



Understanding the Neuroscience of Addiction to Provide Effective Treatment

6 hours

PDH Academy
PO Box 449
Pewaukee, WI 53072

www.pdhacademy.com
pdhacademy@gmail.com

ANSWER SHEET

First Name: _____ Last Name: _____ Date: _____

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** See instructions on the cover page to submit your exams and pay for your course.

By signing and submitting this final exam for grading, I hereby certify that I have spent the required time to study this course material and that I have personally completed each module/session of instruction.

Signature: _____ Date: _____

Understanding the Neuroscience of Addiction to Provide Effective Treatment - Final Exam

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|--------------------|---------------------|---------------------|---------------------|---------------------|
| 1. (A) (B) (C) (D) | 7. (A) (B) (C) (D) | 13. (A) (B) (C) (D) | 19. (A) (B) (C) (D) | 25. (A) (B) (C) (D) |
| 2. (A) (B) (C) (D) | 8. (A) (B) (C) (D) | 14. (A) (B) (C) (D) | 20. (A) (B) (C) (D) | 26. (A) (B) (C) (D) |
| 3. (A) (B) (C) (D) | 9. (A) (B) (C) (D) | 15. (A) (B) (C) (D) | 21. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 4. (A) (B) (C) (D) | 10. (A) (B) (C) (D) | 16. (A) (B) (C) (D) | 22. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 5. (A) (B) (C) (D) | 11. (A) (B) (C) (D) | 17. (A) (B) (C) (D) | 23. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 6. (A) (B) (C) (D) | 12. (A) (B) (C) (D) | 18. (A) (B) (C) (D) | 24. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |

Understanding the Neuroscience of Addiction to Provide Effective Treatment

FINAL EXAM (6 CE HOURS)

1. **Which is not included in the classes of substance in the DSM-5?**
 - a. Tobacco
 - b. Amphetamines
 - c. Cannabis
 - d. Hallucinogens
2. **The three types of coping are:**
 - a. Distress, Eustress, Moderate Stress
 - b. Action-based, Emotion-based, Harmful
 - c. Physical, Emotional, Mental
 - d. None of the above
3. **What is the definition of stress?**
 - a. A reaction of frustration
 - b. A response to a perceived threat, challenge or change
 - c. A response of emotions
 - d. None of the above
4. **The frontal lobe is, typically, fully developed by:**
 - a. 12 years old
 - b. 50 years old
 - c. 26 years old
 - d. 21 years old
5. **The portion of the brain that is responsible for logic and problem solving is:**
 - a. Cerebellum
 - b. Hypothalamus
 - c. Frontal lobe
 - d. Amygdala
6. **The Danger Sequence is:**
 - a. A diagnostic criteria
 - b. A group of at-risk behaviors
 - c. An adaptive coping strategy
 - d. None of the above
7. **The four predisposing factors to addiction are:**
 - a. Low self-esteem, poor will power, minimal support, poverty
 - b. Minimal coping skills, biological vulnerability, social context, lack of belonging
 - c. Spiritual bankruptcy, social context, psychological vulnerability, biological
 - d. Psychological vulnerability, minimal support, poverty, minimal coping skills
8. **Addiction is a chronic disease, similar to:**
 - a. Diabetes
 - b. High Blood Pressure
 - c. Asthma
 - d. All of the above
9. **True addiction 'hijacks' the:**
 - a. Cerebellum
 - b. Hypothalamus
 - c. Frontal lobe
 - d. Limbic System
10. **It takes about _____ nutrient rich calories for the brain to carry out basic body functions.**
 - a. 50
 - b. 100
 - c. 500
 - d. 1000
11. **Technology that is assisting the addiction field with brain imaging is:**
 - a. Biomarkers
 - b. CT Scans
 - c. Biofeedback
 - d. fMRI
12. **The amygdala is active at what age:**
 - a. 2 years old
 - b. 5 years old
 - c. birth
 - d. 1 year old
13. **The basal ganglia is responsible for:**
 - a. Reward
 - b. Relief
 - c. Patterns/Habits
 - d. All of the above
14. **The following has been defined as "pain in the soul that cannot be tolerated":**
 - a. Guilt
 - b. Low self-esteem
 - c. Anger
 - d. Shame

15. **The portion of the brain that is responsible for memory storage:**
- Cerebellum
 - Hypothalamus
 - Hippocampus
 - Prefrontal Cortex
16. **According to Jeff Georgi, what percentage of the population is predisposed to addiction?**
- 1/16
 - 1/3
 - 1/2
 - 1/4
17. **Which one is not part of Emotional Intelligence:**
- Self-regulation
 - Empathy
 - Compassion
 - Self-Awareness
18. **The Reward and Relief pathway is found in which structure of the brain?**
- Basal Ganglia
 - Hypothalamus
 - Frontal lobe
 - Amygdala
19. **Symptoms of stress affect the following:**
- Physical
 - Mental
 - Emotional
 - All of the above
20. **Too little stress can be termed as:**
- Bliss
 - Managed
 - Brown out
 - None of the above
21. _____ is the ability to sustain concentration and attention on a particular activity, thought, or feeling that is in the moment.
- Deep Breathing
 - Mindfulness
 - Gratitude
 - Danger Sequence
22. **Stress is:**
- Annoying
 - Essential
 - Overrated
 - Enjoyable
23. **Kubler-Ross's Stages of Grief has five stages. The third stage is:**
- Acceptance
 - Denial
 - Anger
 - Bargaining
24. **During the Anger Stage, anger is typically:**
- Hidden
 - Projected
 - Internalized
 - Magnified
25. **Raw grief typically lasts:**
- Three – six months
 - Six – nine months
 - Nine – 12 months
 - 12 – 18 months
26. **Which of the following is not a type of coping:**
- Action-based Coping
 - Emotion-based Coping
 - Cognitive-based Coping
 - Harmful (Maladaptive) Coping
27. **The “E” in the Screening Tool C.A.G.E. stands for:**
- Evaluation
 - Eye-opener
 - Explosive Anger
 - Enraged
28. **Individuals with Psychological Liability do not tend to experience:**
- Shame
 - Negativity
 - High levels of frustration
 - Optimism
29. **Addiction takes place in which part of the brain:**
- Cerebellum
 - Forebrain
 - Limbic System
 - None of the above
30. **The following assists in “re-training” the limbic system:**
- Solely Medication
 - Shock treatment
 - Adaptive coping skills and practice
 - All of the above

CONTINUING EDUCATION for Social Workers

Understanding the Neuroscience of Addiction to Provide Effective Treatment

PDH Academy Course #9641 (6 CE HOURS)

Biographical Summary

Jessica Holton, MSW, LCSW, LCAS has nearly two decades of experience and is a private practitioner specializing in treating Trauma & Stress Related Disorders, Anxiety Disorders, and Addictions. She earned her Master of Social Work and became certified in Social Work Practice with the Deaf and Hard of Hearing from East Carolina University. Jessica is active in leadership roles with the National Association of Social Workers (NASW) at the local, state, and national levels (Co-Chair of NASW-NC's Greenville's Local Program Unit from 2005-2012; Elected as NASW-NC's President Elect (2011-2012) and NASW-NC's President (2012-2014); Appointed to NASW's Alcohol, Tobacco and Other Drug (ATOD) Specialty Section Committee as a committee member in 2008, then appointed as the Chair in 2010 to 2016, and recently returned to a committee member. Jessica is involved with Addiction Professionals of North Carolina, as well, in which she was elected as a Member At Large for a three year term (2017 to 2020). Jessica has written many professional newsletter articles, several peer-reviewed journal articles, and has presented nationwide at numerous conferences. She is passionate about learning, sharing her knowledge and elevating her profession. She also received the East Carolina University School of Social Work *Rising Star Alumni Award* in 2012, selected as The Daily Reflector's Mixer Magazines *30 under 30* in 2007, Wilson Resource Center for the Deaf and Hard of Hearing *Community Service Award* in 2005 and the National Association for the Advancement of Educational Research Annual Conference *Award for Service to the Profession 2002 Outstanding Researcher*.

Jessica Holton is not a neuroscientist or neurobiologist; however she is a Licensed Clinical Social Worker and Licensed Clinical Addictions Specialist who has a great deal of respect for neuroscientist and neurobiologist. She is fascinated with learning about the neuroscience of addictions and other emotional and behavioral disorders. As a new clinician, discovering information about the neuroscience of addiction, trauma responses, stress response, et cetera proved to be timely and necessary in providing effective and evidenced-based treatment to the individuals that she treated. She has continued to build her knowledge-base over the years by attending trainings, reading literature (i.e. books, magazine articles and peer-reviewed articles)ⁱ, listening to various TED (Technology, Entertainment, Design) Talks and podcasts, referencing reputable websites and using applications (i.e. 3D Brain, Headspace). Jessica will share her understanding of the basic neuroscience of addiction, both chemical and behavioral. She will also explain suggested adaptive coping skills, which weave in the discussed neuroscience of addiction.

Course Abstract

This course will explain the neurobiology (anatomy terms and definitions) of addiction, as well as the neuroscience (the reward pathway) of addiction. The diagnostic criteria of Substance Use Disorders according to the Diagnostic Statistical Manual (DSM) 5 will be explained. Additionally, the course will provide practical, tangible coping skills to implement with clients. This course is appropriate for professionals who are new to the addictions field, as well as those counselors or therapists without addictions treatment experience. The section explaining the neurobiology of addiction will also prove to be beneficial for more experienced clinicians. Upon completing this course, you are encouraged to continue to build upon your knowledge-base.

Learning Objectives:

1. Identify four factors that predispose individuals to addiction.
2. Describe three types of coping styles.
3. Gain awareness about the basic brain anatomy.
4. Understand the basic neuroscience of addiction.
5. Describe adaptive coping skills that could be used to replace drug, alcohol, and other maladaptive coping.
6. Apply Emotional Intelligence and Critical Thinking to assist in recognizing and addressing biases, as well as critically assessing the client needs based on individual client factors.

Understanding the Neuroscience of Addiction to Provide Effective Treatment Outline

1. What is addiction?
 - a. Societal Stigmas
 - b. Emotional Intelligence
 - c. Critical Thinking
 - d. DSM-5 Criteria for Substance Use Disorders
2. Coping Methods
 - a. Action Based Coping
 - b. Emotion Based Coping
 - c. Harmful Coping
 - d. Addiction Timeline
3. Screening Tools
 - a. CAGE
 - b. Brief Initial Screening Tools
 - c. Longer Screening Tools
 - d. Behavioral Health Screening Tools
4. Predispositions to Addiction
 - a. Biological
 - b. Psychological
 - c. Social/Cultural
 - d. Spiritual
5. Neuroscience of Addiction
 - a. Chronic Disease
 - b. Addiction & Isolation
 - c. Brain Anatomy, Terms, And Concepts
 - d. Basic Neurobiology & Neuroscience of Addiction
6. Assessment Considerations
 - a. Person-In-Environment
 - i. Childhood
 - ii. Current
 - b. Co-occurring Factors
7. Action-Based and/or Adaptive Coping Skills
 - a. Stress Identification and Management
 - i. Deep Breathing

- b. Healthy Distraction & Frontal Lobe Engagement
- c. Mindfulness
- d. Grounding
- e. Daily Gratitude List
- f. Humor
- g. Kindness
- h. Biofeedback Mantra
- i. Stress and Anxiety Management Mantras
- j. Danger Sequence to Counter Stress, Anxiety, and Trauma Responses
- k. Craving Sequence
 - l. Grieving Process
 - m. Healing Process
 - n. Stages of Change
 - o. Communication & Boundaries
 - p. Sleep Hygiene
 - q. Self-Care Tools & Personality
 - r. Resources for Self-Care Tools and Adaptive Coping Skills

What Is Addiction?

Take a moment and think about addiction. More specifically, what are your thoughts and feelings about addiction? Do you have different opinions depending on the role that you are in (e.g. loved one, professional, peer)?

Addictions are stigmatized. Even within addicted groups, there are stigmas. Although progress is being made, misinformation is prevalent. We have all heard, or perhaps thought, that if the individual wanted to quit bad enough, they would. Or individuals who cannot control themselves tend to become addicted. Additionally, those who use substance, not alcohol but the 'hard drugs,' are criminals. Most of our familial or social stigmas are focused on chemical use and/or addictions. It is not uncommon for individuals who do use substances, mild to severe, to have a hierarchy of what is considered 'okay' and what is 'bad' or 'dirty'. It is interesting how many, not all, behavioral addictions are overlooked and do not carry the same morally-based stigmas.

