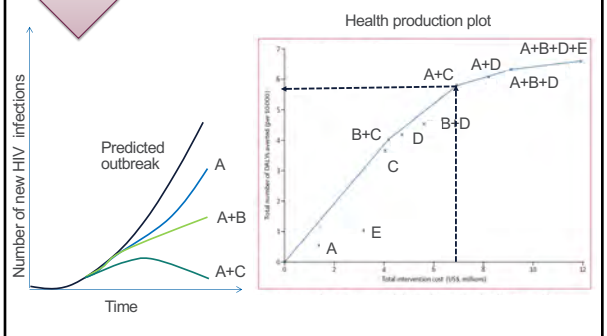
Identify cost-effective response strategies to prevent drug use, HIV, HCV and OD outbreaks



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Inform prevention

Identify cost-effective response strategies to prevent drug use, HIV, HCV and OD outbreaks

- Most cost-effective combination of interventions

- Coverage levels required

- Expected impact on drug use, HIV, HCV and OD incidence

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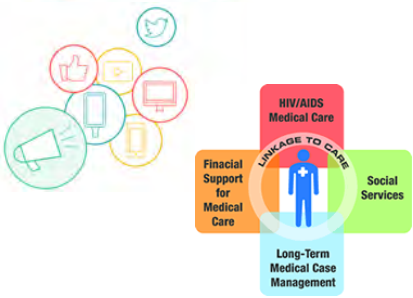
Respond

Mount a real-time response to drug use, HIV, HCV, and OD outbreaks



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Respond

Mount a real-time response to drug use, HIV, HCV, and OD outbreaks

- Feasibility of REACHING the intended population through mass media platforms

- Uptake levels

- Implementation challenges

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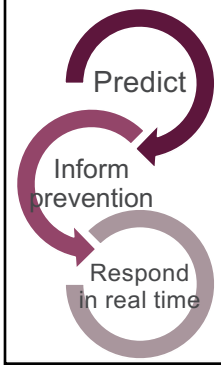
Transforming public health preparedness to drug use outbreaks



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COVID-19 RELATED CHALLENGES:

- ❑ Disruption of illicit drug markets (supply)
- ❑ Increase in mental health disorders
- ❑ Increase in socio-economic factors conducive to drug use disorders

The Pandemic Is Disrupting the Illegal Drug Trade

By Andrew Davis
7 May 2020, 01:55 GMT-7

- Traffickers are shifting to virus-related crimes: UN report
- Virus Fallout may lead to stockpiles of cheap, very pure drugs

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QUESTIONS?

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Devoted to workforce competence in addiction and mental health services by bringing research to practice — our clients deserve the best!

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