Due to the complexities of addiction that will be covered in this course, as you move through the course and treat clients, you are encouraged to implement Emotional Intelligence to acknowledge and push aside possible biases and Critical Thinking to assess and evaluate your current practice. Let's begin with Emotional Intelligence, as it is essential in the helping professions. Emotional Intelligence is the ability to perceive emotions, use emotions to facilitate thought, to process emotions, and to manage emotions. Emotional Intelligence is correlated with increased sense of empathy, use of emotions without being

defensive, and awareness of potential relationship estrangements.ⁱⁱ Additionally, it has been stated that “[Emotional Intelligence] has been found to correlate with an increased sense of empathy, more positive doctor-patient relationships, improved teamwork and communication, stress management, organizational commitment, and leadership.”ⁱⁱⁱ Finally, elements of Emotional Intelligence include:^{iv}

- **Self-Awareness** – The ability to recognize and understand your own moods, emotions and drives, as well as their effect on others.
- **Self-Regulation** – The ability to control or redirect disruptive impulses and moods and the inclination to suspend judgment and think before acting.
- **Motivation** – A passion to work for reasons that go beyond money or status, and a tendency to pursue goals with energy and persistence.
- **Empathy** – The ability to read, sense, even anticipate the emotional makeup of other people.
- **Communication skills** - Being able to communicate your needs and feelings, in addition to being willing to listen to and understand other’s feelings.
- **Social Competence** – A proficiency in managing relationships and building networks.

Emotional Intelligence can also be described in these four skills:

1. **The ability to understand your own emotions:**

Being aware of the different emotions that you recognize and experience, as well as experiences that may trigger emotions.

2. **The ability to control your emotions:** Having the discipline and self-control of yourself to not give in to every emotion.

3. **The ability to read other’s emotions:** Understanding what others are feeling and being open to understanding their vantage point.

4. **The ability to manage your relationships:** How do you interact with others? Do you provoke arguments? Do you avoid conflict whenever possible?

Consistently utilizing Critical Thinking assists in application of information gained. Critical Thinking models, such as Bloom’s revised taxonomy^v suggest that there are less mature, or lower, and more mature levels of Critical Thinking: **Remember (or Know), Understand (or Comprehend), Apply, Analyze, Evaluate, and Create**. The lower levels consist of hearing information, memorizing the data, and potentially, sharing the information with others, either verbatim or in your own words. The higher levels of critical thinking deal with truly understanding the information in order to apply it, questioning or defending how the data applies, evaluating how the application is taking hold, then creating a new

method, if needed. The following questions could assist in implementing all of the levels of Critical Thinking:

- **What do I know?** – What do I know about the situation, past experiences and relevant information?
- **How do I know?** – How do I know that the sources are reliable? What are my assumptions and/or personal biases?
- **What is important?** – What are the priority issues? What are the long-term goals and short-term objectives?
- **What is missing?** - What is missing from the known information and/or my understanding of the information?
- **What is my plan of action?** – What are the next steps in my plan?
- **How did I do?** - What went well? What could I do differently next time? What did I learn?

Now that Emotional Intelligence and Critical Thinking have been explained, I’d like you to reflect back on your response to the question about your thoughts and feelings about addiction. What do you know about addiction? How do you know that information? Of that information, what is important? What might be missing? Do you feel compassion? Might you feel fear? This course will offer a detailed, yet practical, understanding of addiction, the underlying issues or co-occurring diagnosis, and treatment of addiction.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

1. **Which is not a higher level of Critical Thinking?**
 - a. Analyze
 - b. Evaluate
 - c. Remember
 - d. Create
2. **Which aspects are not included in Emotional Intelligence?**
 - a. Social Skills
 - b. Critical Thinking
 - c. Self-regulation
 - d. Self-awareness

Review Question Answers:
1. c
2. b

DSM-5 Diagnostic Criteria for Substance Use Disorders

As many of you know, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)^{vi} was released in May 2013 and implementation by third-party payers, or insurance companies, began in October 2013. There have been five major revisions since the initial DSM was published in 1952. Although the DSM-IV-TR^{vii} had text revisions in 2000, the diagnostic criteria were unchanged since the publication in 1994. Thus, prior to the DSM-5 being implemented, mental health professionals were working off of diagnostic criteria that was just under 20 years old. The DSM-5 incorporated research into the revision, it built diagnoses on foundations of empirical findings from scientific disciplines and sought multidisciplinary, international scientific participation. Ideally, mental disorders, including Substance Use Disorders, will move toward diagnoses based on biomarkers, such as blood work, saliva swabs, heart rate, perspiration, fMRI scans, et cetera, instead of solely relying on objective observations and subjective reports. Furthermore, the DSM-5 is more like a “living document,” where revisions will be made within the current manual (DSM-5.1, DSM-5.2) versus waiting another 20 years for updated criteria.

Before explaining the diagnostic criteria for Substance-Related and Addictive Disorders according to the DSM-5, it is important to review the Substance-Related Disorders’ diagnostic criteria from the DSM-IV-TR. Although change is a consistent aspect within the helping professions, it is often difficult to fully accept. Reviewing the prior diagnostic criteria will assist in ensuring that the correct, updated diagnostic tool is being utilized. First and foremost, the DSM-IV-TR’s Substance-Related Disorders were divided into Substance Use Disorders, which included Substance Dependence and Substance Abuse, and Substance-Induced Disorders. The latter consisted of Substance Intoxication, Substance Withdrawal, and Substance-Induced Disorders. In regards to remission specifiers, DSM-IV-TR indicated: Early Full Remission (one to 12 months and no criteria for Dependence or Abuse met); Early Partial Remission (one to 12 months and one or more criteria for Dependence or Abuse met); Sustained Full Remission (12 months or longer); Sustained Partial Remission (12 months or longer but one or more criteria for Dependence or Abuse met); On Agonist Therapy (prescribed agonist medication is being used and no criteria for Dependence or abuse has been met in that class of medication for at least the past month); In a Controlled Environment (no criteria for Dependence or Abuse met due to being in a controlled environment). The DSM-IV-TR indicates the following 13 classes of substances: Alcohol; Amphetamines; Caffeine; Cannabis; Cocaine; Hallucinogens; Inhalants; Nicotine; Opioids; Phencyclidine; Sedatives, hypnotics, or anxiolytics;

Polysubstance; and Other. Note, Polysubstance refers to using at least three groups of substances, not including caffeine or nicotine, in the past 12 months, in which none of the three took precedence.

With DSM-5 revisions, a consistent framework of classification of diagnoses was created with criteria, subtypes and/or specifiers, severity (which includes codes and recording procedures) and explanatory text (denotes new or expanded information). Substance-Related and Addictive Disorders is also divided into Substance Use Disorders and Substance-Induced Disorders. Substance Use Disorders is no longer classified by Dependence and Abuse, rather by Severity and Specifiers. The severity is an estimate based on criteria met. Thus, mild would be two to three symptoms, moderate would be four to five criteria, and severe would be six or more criteria. The specifiers are now in early remission (no criteria met for the substance use disorder in at least three months and less than 12 months); In sustained remission (no criteria met for the substance use disorder for 12 months or longer; In a controlled environment (in an environment where access to the substance is restricted). Substance-Induced Disorders continues to include intoxication, withdrawal, and other substance/medication-induced mental disorders. Medication-induced conditions are often extreme reactions or side effects for a broad range of medications taken for medical issues. These medications could include: anesthetics, antihistamines, antihypertensives, and steroids. It is important to keep in mind that the ‘substance’ in substance-induced included toxins, such as insecticides and carbon monoxide.

Both the DSM-IV-TR and DSM-5 detail the diagnostic criteria for Intoxication and Withdrawal for each substance. However, the DSM-5 lists the criteria for each substance in order to determine the severity as opposed to diagnosing either Dependence or Abuse according to the DSM-IV-TR. The class of substances in the DSM-5 includes 12 substance classes: alcohol; caffeine; cannabis; hallucinogens; inhalants; opioids; sedative, hypnotics, and anxiolytics; stimulants; tobacco; and other (or unknown) substances. Notice, polysubstance is not included in the DSM-5. Thus, each substance that is being used, in addition to the severity, must be listed. This chapter also includes Non-Substance-Related Disorders: Gambling Disorder, thus indicating evidence that behavioral addictions activate the same part of the brain that chemical use activates. The basic neuroscience of addiction will be discussed below. Due to insufficient peer-reviewed research when the DSM-5 was being revised, other behavioral addictions, such as sex addiction, exercise addiction, shopping addiction, food addiction (binging or restricting), is not included.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. When was the DSM-IV published?**
 - a. 1952
 - b. 2000
 - c. 1994
 - d. 1996
- 2. Which DSM classified substance use into Substance Abuse and Substance Dependence?**
 - a. DSM-III
 - b. DSM-5
 - c. DSM-5.1
 - d. DSM-IV
- 3. How many classes of substances are there in DSM-IV-TR?**
 - a. 12
 - b. 13
 - c. 10
 - d. 9
- 4. Which DSM includes Non-Substance-Related Disorders?**
 - a. DSM-III
 - b. DSM-IV
 - c. DSM-5
 - d. All of the above

Review Question Answers:
1. c 2. d 3. b 4. c

Coping Methods

Take a moment and think about the definition of coping. How would you explain coping to the individuals that you work with? It is not uncommon to find the concept of coping to be abstract or ambiguous. If professions struggle to understand coping skills, imagine how an untrained, lay-person, might misunderstand the notion of coping. Often times, we focus on healthy, or acceptable, methods of coping. Individuals are coping with stressors constantly. Stressors can be defined as a response to a perceived threat, challenge or change. When the limbic system in our brain is feeling threatened or challenged, after responding in a way to ensure survival, it then wants to feel relief or reward. Not all reliefs and rewards are adaptive, or healthy. In fact, not all apparent healthy acts of coping are truly adaptive.

To explain this, the following will explain the three types of coping skills.^{viii} Action-based coping, which is the ideal coping mechanism, will be discussed

first. Action-based coping is the type of coping that we hope to use when we are trying to problem solve and work through life's challenges. In short, action-based coping is acknowledging, than dealing with, the exact cause of the stress. For example, if a student is enrolled in a course and midway through the semester, that student finds that his/her grades are not satisfactory, that student will begin to discover means to improve the grades, such as attending class, completing the assigned readings, practicing a different study technique and/or hire a tutor. Thus, rather than spending time feeling upset, projecting blame on someone else or ignoring the problems, the individual finds solutions. Again, this coping type is ideal; however, it is not highly implemented. Many individuals might feel shame or disappointment, and in turn, try to relieve those uncomfortable feelings with actions that bring about instant reward.

The next coping type is emotion-based coping. This is the coping mechanism, or the coping style, that many of us, professionals and clients alike, use. Emotion-based coping is precisely what it sounds like. When one is experiencing a stressor or challenge, rather than finding the solution to the challenge, the feelings that are correlated to the challenged are addressed. For example, when the student realizes that their grades are not desirable, rather than researching and applying study techniques, the student might take a lot of naps. It is difficult to experience worry or disappointment while sleeping. Sleeping will assist the student in feeling better in that moment; however a long-term solution is being avoided. There are many socially acceptable ways that individuals use emotion-based coping: being a "workaholic;" shopping, or "retail therapy;" working out; going out to eat; wishful thinking or humor.

Working at a job to earn money is engrained. That hard earned money is spent on wanted items or convenient take-out food. Exercising is a great tool to assist with stress reduction. At first glance, the aforementioned statements seem perfectly reasonable and familiar. Let's take a closer look at one of them: exercising. In addition to assisting with stress management, it can proactively, and reactively, assist in mood management. However, if exercise is the only method of coping or the only stress management technique, the stress responses may actually increase. Suppose a work-related stressor occurs at 8:34 a.m. Most employers will not agree to their employees abruptly leaving the office, when needed, to exercise to assist with dealing with said work-related stressors. Furthermore, having to wait until the workday is complete, perhaps 5:00 p.m., will likely increase the emotional distress and stress reactions. Take that same scenario, and swap out exercise and replace it with getting on social media, eating cheesecake, smoking cannabis, or snorting heroine. Notice how your own emotional response and sense of approval might have changed with each example.

Finally, the last manner of coping is harmful coping. This is the method that is typically noted with individuals who experience addiction, whether chemical or behavioral addictions. The means of coping could have begun as emotional-based coping, in which it eventually becomes more harmful over time. The harmful coping method becomes a habit or a pattern, rather than a skill. It becomes maladaptive and interferes with functioning: social, occupational, academic, et cetera. Harmful coping never addresses the initial stressor or challenge. Additionally, harmful coping skills tend to worsen the initial, or created, condition. Harmful coping can include alcohol use, prescription drug misuse, illicit substances use, as well as self-injury, gambling and disordered eating.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

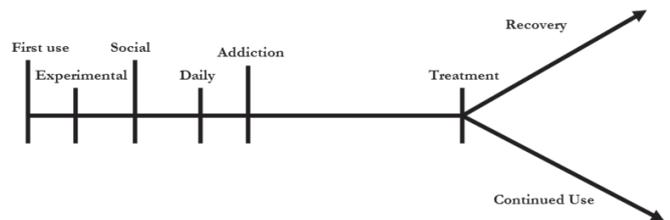
- 1. What is an example of action-based coping?**
 - a. Seeking additional employment to resolve financial strain
 - b. Biting finger nails while bored
 - c. Calling a friend to vent about stressors
 - d. All of the above
- 2. What is an example of emotional-based coping?**
 - a. Studying to improve grades
 - b. Sleeping to avoid relational conflict
 - c. Cutting forearms when feeling shame
 - d. None of the above
- 3. Harmful coping is the same as emotion-based coping.**
 - a. True
 - b. False

Review Question Answers:
1. a 2. b 3. b

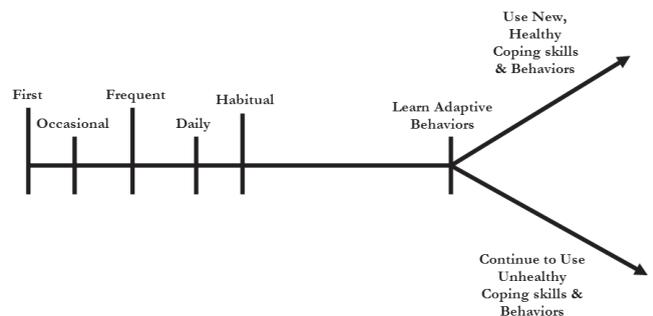
trainings use the term “drug of choice” frequently when discussing assessment and treatment of Substance Use Disorders. Despite the frequency of that statement, is addiction an actual choice? Is addiction a series of emotionally-based coping skills that might eventually turn into a habit? Is it due to a chemical imbalance in the brain? Perhaps there is a hereditary or genetic component to addiction? The words that are used have a powerful impact. How we phrase things to ourselves, our colleagues and clients have an impression. Very simply put, words become thoughts and those thoughts become reactions. Thus, the language that is used about substance use, addictions and treatment with colleagues and clients is extremely powerful. Depending on your answer to “Is addiction an actual choice,” the next two sections will assist in challenging or validating your response.

Below are an Addiction Timeline^{ix} and a Maladaptive Coping Timeline. Please note that the timelines are not to scale regarding the notches in time. Every person will move through their using experience at differing rates of time. Additionally, each individual will have a unique ending point in the timeline. Not every individual will enter treatment. Some individuals never use again after their first use. Other individuals might hover over social use and never proceed into daily use or addiction. Both timelines have been included since substance use is not the only method of emotional-based coping or harmful coping. The timelines will serve as a visual foundation, which will be confirmed while discussing the neuroscience of addiction.

ADDICTION TIMELINE



MALADAPTIVE COPING/BEHAVIORS TIMELINE



Addiction Timeline

At the beginning of the course, you were asked to consider your thoughts and feelings about addiction. Now, do you consider that addiction is a choice? The response to that question will vary from person to person, regardless if the impact of addiction has been direct or indirect. Additionally, community and cultural differences will impact one's opinion. It makes sense that the response will vary among clients and helping professionals since the question, “What is your drug of choice?” is often the check-in question in groups settings or an assessment question. Professional

To assist with ease of description and consistency, the Addiction Timeline will be referenced. The very explanation used for the Addiction Timeline can easily be substituted while describing the Maladaptive Coping Timeline. You will notice that the first occurrence, or first notch, is exactly what it reads. The first use, or initial act, is the first time the individual used the substance or noticed that the behavior offered relief or reward, on an unconscious or conscious level. When working with Clients, in individual or group settings, this first notch on the timeline can offer a great deal of history and demonstrate the individuals level of insight. Asking the following open-ended questions and understanding the individual's responses and perspectives can create, or add to, a therapeutic rapport: "How old were you when you first used?" "Can you recall what led to your first use?" Some individuals will answer those questions without pause. Other individuals might hesitate. If the person is hesitating due to being unsure how to answer, perhaps the following questions would assist: "Did you first use out of curiosity?" "If so, tell me more about that;" "Were you experimenting?" "If yes, how did you get access to the substance(s);" "Was your first use to fit in with peers?" "If so, was it positive peer pressure, in which you were choosing to use to fit in?" Or, "Was it negative peer pressure, in which you felt like you were being harassed, bullied, or emotionally extorted if you did not use?;" "Was your first use from modeling? That means that several people within your family, community or environment used." "If so, who were you possibly modeling after?" Additional questions could include: "How did you feel emotionally/mentally/physically/spiritually after using?" "Were there cultural/community/academic/employment/socioeconomic/environmental factors that influenced your first use?" The goal of the open-ended questions is to gather information, build upon rapport and create a therapeutic conversation.

The first use will vary in age based on region, culture, exposure, et cetera. Many presenters and educator will state that the age of first substance use hovers around 13 years old. This is not set in stone and may not be backed up with research, rather unscientific observations. While reflecting on the individuals who I have worked with, the age of first use have ranged from nine-years-old to 30-years-old. The DSM-5^x specifies that "...individuals ages 18-24 years have relatively high prevalence rates for the use of virtually every substance. Intoxication is usually the initial substance-related disorder and often begins in the teens." It is my understanding that during adolescent years, specifically until the mid-20s, the Dopamine receptors recede. Dopamine will be discussed further in later sections. In short, it is a neurotransmitter that assists with motivation, drive, creativity, and feeling accomplished. When the receptors recede, the adolescent brain is not receiving the amounts of Dopamine that they did prior to puberty, thus they will seek activities to assist in feeling driven and accomplished. The exact substances that younger

children agreed to avoid in elementary school through early learning prevention programs seems intriguing to the early adolescent. That overall lack of motivation that accompanies adolescent years seems to decrease when emotional-based coping activities are utilized, resulting in an increased Dopamine production, which makes adolescents more susceptible to using substances.

The next notch on the timeline is experimental. Experimental uses consist of using more often, perhaps a little less often, at different rates, adjusting amounts used and/or the types of substances used. This could include changing peer groups, by leaving or joining groups, pending the goal of the group. Depending on the individual, experimental use could be a very short amount of time or it could last years. The timeframe could be attributed to the type of substance, substance-related activities, peer groups, academic drive, familial involvement, and so on.

The third notch is social use. The definition and acceptance of social use will vary depending on culture, subculture, community, belief system or religion practice, gender roles, cohort differences, as well as socioeconomic status. In many cultures, social use may be considered acceptable, as long as the substance is acceptable. For instance, consuming a glass of wine in the hour between leaving work and attending an aerobic exercise class might be viewed as more acceptable in Paris, France^{xi} than it would in the "bible belt" of America. During social use, the plan to use chemicals and the actual use is often discussed openly, especially among peers. When individuals are using socially, they tend to look forward to the socializing component that incorporates consuming substance(s). According to the DSM-5, during this stage in the timeline, individuals might not meet criteria for a substance use disorder. Or they might meet criteria for a mild substance use disorder or a moderate substance use disorder. Under the DSM-IV-TR, this stage could be classified as substance abuse. The DSM-5 assists with offering a range of criteria and severity to appropriately diagnose, or rule out a diagnosis, of a substance use disorder. For example, an individual who meets friends after work for drinks, smokes cannabis at a gathering or uses ecstasy at a music festival may not meet criteria for a substance use disorder. Society might agree with having drinks after work but object to using ecstasy or smoking cannabis. A thorough clinical biopsychosocial-spiritual assessment is vital to gain insight into the individual's perception of substance use, motivation for using and pattern of use to determine the severity of the substance use. Most people who use substances envision that social use will be the end of their using timeline. This is the case for many. However, those who move into experiencing severe substance use never imagine that the social use will evolve into an addiction. Fewer to none ever begin using chemicals with the image, or goal, of becoming addicted in the future. Often during social use, whether it is substance use, shopping or gambling, the individual is interacting with others,

they are typically enjoying themselves, and the use or activity is intertwined with shared goals of their peers. What's more, when individuals progress beyond this stage, into more problematic use, they often reminisce about social use and will rationalize that they are still using socially despite having the negative consequences weaved into a moderate or severe substance use disorder.

The caveat with this stage is that it can be skipped depending on the substance. For example, it is almost unheard of for an individual to stop on the timeline at social using while using crack cocaine or crystal meth. Both of those substances have a high potential of addiction (Figure 1).

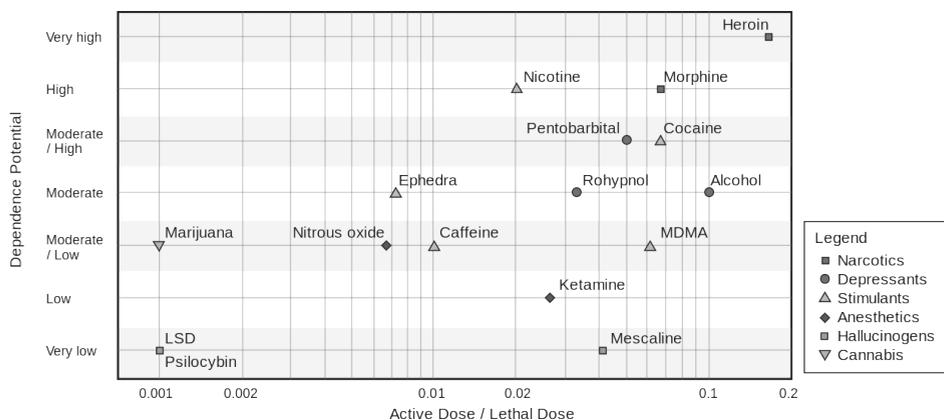


Figure 1
Source: Gable, R. S. (2006)

Social using can be misinterpreted if the substances are legal. For instance, if an individual began drinking heavily at the age of 14 and has continued to drink substantial amounts of alcohol on a daily basis, but insists on drinking with others, not alone, this is not social use. Sure, they are interacting with others and maybe even have a perception of enjoyment; however from a wellness perspective, subjective and objective, their engagement with others may not be actually gratifying or healthy. The common factor or motivation is alcohol consumption, not social interactions.

The next two notches are daily use and addiction. Many may wonder, "What is the difference?" It is assumed that individuals who have an addiction probably use on a daily basis. According to the DSM-5, a person could use a substance daily and if they meet two to three criteria, they would have a mild substance use disorder or a moderate substance use disorder if they meet four to five criteria. Remember, six or more criteria must be met to constitute a severe substance use disorder, or what could be called an addiction.

With daily use there is an awareness of having control and choice over actions, regardless if there is not a true substance use disorder or there is a mild to moderate substance use disorder. Many individuals, both helping professionals and laypersons, would call a daily user a "functioning alcoholic," assuming that the substance that is being ingested is alcohol. Is daily use a true

disorder if there is not a clinically significant decline in social and/or occupational functioning? Let us suppose that a gentleman named John wakes up early every morning, takes care of morning chores, arrives to work on-time and is considered a competent worker with high work ethics. On his way home from work, he stops at the local market, and purchases a six pack of beer. While making dinner and completing his evening chores and routines, he consumes four to six beers. He goes to bed and the next morning, repeats the pattern the next day. Is he a "functioning alcoholic?" Not necessarily, according to the diagnostic criteria for Substance Use Disorders in the DSM-5. Sure, the pattern of use does appear habitual; however there appears to be control and choice in the pattern of alcohol consumption. His occupational and social functioning does not seem as impacted as it would be if he had an addiction, or a moderate to severe substance use disorder. Certainly, if this person pursued services for another reason, such as grief of a loved one, his alcohol use should be monitored. Not necessarily because, "they always

underreport" or "they never tell the truth." But rather because the individual might use alcohol as a means of emotion-based coping and not fully realize that they are using a substance as a coping skill. Within various addiction field circles, it is assumed, and therefore taught, that the majority, if not all, substance users underreport their use and are dishonest about using. It is important to meet the individuals where they are at, without bias. Automatically assuming that individuals who use substances or have behavioral addictions are dishonest is an unfair, inaccurate, and goes against the Code of Ethics of the National Association of Social workers. This course will assist in creating more accurate perceptions, thus providing more effective treatment.

As a person moves from daily use into an addiction, their own rationalizations contribute to the development of an addiction, as well as their culture, subculture, ethnicity, community, belief system or religion practice, gender roles, cohort differences, and socioeconomic status. With addiction, individuals who have experienced an addiction will report that they experience a significant lack of control in their life: thoughts, emotions, reactions, value system, belief system, et cetera, if not losing total control, while in active use. Additionally, with true addiction, there is an obvious impact on social, occupational and academic functioning. This could include occupational issues, medical concerns, relationship strain, and so on. Essentially, while in active addiction, stressors, concerns, and problems continue to worsen. Furthermore, using

the substance is often times the only form of coping that the individual turns to. Emotional-based coping that transitioned into harmful coping. A vicious cycle has been created since the method of coping is adding to the original stressors and creating more stressors and negative consequences. The negative outcomes are then addressed with the harmful coping of substance use or behavioral addictions. This entrapping cycle could make sense, if the non-addicted person were to apply Emotional Intelligence, specifically empathy, about how the person's perception of control and choice is lessened or lost while caught in this deceiving cycle.

Next, there is the fork in the timeline. As indicated on the addiction timeline image, that is where treatment occurs. Residential treatment could include: detoxification, which is typically less than one week; in-patient treatment, which can be from two weeks, to 90-days to several months; long-term recovery programs lasting several months to over a year; Non-residential treatment, which varies greatly in duration, includes outpatient treatment, intensive outpatient treatment, group sessions, and/or 12-step based support groups. An inpatient treatment program stay is typically 21 to 28 days. The longer treatment stays are usually at the more elite treatment centers or the programs that the individuals work to "pay" to stay in the sober living environment. Unfortunately, residential and non-residential treatment is not always accessible, depending on location, funding, insurance, bed availability, lack of family and peer support, and/or stigmas from society, family members and the individual. The individual is likely to experience a beneficial treatment stay, sustained sobriety, with fewer treatment attempts, and lower medical complications if they started using at a later age and/or has been using for a shorter duration.^{xii} Also, if the person has been using daily and the use is more of a habit, not a harmful coping cycle, the lower levels of treatment (outpatient) or interventions (support groups) could assist the individual in becoming, and remaining, sober. If the person has been actively using for many years and meets full criteria for a Moderate to Severe Substance Use Disorder, the lower levels of treatment or interventions do not typically result in sustained sobriety. In fact, many individuals who have Moderate to Severe Substance Use Disorder or behavioral addictions will enter higher levels of treatment (in-patient, intensive outpatient) multiple times. The multiple treatment attempts could be related to the individual initially seeking treatment for external motivating factors, such as legal concerns or relational ultimatums.

When the person gains more internal motivation, multiple treatment attempts may occur due to focusing on the addiction solely and not addressing the co-occurring factors (past traumas, anxiety disorders, mood disorders, medical complications) simultaneously. Addictions are often tangible: substance paraphernalia, lottery tickets, body weight changes, typing in a pornographic web address. Medical complications could

be observable due to the attended doctor appointments, medication prescriptions, and change in physical functioning. The emotional and mental co-occurring disorders do not always have as many tangible or discernible attributes. That said, individuals might seek treatment for their substance use patterns, but not address the emotional concerns. There are stigmas linked with mental health, addictions and certain medical complications. Depending on perceptions of priorities, resiliency factors and use of coping skills, the person could seek treatment for just one concern instead of receiving co-occurring treatment. Or, the individual could carry many misdiagnoses due to medical diagnoses or substance use disorder not being ruled out, thus mimicking a mental health diagnosis. Please note that co-occurring disorders do come into play throughout the timeline, not just during the treatment phase. Identifying the co-occurrence early on assists in prevention of progression and managing the co-occurring disorders could deter returning to active addiction. It may be difficult to believe that treating co-occurring disorders at the same time is a newer concept, yet it is.^{xiii} Regardless of external or internal motivating factors, inpatient treatment for those with Moderate to Severe Substance Use Disorders, with or without co-occurring disorders, seem to be a more successful starting point than outpatient treatment due to the individuals getting distance from their environment, from competing demands, from their triggers and from their enablers. After inpatient treatment, following up with consistent outpatient treatment and/or support groups (formal or informal) attendance for at least one to two years is critical to maintain sobriety. This consistency assists in re-wiring the brain and creating new, adaptive coping patterns.

The top line of that fork is recovery and the bottom fork is continued use. Irrespective of whether inpatient treatment, outpatient treatment, or other interventions were sought, the individual has to continue building their sobriety. Many in our society expect "quick fixes." Attending a long-term inpatient treatment center does not guarantee sobriety. Ideally, regardless of length of stay, initial treatment offers a foundation of knowledge and skills, whether a 21-day program or six month program. The individual has to build upon that foundation of knowledge and skills to ensure a higher chance of sobriety. Because addictions involve destructive patterns, many times, individuals do not gain that foundation, realize the importance of ongoing wellness and growth, or they are not ready to change the various aspects needed to remain in recovery. Thus, while some individuals are in the treatment center, they continue using or are actively planning their next use. It would be easy to say that they are choosing to use or not choosing sobriety. But is addiction a choice? If the person is experiencing a true addiction, or a Moderate to Severe Substance Use Disorder, it may not be a choice. This will be explained below in the section about the basic neuroscience of addiction.

Suppose an individual has been in sustained recovery for several years. They have a support group that they turn to and several adaptive coping skills that they consistently utilize. Yet, they relapse “out of the blue.” That recovery line is not a set, stable line. Rather, it will contain loops. The loops are on a forward trajectory, but the individual, or those in the individual’s natural support system, might indicate that the individual seems stuck. Think about riding a roller coaster with loops. When the roller coaster car, which is moving forward, comes to a loop, there is a point in the loop that you are looking “back” or seeing where you just came from. When individuals experience this phenomena while in recovery, they might state, “I feel like I’ve been set back,” or “I feel like I am not doing what I’m supposed to.” If they are using adaptive coping skills consistently, they are experiencing the growing pains of recovery and wellness. They are experiencing the evolution of rewiring their brain, which will be discussed in detail below. Relapse, or returning to using, can be a growing pain of recovery. Relapse is not a part of recovery. It is an aspect of addiction and addiction can be cyclical. Relapses are packed full of insights and learning experiences. The hope is that the relapse, mental relapse, or feeling “stuck” is short lived. Even if it persists, the individual is still learning. The provider needs to be able to assist the individuals with learning through the loops; not stalling in the loop.

An example of a loop could be: suppose that, one day, an individual who is in sustained recovery discovers that they have an aggressive type of cancer. Due to the nature of the upsetting diagnosis, they resorts to familiar thinking and coping, which includes emotion-based coping of isolation. Since the familiar, older patterns have reemerged, they are not utilizing the newer laid pattern of adaptive coping, which includes reaching out to support systems. Over time, they do not counter their negative thoughts or familiar patterns and eventually, begin using substances again. Many would label the “begins using again” as a relapse. However, when this individual did not counter their maladaptive patterns with adaptive patterns, or offered permission granting thoughts when thinking of using, this was the actual relapse. It is mental and emotional in nature, but a relapse nonetheless. By the time the individual uses substances again, the relapse is over and they are actively using. The hope is that they are only in active use for a few hours or days before reaching out for help and begin to implement the adaptive skills that they had been previously utilizing. Unfortunately, if an individual has had sustained recovery and then returns to active use, they tend to use more of the substance than they did before entering recovery.^{xiv} Additionally, they tend to use for a long duration, not the few hours or days, before seeking assistance. This could be attributed to the high levels of shame that accompanies mental relapses that lead into returning to active use. Before individuals enter recovery, they probably had multiple unsuccessful attempts to quit using on their

own. There were likely feelings of guilt, shame and hopelessness then. After the individual acquires sobriety knowledge and skills, returning to using seems to have a different intensity of shame and guilt due to “knowing better.” Relapse will be discussed in a more detailed section titled *Addiction: Chronic Disease*.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

1. **What is the second notch in the Addiction Timeline?**
 - a. Social
 - b. Daily
 - c. First Use
 - d. Experimental
2. **What is the difference between Daily Use and Addiction?**
 - a. The amount used
 - b. The sense of control vs loss of control
 - c. Weekend use vs weekday use
 - d. There is not a difference
3. **If a person is experiencing a severe substance use disorder, outpatient therapy is the most effective treatment modality initially.**
 - a. True
 - b. False
4. **Which stage of the Addiction Timeline is often glorified or individuals will reminisce upon as “good times”?**
 - a. Social Use
 - b. Experimental Use
 - c. Daily Use
 - d. First Use
5. **While in sustained remission, familiar, emotion-based coping, will likely resurface if significant stressors emerge.**
 - a. True
 - b. False
6. **When does a relapse begin?**
 - a. When the individual thinks about using substances
 - b. When the individual begins using substances
 - c. When the individual does not counter permission giving thoughts related to using
 - d. When the individual needs to enter treatment to cease using substances

Review Question Answers: 1. d 2. b 3. b 4. a 5. a 6. c

Screening Tools:

Screening Tools are brief questionnaires that assist professionals in getting a snapshot of information to determine whether additional treatment referrals are needed. An Assessment Measurement Tool usually entails questions and the tools will take more time to administer. Assessment Tools and Screening Tools are measurement tools that have differences and similarities, in which the terms are often used interchangeably. Using the term Assessment Tool for Screening Tools could not only be considered incorrect, but also confusing, especially for students, newer clinicians or clinicians becoming familiar with the benefits of using Screening Tools. There are hundreds of Screening Tools for a variety of disorders, from mental to physical. It is crucial to implement evidenced-based Screening Tools and/or valid Assessment Tools, within one's scope of practice. It is also imperative to implement Screening Tools that are culturally applicable. If there is not a specific tool that is culturally specific or accounts for cultural differences, the professional would need to consider the effectiveness of the tool before proceeding with that tool. Furthermore, it is important to understand that Screening Tools and Assessment Tools do not replace a thorough clinical biopsychosocial-spiritual assessment. Rather, the measurement tools could assist in navigating the direction of treatment and/or treatment referrals. The National Institute of Drug Abuse (NIDA) has a Chart of Evidence-Based Screening Tools for Adults and Adolescents, in which the tools are available, free of charge, and are fairly easy to implement. A few screening tools will be described below:

CAGE

The CAGE Questionnaire, developed by Bowles Center for Alcohol Studies Founding Director Dr. John Ewing, is an assessment instrument developed for use by primary caregivers to identify people with alcohol-related problems. It is a rudimentary, and somewhat dated, screening tool to identify an Alcohol Use Disorder. The CAGE was designed specific to alcohol use; however the CAGE-AID has been adapted to screen for other substances. The CAGE and/or CAGE-AID could be adjusted further and applied to behavioral addictions, as well. Certainly, some creativity with the wording, not the concept, will be needed if adjustments are desired. To score the CAGE, if a person answers "Yes" to two, or more, out of the four, there is a high likelihood that there is a Substance Use Disorder. Of course, further confirmation from referencing the DMS-5 diagnostic criteria would be expected.

The following are the questions to ask while utilizing CAGE, including non-researched based adaptations that could be used:

C: Have you felt that you should cut down on your drinking/shopping/ gambling?

A: Have people annoyed you by criticizing your using/shopping/gambling?

G: Do you feel guilty about your drinking/shopping/gambling?

E: Do you need an eye opener first thing in the morning to steady your nerves or ease your hangover/Do you find that you need to check the shopping adds/get on-line to gamble shortly after waking?

Additional Screenings Tools are included below. While reviewing the below Screening Tools, and additional measurement tools, you are encouraged to note that some of the questionnaires are based on the DSM-IV-TR, not the DSM-5, criteria.

Brief Initial Screening Tools

AlcoholScreening.org, a free service of Join Together, helps individuals self-assess their own alcohol consumption patterns to determine if their drinking may be harmful to their health or increasing their risk for future harm.

The CRAFFT Screening Interview is a behavioral health screening tool designed for children under the age of 21. Recommended by the American Academy of Pediatrics' Committee on Substance Abuse for use with adolescents, the screening tool consists of a series of six questions intended to identify adolescents who may have simultaneous risky alcohol and other drug use disorders. It is a short, effective tool meant to assess whether a longer conversation about the context of use, frequency, and other risks and consequences of alcohol and other drug use is warranted.

NIAAA 3 Question Screen is a three-question screen developed by NIAAA to assess problem alcohol use.

Longer Screening Tools

ASSIST obtains information from patients about lifetime use of substances, as well as current substance use associated problems over the last 3 months. It can identify a range of problems associated with substance use, including acute intoxication, regular use, dependent or 'high risk' use, and injecting behavior.

AUDIT is a simple method of screening for excessive drinking and brief assessment. It can help identify excessive drinking as the cause of a presenting illness. It also provides a framework for intervention to help drinkers reduce or cease alcohol consumption and thereby avoid the harmful consequences of their drinking.

Michigan Alcoholism Screening Test (MAST) is a quick and accurate screen designed to assess problems with alcohol use.

The Drug Abuse Screening Test (DAST) has served as a successful screening instrument for abuse of drugs and alcohol since its development in 1982. DAST is a 28-item self-report scale that consists of items that parallel those of the Michigan Alcoholism Screening Test (MAST).

Behavioral Health Screening Tools

The Wisconsin Initiative to Promote Healthy Lifestyles' (WIPHL) Sample Behavioral Health Screen assesses a patients' drug and alcohol use, as well as screens for depression and exposure to domestic violence.

Global Assessment of Individual Needs Short Screen (GAIN-SS) was created by Chestnut Behavioral Health to screen a general population and quickly and accurately identifies clients who may have one or more behavioral health disorders.

The Patient Health Questionnaire (PQ-9) is the nine-item depression scale of the Patient Health Questionnaire. The PHQ-9 is a powerful tool for assisting primary care clinicians in diagnosing depression as well as selecting and monitoring treatment.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. What is the purpose of a Screening Tool?**
 - a. To gain a brief snapshot to assist in treatment direction
 - b. To thoroughly assess the individual
 - c. To advertise for therapeutic services
 - d. None of the above
- 2. Can CAGE be used to screen behavioral addictions?**
 - a. No, only alcohol use
 - b. Yes, with adaptations of wording
 - c. No, only substance use
- 3. How many "Yes" responses indicate a high likelihood for a Substance Use Disorder?**
 - a. 1
 - b. 4
 - c. 3
 - d. 2

Review Question Answers:
1. a
2. b
3. d

Predispositions to Addiction

As mentioned above, prior to the DSM-5, the DSM-IV-TR diagnostic criterion was in place for approximately 20 years. Over the past 15 to 20 years, neuroscience, specifically the use of fMRI (functional magnetic resonance imaging) has been used. This technology measures brain activity by detecting changes associated with blood flow. Various studies that include fMRIs have assisted in validating observational data,

improving diagnostic criteria, as well as providing more effective treatment of Substance Use Disorders and addictions. In the past two decades, fMRIs have indicated the sections of the brain that activates when we feel certain emotions, eat a particular food, and crave a substance. One of those areas is the limbic system. The limbic system has gone unchanged for tens of thousands of years. This part of the brain is hardwired to crave high concentrations of animal fat, salt and sweets. Ten thousand years ago, it would take substantial effort to obtain these substances and the quantity would be limited. Fast forward to today, in which over 80%^{xv} of the products in grocery stores are processed food products that include: salts, sugars and animal fats. Studies utilizing fMRIs are in the process of validating that some individuals struggle with eating food, especially processed food, in moderation. Likewise, studies that have included fMRIs have shown that some individuals are unable to use chemicals in moderation.

When considering substance use among the population, the population is divided into thirds: Non-users; Social Users; Addiction.^{xvi} That very limbic system that was mentioned above also desires relief and reward. This is the part of the brain that is linked to addiction.

For the sake of the next example, the focus will remain on chemical use, specifically cocaine.^{xvii} On a slight side note, it is interesting how often cocaine is used in research studies. Pretend that you are attending a meeting with 12 other people when a facilitator enters the room. The facilitator puts her briefcase on the table, opens the briefcase and reveals a bag with a white, powdery substance. In this scenario, you and your peers have never used cocaine. The facilitator informs you that you will not get into any trouble with your employer or licensure boards. She offers an informed consent, which includes IRB approval. Alas, she convinces all of you to try the cocaine.

One-third or four peers, who would theoretically represent one-third of the general population, try the cocaine. They report feeling afraid, perhaps even absolutely terrified. So much so, that they are now mad at the facilitator for giving this substance to them. They abruptly leave the meeting due to feeling so angry and afraid. As a result, they may never use again. Not only cocaine, but they do not use any substances. Many people can identify with that or know of individuals who never use substances or very rarely have a sip of alcohol at an event. Thus, they do not drink alcohol. They have never been interested in trying illicit substances. Overall, they might even use action-based coping. They may not identify as having any behavioral addictions either. There is a conscious choice about not using.

The second third of the peers in the meeting, which would represent the general population, uses the cocaine. They reported that the experience was okay.

They may have even enjoyed it or found some benefit or reward to using. Despite the identified reward, they would likely state that they might use it again but would not “need” to use it again. Finally, they could identify other activities that offer a similar rush, such as a really hard run, rock climbing or a roller coaster ride. They notice some perks to using cocaine, but also have other healthier, acceptable alternatives. There is a conscious choice about using.

The final third of the peers in the meeting, which represents the general population, ingest the cocaine. After a few seconds to minutes pass, they report that they are enjoying the resulting experience. In fact, they state that they love it. They might go on to describe that they feel euphoric and joyful. Some might indicate that the cocaine is their “medicine” and that they finally feel “normal,” “complete” and/or “safe.” The reward and relief to the limbic system is so intense that this becomes their way of coping and being. If the person continues to use, this would indicate those who have a true addiction. Not a habit or routine, but a hijack of the limbic system.

There are four predisposing factors that seem to contribute to whether a person becomes addicted: biological, psychological, social or cultural, and spiritual:^{xviii}

Biological vulnerability deals with nature versus nurture. Is addiction passed down from generation to generation like eye color and hair color? Is it rather a gene awaiting activation? Is it the family lessons and associations to the addiction that encourage or discourage use? When a family member has a family history of diabetes, there is a biological vulnerability to diabetes compared to a family who does not have a family history of diabetes. Addiction is a disease, not a choice. In fact, it is a chronic brain disease. Individuals with a family history of addiction could have a higher biological vulnerability for addiction based on heredity and/or epigenetics. Likewise, some individuals are less vulnerable and more resistant to addiction based on heredity and epigenetics.

The psychological liability includes experiencing high levels of shame and burdens. The shame aspect is extremely critical and is often misunderstood. Shame and guilt are often interchanged. Guilt is an emotion that could be very motivating. Guilt is, “I did something wrong.” Thus, there is a desire to right the wrong and motivation to make a change. Shame is, “I am wrong.” That belief is difficult to correct, especially if there is a limited support network and minimal adaptive coping skills. Many individuals who can relate to being addicted will often admit to high levels of shame. It is often part of the underlying issues that feed into the addiction initially, as well as maintaining the addiction. When a person truly believes that “I’m bad,” “I’m wrong,” “I’m broken,” “I’m unlovable,” finding relief from that belief system is a welcomed reprieve.

Psychological liability is tied into personality and not to be confused with emotional liability, which is comprised of the difficulty of controlling emotions. One notion is that those with Type A Personalities will have higher levels of shame and perception of overarching burdens due to becoming frustrated and discouraged when they face struggles. It is unclear how productive it is to focus solely on Type A or Type B. Taking into account the individual’s temperament, which includes Easy, Difficult and Slow to Warm, as well as Introvert or Extrovert personality types would offer a more diverse, relevant vantage point than the twofold Type A or Type B view. The constant in life is change. If a person who is more sensitive to stimuli and finds that they need time to adjust to change is compared to someone who is energized by stimuli and adjusts to change smoothly and both use emotion-based coping, then both individuals could have a higher psychological liability but for very different reasons. Psychological liability also includes one’s thought patterns. Negative thinking complicates, if not inhibits, one’s ability to cope effectively. Humans are hardwired to scan for risks and threats. This assisted in evolution and we continue to unconsciously scan for risks non-stop. Depending on the prior experiences of the individual, the scanning for risks might be quickly processed and deemed neutral or the scan for potential risks could become a negative, maladaptive thought process or fear. Being that our thoughts, emotions and reactions are connected, negative thoughts contribute to one’s psychological liability.

Social or cultural context, involves the messages received from society on a whole during our upbringing or childhood. Social workers are trained to recognize and assess the Person in Environment (PIE). The individual’s system could have openly accepted and used chemicals. The individual’s system could have demonized chemical use. The societal messages and information gathered during upbringing, whether individuals are directly, or indirectly, exposed to substances determine the social predisposition.

Spirituality comes next. This predisposition deals more with having a spiritual bankruptcy. To clarify, spirituality is different from holding a religious practice, which includes a specific doctrine, as well as rules or laws. Religion beliefs and spirituality are often intertwined. Spirituality could be defined as the lens that we view experiences through. Spirituality involves individual belief systems, hope and faith. For those who have a spiritual bankruptcy, they tend to have little to no hope and a faltering belief system. They also tend to have a false sense of control and wishful thinking. An example could be, “If I get this job then my finances will be better and then I’ll quit drinking as much,” or “When I lose weight and I’m more attractive then I won’t overeat as much.” Spiritual bankruptcy involves being driven by an external locus of control, which entails the environment dictating actions and, in turn, the individual trying to control their

environments. Ideally, one strives to have an internal locus of control, which aligns nicely with action-based coping. Having an internal locus of control, one understands that environmental factors could contribute to decisions, but ultimately, the individual is in control of what they do with their thoughts, how they manage their emotions, and the resulting reactions.

Biological vulnerability in conjunction with psychological liability, social context and spiritual bankruptcy leads to a high predisposition to addiction. Similarly to the brief assessment tool CAGE, only two of the four components are needed to indicate a significant predisposition to addiction. Being that addiction is a chronic disorder, like other chronic disorders, a predisposition does not mean that the individual will develop the disorder. If protective factors are in place and proactive actions are taken, the disorder may not develop. Reviewing the predisposing factors with those who meet criteria for a Substance Use Disorder could assist in identifying and treating underlying issues.

Another concept to keep in mind regarding predisposition to addiction, according to Dr. Brian King, who is a psychologist and authored "The Laughing Cure," is that everyone is susceptible to becoming addicted. It has nothing to do with having an "addictive personality," rather everyone's limbic system, specifically the structures within the Basal Ganglia, desires relief and reward. That relief and reward may end up being a harmful coping skill. The good news is that not everyone will live long enough or have access to try all of the substance or potential behaviors that bring about reward and relief to discover what their addiction might be. There are also predisposing factors that contribute to addiction, assuming that the chemical or behavior is readily available. Like many predisposing factors, those factors must be activated. Predisposition does not automatically equate to the disorder.

Additionally, behavioral epigenetics is a newer scientific finding that is an important consideration for practitioners to learn about. I became aware of behavioral epigenetics through professional conferences and social media in the summer and fall of 2015. I was intrigued by the research as well as the sudden surge of information. If behavioral epigenetics is a new concept for you, I encourage you to do more research and discover the intriguing findings. The very succinct description is that since 2004, studies have shown that nurture overpowers nature (Meaney and Szyf, 2005). Behavioral epigenetics research offers additional evidenced-based data that validate the beneficial outcomes that social workers and other helping professionals assist in creating for the populations we serve, regardless of specialty or practice arena.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. What does fMRI stand for?**
 - a. Functional magical resonance imaging
 - b. Functional magnetic resonance imagining
 - c. Functional magnetic resonance imaging
 - d. Factual magnetic resonance imaging
- 2. What part of the brain is hard-wired to crave salts, sugars, and high concentrations of animal fats?**
 - a. Taste bud lobe
 - b. Limbic system
 - c. Prefrontal cortex
 - d. Hippocampus
- 3. What fraction of the population could be predisposed to Addiction?**
 - a. 1/3
 - b. 1/8
 - c. 1/2
 - d. None of the above
- 4. Which is not one of the four predisposing factors of addiction?**
 - a. Biological Vulnerability
 - b. Cultural Context
 - c. Truncated willpower
 - d. Spiritual Bankruptcy
- 5. There is not a difference between Biological Vulnerability and Cultural Context.**
 - a. True
 - b. False
- 6. There is no difference between Spiritual Bankruptcy and not having a religious belief.**
 - a. True
 - b. False
- 7. How many predisposing factors could indicate a high likelihood of an addiction?**
 - a. 1
 - b. 3
 - c. 2
 - d. 4
- 8. What is a redefinition of "Addictive Personality"?**
 - a. Everyone likes to feel joy
 - b. Everyone is in denial about having an addiction
 - c. Early learning programs encourages addictions
 - d. Everyone has a limbic system that desires reward and relief

9. When did research on behavioral epigenetics emerge?

- a. 2016
- b. 2004
- c. 2000
- d. 2008

Review Question Answers:
1. c 2. b 3. a 4. c 5. b
6. b 7. c 8. d 9. b

Addiction: Chronic Disease

Shame has been mentioned several times and will be discussed in depth now. Society teaches us that if something physically hurts, the experienced pain needs to be alleviated. The quickest way to alleviate, lessen, or “fix” the pain is to take a pill for it. The notion of “fixing” or “curing” pain or discomfort becomes ingrained in many of us. If it is allergy season, allergy medication advertisements are bounteous, thus taking allergy medicine is encouraged. If someone has a headache, they tend to take an anti-inflammatory or analgesic. If one does not feel well, they may look up their signs and symptoms on an internet search engine, implement a home remedy, purchase over-the-counter medication and/or seek medical attention. Certainly, some of us will seek the alleviation of discomfort or pain immediately and others will wait too long. Searching for answers, remedies, and medical advice, in addition to utilizing medical advances through medication is understandable. We all need to take that route at some point in our lifetime. The fact of the matter is that there is not always a pill for everything. Additionally, we live in a shame-based society: If something is “wrong” with you, it might reflect negatively on others; if you are “broken,” that is disgraceful, so you better fix it. That inner voice that states, “You should know better,” or “What is your problem?” Every single person has experienced shame, unwarranted disgrace and exaggerated embarrassment during their life. The level of shame, how we counter or nurture the shame determines how much we will seek a means to “fix” it.

While watching a 60 Minutes episode that discussed addiction on CBS in early 2016, a comparison between addiction and cancer was made. An individual viewing the episode got very vocal about how addiction and cancer “was not the same thing.” This person became upset, if not angry, about the comparison since “people choose addiction” and “people do not choose cancer.” I can understand why the general public might have a very similar response. One does not choose to get cancer, but they do have choices in environmental factors. There might be a genetic, or inherited, component, in which those cancer genes have to be

activated, or turned on. No one would ever create a long-term goal while in childhood of having cancer in adulthood. Regardless of genetic or environmental risk-factors, if a person gets cancer, they are encouraged to seek treatment; to fight for a cure; to survive. They are rarely shamed for having cancer. They might experience some shaming from others if they smoked cigarettes or ingested chemicals that might have increased the risk of cancer. Having cancer in the body and needing treatment would not be shamed. The mood swings, anger outbursts and grieving process would likely be overlooked and even justified.

We have already touched on addiction may not be a choice. In fact, fMRI studies are showing that the limbic system, which is responsible for relief and reward, is hijacked when one has an addiction. Let’s take the above paragraph and insert “an aggressive form of cancer” in place of “addiction” or “addicted.”

‘One does not choose to get [addiction], but they do have choices in environmental factors. There might be a genetic, or inherited, component, in which those [addiction] genes have to be activated, or turned on. No one would ever create a long-term goal while in childhood of having [addiction] in adulthood. Regardless of genetic or environmental risk-factors, if a person becomes [addicted], they are encouraged to seek treatment; to fight for a cure; to survive. They are rarely shamed for having [an addiction]. They might experience some shaming from others if they smoked cigarettes or ingested chemicals that might have increased the risk of [addiction]. Having [addiction: a brain disease] and needing treatment would not be shamed. The mood swings, anger outbursts and grieving process would likely be overlooked and even justified.’

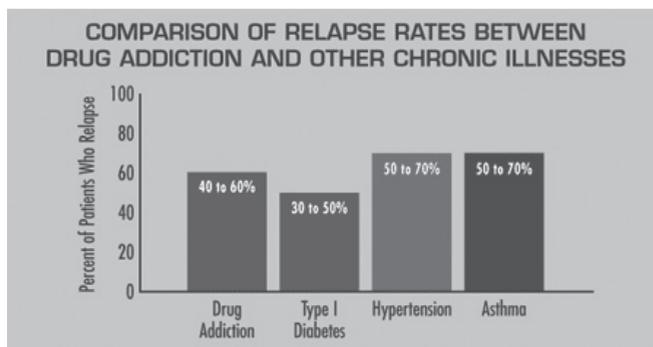
Perhaps the comparison between addiction and cancer is perfectly acceptable. Addiction is a brain disease. Technological advances, research studies and evidenced-based treatment confirm that addiction is not a choice, yet a brain disease on an ongoing basis. Addiction and cancer is “different” because society accepts that a person does not choose cancer. They recognize that treatment might not be successful the first time around. They expect that the person might not feel well, emotionally and physically, while experiencing treatment and recovery. Addiction and cancer is “different” because society continues to hold stigmas against those who experience addiction, directly and indirectly. Society blames the person who has an addiction. Society becomes frustrated when the person does not “cure” their addiction on the first treatment attempt. Society focuses on the person’s lack of motivation and will power when recovery is difficult to obtain or relapses occur. Imagine if society became frustrated at the individual who has cancer if the treatment is not successful on the first attempt. Addiction and cancer has affected humans for centuries. Sympathy for those with cancer, and the chronic nature of cancer, and demonizing those with

addiction, and the chronic nature of addiction, has also been present for centuries.

Synonyms of the word chronic include: lasting, enduring, prolonged, lingering and continuing. Cancer is a chronic disease with varying relapse and remission rates. Addiction is a chronic brain disease. The National Institute of Drug Abuse (NIDA) indicates that the relapse rate of drug addiction is 40 to 60 percent. An article through The National Institute of Health (NIH) stated that individuals with alcohol use disorders will have between a 20 and 50 percent short-term remission rate. Additional chronic diseases include hypertension, diabetes, and asthma (Figure 2). The following are some generalized statistics relating to chronic diseases.

Approximately 30 percent of individuals, who are diagnosed with hypertension, or high blood pressure, follow the recommendations from the doctor. Roughly 50 to 60 percent of people with hypertension will relapse within 12 months of the diagnosis. Regarding diabetes, less than 30 percent of individuals will follow the recommendations of medical professionals. Thirty to 50 percent of individuals will need retreatment as the months progress post diagnosis. Finally, less than 30 percent of individuals diagnosed with asthma will take their medicine as prescribed. Resulting in 60 percent to 80 percent of individuals with asthma will experience frequent doctor, or hospital, visits within the year. The diagnoses of asthma, diabetes or hypertension could be concerning to the individual and family members initially. The individual and family members might be very motivated to adjust their diet, activity level and/or environmental triggers. Change is difficult. Food temptations are plentiful. Taking medication daily can become tedious. Cultural contexts, competing demands and financial constraints might discourage medical recommendations. Habits, or reward and relief patterns, despite being maladaptive, are difficult to rewire. In general, members of our society will be more understanding, sympathetic, or even empathetic, with individuals struggling with chronic medical conditions. We understand that the conditions are persistent. We do not usually get angry with those individuals for relapsing, readmissions, or unsuccessful treatment. This is not the case with the addiction.

Therefore, “the chronic nature of the disease means that relapsing to drug abuse at some point is not only possible, but likely. Relapse rates (i.e., how often symptoms recur) for people with addiction and other substance use disorders are similar to relapse rates for other well-understood chronic medical illnesses such as diabetes, hypertension, and asthma, which also have both physiological and behavioral components. Treatment of chronic diseases involves changing deeply imbedded behaviors, and relapse does not mean treatment has failed. For a person recovering from addiction, lapsing back to drug use indicates that treatment needs to be reinstated or adjusted or that another treatment should be tried.” (McLellan, 2002)



Source: JAMA, 284:1689-1695, 2000
Figure 2

It is thought, and expressed by professionals and the general public alike, that addiction leads to crime and other unsavory activities. To be fair, there are some correlations (not necessarily causations) between substance use disorders and illegal activities. Some substances will attribute to higher risk factors for illegal involvement. Certainly some substance use disorders may impact a person’s integrity, impulse control and decision making. The very things that they thought they would never do prior to being actively addicted, they did while in active addiction. I can think of individuals that I worked with who stated that their moral compass became askew while using crystal meth, crack cocaine, or alcohol. Addiction does not solely lead to criminal activity. It is also thought that people who use substances or seem to have an addiction do not desire assistance or treatment. This is not the case. Many individuals suffering from addiction, and the resulting experiences, desperately want treatment. The desire might ebb and flow. If they are in the midst of being high and feeling “good,” treatment is probably not a priority. If they are out of substances, cannot acquire funds and are experiencing more and more isolating experiences, treatment will likely be considered. Another barrier for treatment for those with addiction is resources, access to resources and finances. Many, many individuals are turned away when they seek treatment for addiction because there is not a bed available in a treatment center and/or the individual cannot afford treatment. When was the last time that you heard about an individual seeking treatment for cancer, hypertension, diabetes or asthma, in which they were turned away from the facility? This would be the one area where cancer and addiction are “different”. People with addictions are not offered the right to become well like those with chronic medical conditions. The Affordable Care Act (ACA) has greatly assisted in more individuals getting treatment for medical conditions and addictions. However, there is a great deal of room for growth regarding treatment access for addictions, chemical and behavioral.

Imagine being turned away when you sought a medical intervention. Imagine being blamed for said medical diagnosis. Consider what feelings would be evoked when the very medical concern that you are seeking

an intervention for is deemed unimportant, resulting in you being turned away. Many would experience a sense of shame. Earlier, the difference between shame and guilt was explained. Another definition of shame is pain in the soul that cannot be tolerated. Shame, pain in the soul that cannot be tolerated, was specified as a psychological vulnerability among the predisposing factors of addiction.

For those who suffer from any type of physical chronic pain or traditional, visible, chronic illness we want to feel better. We encourage medical technologies and medical interventions. Medicating a physical ailment with prescribed medication is acceptable. If one is in pain, perhaps emotional or mental pain, that pain in the soul that cannot be tolerated, and they self-medicate with chemicals, negative judgements tend to ensue. It is rare that they are empathized with if they are turned away during that window of time when they are motivated to seek interventions or if an intervention is not followed. When one self-medicates with retail therapy, excessive exercise or food, we might receive negative judgements if their actions are negatively impacting others. When one self-medicates with chemicals, and if the chemical use is not culturally or socially accepted, it is often negatively judged. It is critical that professionals, community members and family members employ Emotional Intelligence when assisting those experiencing addictions and possible co-occurring conditions. Implementing empathy and self-awareness is extremely important to retain humility and dedication to work with the human, not just focusing on addition or diagnosis. All individuals have experienced some form of suffering. All individuals want to feel relief from that suffering. Individuals who are predisposed to addictions could find relief, and a sense of feeling “cured” from suffering, by way of turning to chemicals and/or maladaptive behaviors.

Paul Hayes, Honorary Professor Drug Policy, London School of Hygiene & Tropical Medicine stated, “Drug use is common, drug addiction is rare. About one adult in three will use an illegal drug in their lifetime...Most will suffer no long-term harm. A powerful cultural narrative focusing on the power of illegal drugs to disrupt otherwise stable, happy lives dominates our media and political discourse, and shapes policy responses. Drug use is deemed to ‘spiral out of control,’ destroying an individual’s ability to earn their living or care for their children, transforming honest productive citizens into welfare dependent, criminal ‘families from hell.’ In short what determines whether or not drug use escalates into addiction, and the prognosis once it has, is less to do with the power of the drug and more to do with the social, personal and economic circumstances of the user.”^{xix}

Mary Abigail “Abby” Wambach^{xx} stated the following while discussing her experiences with addiction, “The public perception of abuse, of substance abuse or

addiction, is that we’re weak. In fact, you’re just in pain. That is a massive, massive, difference.”

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. What characterizes a shame-based society?**
 - a. Feeling dishonored by others
 - b. Thinking society is disgraceful
 - c. If something hurts, find a quick fix to feel better
 - d. None of the above
- 2. How do addiction and cancer differ?**
 - a. Society believes that cancer remission is necessary
 - b. Society shames those with addiction
 - c. Individuals with an addiction rarely seek support from others
 - d. All of the above
- 3. Seeking treatment for addiction and treatment for cancer are viewed similarly.**
 - a. True
 - b. False
- 4. What is the relapse rate for diabetes?**
 - a. 60-80%
 - b. 40-60%
 - c. 50-70%
 - d. 30-50%
- 5. What is the relapse rate for hypertension?**
 - a. 60-80%
 - b. 40-60%
 - c. 50-70%
 - d. 30-50%
- 6. What is the relapse rate for asthma?**
 - a. 50-70%
 - b. 40-60%
 - c. 60-80%
 - d. 30-50%
- 7. What is the relapse rate for severe substance use disorders?**
 - a. 60-80%
 - b. 40-60%
 - c. 50-70%
 - d. 30-50%
- 8. Pain in the soul that cannot be tolerated is a definition for which feeling/emotion?**
 - a. Anger
 - b. Disappointment
 - c. Grief
 - d. Shame

Review Question Answers:
 1. c 2. d 3. b 4. d 5. c
 6. a 7. b 8. d

Addiction & Isolation

The lack of human connection is the key component in developing addiction.^{xxi} The impacts of isolation on addiction must be recognized, as it ties into shame, and shame feeds addiction. Furthermore, understanding how isolation correlates with addiction will better assist in providing effective treatment. Bruce Alexander's *Addiction: The View from Rat Park* (2010) details a summary of his journey acknowledging the links between isolation and addiction. As to not dilute his subjective experiences with paraphrasing, below are excerpts directly quoted from Bruce Alexander from www.brucealexander.com.^{xxii}

"If you were a cute little white rat you certainly wouldn't want to live in a psychology laboratory. When I was an experimental psychologist, between about 1960 and 1980, white laboratory rats had to live in solitary confinement cellblocks...Although the rats lived in close proximity, they could neither see nor touch each other, because the sides of their cages were made of sheet metal. The only visual stimulation they got was seeing the people who brought food and water and cleaned the metal pans under their cages every few days. Unlike human prisoners, the rats did not even get an exercise period outside their cramped cages.

"And that was in the best of times. In the worst of times they were starved for 24 hours or more and put into Skinner Boxes...Inside Skinner Boxes, the rats could get tiny pellets of food one at a time, provided they pushed a little lever on the side of the box over and over and over. The metal floor made it possible for the experiment to administer electric shocks when the experiment was about punishment rather than reward, which it often was....we young psychologists were trained not to think about what the rats might be experiencing. We usually did not even look at the rats, but only at the data they produced in the Skinner Boxes by pressing their little levers.



Source: Alexander, B. (2010)
Skinner Box

"In the 1960s, some experimental psychologists began to think that the Skinner Box was a good place to study drug addiction. They perfected techniques that allowed the rats to inject small doses of a drug into themselves by pressing the lever. This required tethering the rat to the ceiling of the box with tubing and surgically implanting a needle, or catheter, into their jugular veins. The drug passed through the tube and the needle into the rats' bloodstreams almost instantaneously when they pushed the lever. It reached their brains moments later.

"Under appropriate conditions, rats would press the lever often enough to consume large amounts of heroin, morphine, amphetamine, cocaine, and other drugs in this situation. The mass media of the day were quite excited about these experiments. The results seemed to prove that these drugs were irresistibly addicting, even to rodents, and by extension, to human beings. The conclusion that illegal drugs are irresistibly addicting fit well with the fearsome images that were being propagated about them. The rat research provided additional support for the War on Drugs of that day. Irresistibly addicting drugs certainly cannot be allowed to circulate in human society, especially if, as we were told, this [eggs frying in a pan] is your brain on drugs...

"At first, the conclusion that was reached from this rat research made sense to me. But then I began to realize that it was a stretch. Actually, it was more than a stretch; it was a bone-cracking, joint-popping contortion of normal reason, for several reasons. First, the ancestors of laboratory rats in nature are highly social, sexual, and industrious creatures. Putting such a creature in solitary confinement would be the equivalent of doing the same thing to a human being. Solitary confinement drives people crazy; if prisoners in solitary have the chance to take mind-numbing drugs, they do. Might isolated rats not need to numb their minds in solitary confinement for the same reason that people do? Second, taking drugs in a Skinner box where almost no effort is required and there is nothing else to do is nothing like human addiction which always involves making choices between many possible alternatives. Third, rats are rats. How can we possibly reach conclusions about complex, perhaps spiritual experiences like human addiction and recovery by studying rats? Aren't we more complex and soulful than rats, even if we have similar social needs?

"A small group of colleagues at Simon Fraser University, including Robert Coombs, Patricia Hadaway, Barry Beyerstein, and myself undertook to test the conclusion about irresistibly addicting drugs that had been reached from the earlier rat studies. We compared the drug intake of rats housed in a reasonably normal environment 24 hours a day with rats kept in isolation in the solitary confinement cages that were standard in those days. This required building a great big plywood box on the floor of our laboratory, filling it with things that rats like, such as platforms for climbing, tin cans for hiding in, wood chips for strewing around, and running wheels for exercise. Naturally we included lots of rats of both sexes, and naturally the place soon was

teeming with babies. The rats loved it and we loved it too, so we called it “Rat Park”.



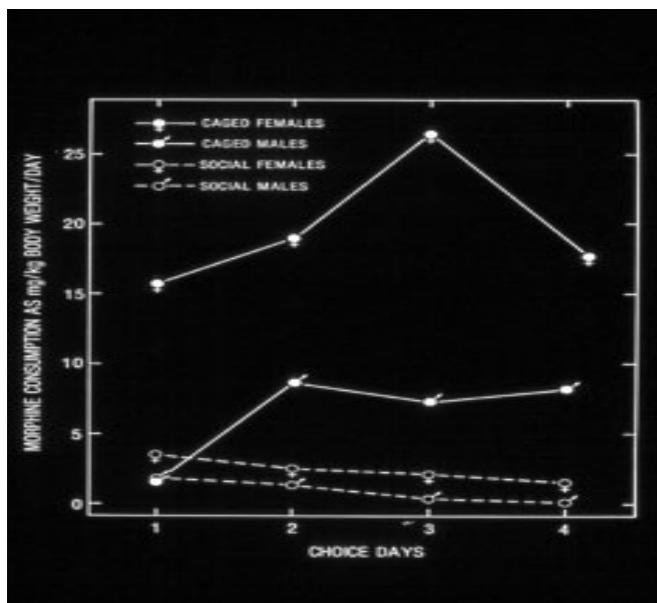
Source: Alexander, B. (2010)
Rat Park – Areal View



Source: Alexander, B. (2010)
Rat Park - Socializing

“We ran several experiments comparing the drug consumption of rats in Rat Park with rats in solitary confinement in regular laboratory cages. In virtually every experiment, the rats in solitary confinement consumed more drug solution, by every measure we could devise. And not just a little more. A lot more.

“You will see at a glance that the rats in Rat Park, called the ‘Social Females’ and ‘Social Males’ in this graph, are consuming hardly any morphine solution, but the ‘Caged Females’ and ‘Caged Males’ are consuming a lot. In this experiment the females consumed more than the males, but that gender difference did not hold up in later experiments.



“It soon became absolutely clear to us that the earlier Skinner box experiments did not prove that morphine was irresistible to rats. Rather, most of the consumption of rats isolated in a Skinner box was likely to be a response to isolation itself. So, we published the results of our experiments in psychopharmacology journals.

“The Rat Park research attracted lots of attention in the local media in our city, and among our students at our university, but in the larger world of addiction theory it sank like a stone, even after other researchers replicated our findings. We had hoped that our research might initiate a serious reconsideration of the conventional wisdom on the causes of addiction. When it didn’t, we were surprised and disappointed. However, we were all at an early stage in our professional careers and looking for other issues to tackle. After our satisfying, but unheralded, success with Rat Park, our individual interests took us off in separate directions.

“One of the worst aspects of closing of Rat Park was that it left us with unresolved questions. A new graduate student in our lab had tried to replicate one of our original experiments but did not get statistically significant results. Non-replication is not a fatal problem in laboratory research, but it requires follow up studies to determine why it happens. Many factors can determine the outcomes of experiments and not all of them can be controlled. Did the non-replication occur because the researcher had to use a new substrain of rats, or because the modified, presumably improved, apparatus that measured drug and water consumption in Rat Park did not work as well as the original machinery, or simply because the Rat Park effect was not as robust as we originally thought? We never were able to work out the mystery, because Rat Park was closed down for good. However, we remain confident in our original experiments, partly because we had repeated them several times in different ways, partly because they were replicated with different apparatuses by researchers

at other universities, and partly because more recent research with different methods has shown other fatal deficiencies in the original Skinner box research which once appeared to show that all rats and people who use addictive drugs become addicted.

“But a vague question lingered in my mind. Our rats consumed much more morphine when they were isolated. This fact definitely undermined the supposed proof that certain drugs irresistibly cause addiction. But what does cause addiction? Why is there currently a flood of addiction to drugs and many other habits and pursuits? People do not have to be put into cages to become addicted – but is there a sense in which people who become addicted actually feel “caged”?

“It turns out that the answer to this last question is “yes”. Or rather, “YES!” The insight into human addiction that grows from the Rat Park research is not terribly complicated, but it took me about 15 years to grasp it clearly and another 10 years to assemble the evidence from human history and anthropology to show that it is true and another 5 years to write a book about it. (The Globalisation of Addiction: A study in poverty of the spirit, Oxford University Press, 2008). That’s how I got to be an old guy.

“My graduate students and I first tried to replicate part of the Rat Park research with human beings, by getting people to role-play prisoners and guards in a prison. The idea was that the prisoners in a simulated prison would be in the same state of mind as the rats in Rat Park. We couldn’t offer them drugs of course, but we could at least ask them about how they felt and get an idea of the mindset that is conducive to consumption of drugs. Unfortunately, the experiment told us nothing...Back to the drawing board.

“How could we do an experiment with people that was something like Rat Park, without treating our human subjects unethically or illegally? I gradually realized that history provides natural experiments of the sort I needed. The results are sitting around in dusty books just waiting to be analyzed. One of these many natural experiments is the effect of colonization on native people.

“Here are the basic facts as they are recorded in the history of Western Canada, where I live, although very similar historical data can be found in many countries:

The English colonial empire overran hundreds of native tribal groups in Western Canada in the 18th and 19th century. The native people were moved off expansive tribal lands onto very small reserves, completely destroying the economic basis of their cultures. Their children were taken from their parents and sent off to “residential schools” to be taught the white man’s culture so they could be assimilated. They were forbidden to speak their native languages and found themselves strangers in their own communities when they finally came home. Prior to the colonial conquest, the native people had some serious problems, of course, including frequent tribal

warfare, with prisoners being killed or kept as slaves. Mental illness, personal betrayals, and epidemic diseases occasionally occurred in pre-colonial tribes. Basically, native people had all the problems of their English colonizers except one. There was so little addiction that it is very difficult to prove from written and oral histories that it existed at all.

But once the native people were colonized alcoholism became close to universal. There were entire reserves where virtually every teenager and adult was either an alcohol or drug addict or “on the wagon”. There still are a few reserves like this. Addiction was not limited to alcohol, but eventually encompassed the full range of addictions found in the wider society: drugs, television, gambling, Internet, dysfunctional love relationships, etc.

At first, the English settlers explained the universal alcoholism of the natives with a story of genetic vulnerability. They said “Indians just can’t handle liquor” and tried to solve the problem with strict alcohol prohibition. That didn’t work and most people don’t believe the genetic vulnerability story anymore.

So why did universal addiction strike the colonized natives of Western Canada and the world as well? Certain parallels between the problems of colonized human beings and the rats in Rat Park appear to provide an explanation. In both cases there is little drug consumption in the natural environment and a lot when the people or animals are placed in an environment that produces social and cultural isolation. In the case of rats, social and cultural isolation is produced by confining the rats in individual cages. In the case of native people, the social and cultural isolation is produced by destroying the foundations of their cultural life: taking away almost all of their traditional land, breaking up families, preventing children from learning their own language, prohibiting their most basic religious ceremonies (potlatches and spirit dancing in Western Canada), discrediting traditional medical practices, and so forth. Under such conditions, both rats and people consume too much of whatever drug that is made easily accessible to them. Morphine for the rats, alcohol for the people.

“In both cases, the colonizers or the experimenters who provide the drug explain the drug consumption in the isolated environment by saying that the drug is irresistible to the people or the rats. But in both cases, the drug only becomes irresistible when the opportunity for normal social existence is destroyed.

“In the case of natives of Western Canada, other historical information makes it perfectly clear that a simple genetic vulnerability to alcohol was not the cause of the devastating plague of alcoholism that occurred. There are several different types of evidence:

1. In cases where alcohol was available to natives, but their cultures were not destroyed, they were able

to incorporate alcohol into their native traditions without too much trouble. People drank and some people got plenty drunk on some occasions, but there was no widespread alcoholism.

2. In cases where native cultures were destroyed, but alcohol was not available, native people showed many of the symptoms that are associated with mass alcoholism, without ever tasting a drop. In other words, people stopped doing productive work and taking care of their families and concentrated on aping the manners of the English invaders and idling away their time. Criminality and child neglect became problems, where they had not been before. But alcohol was not the cause because there wasn't any!

3. We now know that native people whose cultures have been destroyed are vulnerable to all the addictions that white people are. If Indians whose cultures have been destroyed have a genetic weakness for alcohol, they also have a genetic weakness for drugs, television, gambling, bingo, Internet, and dysfunctional love relationships!

"If the alcohol itself was not the cause of native alcoholism, what was? The great advantage of doing our research with human beings rather than rodents is that people are often willing to tell us the answer to our questions. Native people have described the anguish of being deprived of their traditional cultures and social networks in eloquent language and have explained how drunkenness relieved their misery temporarily, even as it ultimately led to self-destruction.

"...There is no way to resolve an argument what rats are feeling. So I have never gone back to rat experimentation but have instead searched out more and more parallels in the literature of human history and anthropology. This work is still in progress. There is no shortage of parallels from people of all races and many cultures.

"When I talk to addicted people, whether they are addicted to alcohol, drugs, gambling, Internet use, sex, or anything else, I encounter human beings who really do not have a viable social or cultural life. They use their addictions as a way of coping with their dislocation: as an escape, a pain killer, or a kind of substitute for a full life. More and more psychologists and psychiatrists are reporting similar observations. Maybe our fragmented, mobile, ever-changing modern society has produced social and cultural isolation in very large numbers of people, even though their cages are invisible!

"...Chronic isolation causes people to look for relief. They find temporary relief in addiction to drugs or any of a thousand other habits and pursuits because addiction allows them to escape from their feelings, to deaden their senses, and to experience an addictive lifestyle as a substitute for a full life.

"At this point, it is too early to say conclusively if the Rat Park view of addiction is right or not, but it is not too early to be sure that the old theory that addiction is

a problem caused by addictive drugs is far too simple. Huge amounts of research money have been spent researching the idea that addictive drugs are the cause of addiction and treatments based on that idea have been tried over the world. In the meantime, the once-small problem of addiction has globalized. Moreover, it has become absolutely clear that drug and alcohol addiction is only a corner of a much larger addiction problem!

*"It is definitely time for a fresh direction in the theory of addiction, and I have a hunch – as well as a hope – that Rat Park might provide the starting point. The next steps from this starting point are explained in my book *The Globalization of Addiction: A study in poverty of the spirit.* (Oxford Univ. Press, 2010)."*

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. What was the main difference between the Skinner Boxes and Rat Park?**
 - a. In Skinner Boxes, the rats could interact, thus use of cocaine water decreased
 - b. In Rat Park, the rats were isolated, thus use of cocaine water increased
 - c. In Rat Park, the rats could interact, thus use of cocaine water decreased
 - d. None of the above
- 2. Can feeling 'caged' lead to increase substance use?**
 - a. No
 - b. Yes
- 3. Which population did Alexander specifically describe isolation leading to substance use?**
 - a. Natives of Western United States
 - b. Natives of Western Canada
 - c. Natives of Western Alaska
 - d. None of the above
- 4. How many years did it take for Alexander to adjust his concepts about addiction?**
 - a. 15
 - b. 25
 - c. 30
 - d. 10

Review Question Answers: 1. c 2. b 3. b 4. a

Brain Anatomy, Terms and Concepts:

In order to move into a renewed direction in effective addiction treatment, it is necessary to understand the neurobiology of the brain. The below terms and definitions will be tied into the neuroscience of addiction.

The following are details about the human brain: ^{xxiii}

- The human brain is the largest brain of all vertebrates comparative to body size
- It weighs about 3.3 pounds (1.5 kilograms)
- Approximately 33 percent of the bodies energy is used by the the brain
- The brain makes up about 2 percent of a human's body weight
- The **cerebrum**, or **cerebral cortex**, makes up 85 percent of the brain's weight
- The **cerebellum** accounts for roughly 10% of total brain weight
- The **cerebellum** contains more **neurons** than the rest of the brain combined and can develop new neurons into adulthood
- It contains about 86 billion nerve cells (**neurons**) that comprises the "gray matter"
- It contains billions of nerve fibers (**axons** and **dendrites**) which consist of the "white matter"
- These **neurons** are connected by trillions of connections, called **synapses**
- At birth, a human has approximately 2,500 **synapses**; a three-year-old has approximately 15,500 **synapse**; during adolescents, the synapses that are rarely used are eliminated, thus by adulthood, 50 percent of **neurons** die off secondary to the "use it or lose it" phenomenon
- Information travels from the **hindbrain**, through the **midbrain**, then the **limbic system** and ultimately processed in the **forebrain**
- The **forebrain**, also commonly called the **prefrontal cortex** or **frontal lobe**, does not fully develop, or mature, until the age of 25 or 26
- It takes approximately 500 nutrient rich calories for the brain to carry out basic body functions

The brain is a complex, amazing structure that is mostly undiscovered. It is essential to develop a rudimentary understanding and define terms and function of the brain's anatomy, as they are understood currently. Please note that this is not an exhaustive list, rather a list of terms that are applicable to this course:^{xxiv}

Autonomic Nervous System: noun - the system of nerves and ganglia that innervates the blood vessels, heart, smooth muscles, viscera, and glands and controls their involuntary functions, consisting of sympathetic and parasympathetic portions.

Amygdala: noun, plural - an almond-shaped part of the limbic system; a ganglion of the limbic system adjoining the temporal lobe of the brain and involved in emotions of fear and aggression. The amygdala is active at birth and is adjacent to the hippocampus. It connects areas of the cortex that process "higher" cognitive information with hypothalamic and brainstem systems that control "lower" metabolic responses (e.g. touch, pain sensitivity, and respiration). This allows the amygdala to coordinate physiological responses based on cognitive information: the most well-known example being the fight-or-flight response. The amygdala has three functionally distinct parts: medial group of subnuclei has many connections with the olfactory bulb and olfactory cortex, basolateral group has extensive connections with the cerebral cortex, particularly the orbital and medial prefrontal cortex; central and anterior group of nuclei has many connections with the brainstem, hypothalamus, and sensory structures. *Image 3*

Axon: noun - the appendage of the neuron that transmits impulses away from the cell body. *Image 1*

Basal Ganglia: noun - any of several masses of gray matter in each cerebral hemisphere. The basal ganglia are involved in cognitive and emotional behaviors and play an important role in reward and reinforcement, addictive behaviors and habit formation. For the sake of this course, it is not necessary to fully understand each structure in the Basal Ganglia; however the structures will be referenced in images. The structures include: Nucleus Accumbens, Globus Pallidus, Subthalamic Nucleus, Substantia Nigra, Caudate Nucleus and Putamen.

Brain Stem: noun - the portion of the brain that is continuous with the spinal cord and comprises the medulla oblongata, pons, midbrain, and parts of the hypothalamus, functioning in the control of reflexes and such essential internal mechanisms as respiration and heartbeat.

Broca's Area: noun - a cerebral area, usually in the left inferior frontal gyrus (located in the frontal lobe), associated with the movements necessary for speech production.

Cell Body: noun - the compact area of a nerve cell that constitutes the nucleus (with DNA) and surrounding cytoplasm, excluding the axons and dendrites. *Image 1*

Cerebrum: noun, plural - the anterior and largest part of the brain, consisting of two halves or hemispheres and serving to control voluntary movements and coordinate mental actions; the forebrain, which is associated with higher order functioning, such as thinking, perceiving, planning, and understanding language, as well as the control of voluntary behavior, and midbrain. *Image 2*

Cerebellum: noun, plural - a large portion of the brain, serving to coordinate voluntary movements, posture, and balance in humans, being in back of and below

the cerebrum and consisting of two lateral lobes and a central lobe. *Image 2*

Cerebral Cortex: noun - the furrowed outer layer of gray matter in the cerebrum of the brain, associated with the higher brain functions, such as voluntary movement, coordination of sensory information, learning and memory, and the expression of individuality. *Image 3*

Cerebrospinal Fluid: noun - the fluid in the ventricles of the brain, between the arachnoid and pia mater, and surrounding the spinal cord.

Cingulate Gyrus: noun - a long curved convolution of the medial surface of the cortical hemisphere, arched over the corpus callosum from which it is separated by the deep sulcus of the corpus callosum. Also called callosal gyrus. The cingulate gyrus helps regulate emotions and pain and is involved in fear and the prediction (and avoidance) of negative consequences and can help orient the body away from negative stimuli. Learning to avoid negative consequences is an important feature of memory.

Cognition: noun - the act or process of knowing or perceiving; the product of such a process; knowledge.

Corpus Callosum: noun, plural - a great band of deeply situated oblique white fibers uniting the two halves of the cerebrum in humans and other mammals.

Declarative Memory: The ability to learn and consciously remember everyday facts and events.

Dendrite: noun - the branching process of a neuron that conducts impulses toward the cell. *Image 1*

Dentate Gyrus: noun - one of the two interlocking gyri composing the hippocampus.

Forebrain: noun - the forward most part of the vertebrate brain. In humans, it consists of the thalamus, the hypothalamus, and the cerebrum. The forebrain is credited with the highest intellectual functions. *Image 2*

Frontal Lobe: noun - the largest and forward most lobe of each cerebral hemisphere, responsible for the control of skilled motor activity, including speech. Mood and the ability to think are also controlled by the frontal lobe; has a role in controlling movement and in the planning and coordinating of behavior. *Image 2*

Gray Matter: noun - nerve tissue, especially of the brain and spinal cord, which contains fibers and nerve cell bodies and is dark reddish-gray.

Hindbrain: noun - The rearmost part of the vertebrate brain. In humans, it consists of the pons and the medulla. *Image 2*

Hippocampus: noun, plural - an intricate, seahorse-shaped structure in the cerebral cortex of the temporal lobe of the brain, composed of two gyri with white

matter above gray matter. It forms part of the limbic system and is involved in the processing of emotions and memory. This structure is one of the most studied areas of the brain, in which it is involved in learning, memory storage, and emotion. The hippocampus is the structure in the brain most closely aligned to memory formation and begins functioning around two-years-old. It is important as an early storage place for long-term memory. Long-term memory consists of information older than 30 seconds. It is involved in the transition of long-term memory to even more enduring permanent memory. The hippocampus also plays an important role in spatial navigation. *Image 3*

Homeostasis: noun - the tendency of a system, especially the physiological system of higher animals, to maintain internal stability, owing to the coordinated response of its parts to any situation or stimulus that would tend to disturb its normal condition or function; in psychology, it is a state of psychological equilibrium obtained when tension or a drive has been reduced or eliminated.

Hormones: noun - any of various internally secreted compounds, as insulin or thyroxine, formed in endocrine glands, that affect the functions of specifically receptive organs or tissues when transported to them by the body fluids; chemical messengers secreted by endocrine glands to regulate the activity of target cells.

Hypothalamus: noun, plural - a region of the brain, between the thalamus and the midbrain, that functions as the main control center for the autonomic nervous system by regulating sleep cycles, body temperature, appetite, et cetera, and that acts as an endocrine gland by producing hormones, including the releasing factors that control the hormonal secretions of the pituitary gland. The hypothalamus is like a “thermostat” or “master gland” that regulates a wide range of behavioral and physiological activities.

Limbic System: noun - group of deep brain structures, common to all mammals and including the hippocampus, amygdala, gyrus fornicatus, and connecting structures, associated with olfaction, emotion, motivation, behavior, and various autonomic functions; an important element of the body’s response to stress and is highly connected to the endocrine and autonomic nervous systems; responsible for processing the body’s response to odors.

Long-Term Memory: noun - information stored in the brain and retrievable over a long period of time, often over the entire life span of the individual.

Midbrain: noun - the middle part of the vertebrate brain. In most animals except mammals, the midbrain processes sensory information. In mammals, it serves primarily to connect the forebrain with the hindbrain.

Mitochondria: noun, plural - spherical or elongated organelle in the cytoplasm of nearly all eukaryotic cells, containing genetic material and many enzymes

important for cell metabolism, including those responsible for the conversion of food to usable energy. It consists of two membranes: an outer smooth membrane and an inner membrane arranged to form cristae. *Image 1*

Motor Neuron: noun - A neuron that conveys impulses from the central nervous system to a muscle, gland, or other effector tissue. *Image 1*

Myelin Sheath: noun - a wrapping of myelin around certain nerve axons, serving as an electrical insulator that speeds nerve impulses to muscles and other effectors. *Image 1*

Neurohormones: noun - A hormone that is produced and secreted by neurons and that effects its action on the nervous system. The hormones secreted by the hypothalamus that in turn control the secretions of the pituitary gland are neurohormones.

Neuron: noun - A hormone that is produced and secreted by neurons and that effects its action on the nervous system. The hormones secreted by the hypothalamus that in turn control the secretions of the pituitary gland are neurohormones. *Image 1*

- *The adult human brain has approximately 100 billion (100,000,000,000) neurons.*^{xxv}
- *The gut contains 100 million neurons, which is more than the spinal cord. Several major neurotransmitters, including serotonin and dopamine, are in the gut. Also two dozen small brain proteins, called neuropeptides are there along with the major cells of the immune system.*^{xxvi}
- *The heart is equipped with approximately 40,000 neurons. These neurons can deliver pain signals and other sensations to the autonomic parts of the brain (which are largely unconscious), as well as messages to brain centers involved in conscious thought and emotion.*^{xxvii}

Neurotransmitter: noun - A chemical substance that is produced and secreted by a neuron and then diffuses across a synapse to cause excitation or inhibition of another neuron. Acetylcholine, norepinephrine, dopamine, and serotonin are examples of neurotransmitters.

Neuroplasticity: noun - the capacity of the nervous system to develop new neuronal connections.

Neurobiology: noun - the branch of biology that is concerned with the anatomy and physiology of the nervous system.

Neuroscience: noun - the field of study encompassing the various scientific disciplines dealing with the structure, development, function, chemistry, pharmacology, and pathology of the nervous system. Includes neurobiology and extends it to theoretical models, neural coding, mapping of cognitive science and psychology onto brain activity (fMRI), models of learning, perception, and behavior. When

animals are studied in neuroscience, it is as a proxy for understanding humans. Neuroscience and neurobiology can essentially be used interchangeably.

Occipital Lobe: noun - The posterior lobe of each cerebral hemisphere, having the shape of a three-sided pyramid and containing the visual center of the brain. *Image 2*

Olfactory Bulb: noun - The bulblike distal end of the olfactory lobe where the olfactory nerves begin. The olfactory bulb processes directly in the limbic system.

Parasympathetic Nervous System: noun - The part of the autonomic nervous system originating in the brain stem and the lower part of the spinal cord that, in general, inhibits or opposes the physiological effects of the sympathetic nervous system, as in tending to stimulate digestive secretions or slow the heart during relaxed states.

Parietal Lobe: noun - the portion of each cerebral hemisphere concerned with the perception and interpretation of sensations of touch, temperature, and taste and with muscular movements; integrates information from the ventral visual pathways (which process what things are) and dorsal visual pathways (which process where things are). *Image 2*

Pons: noun, plural - a thick band of nerve fibers in the brainstem of humans and other mammals that links the brainstem to the cerebellum and upper portions of the brain. It is important in the reflex control of involuntary processes, including respiration and circulation. All neural information transmitted between the spinal cord and the brain passes through the pons.

Prefrontal Cortex: noun - located at the front of the frontal lobe is thought to play an important role in “higher” brain functions. It is a critical part of the executive system, which refers to planning, reasoning, and judgment. It is also involved in personality and emotion by contributing to the assessment and control of appropriate social behaviors. It is considered the conscious brain.

Short-Term Memory: noun - retention of information that undergoes little processing or interpretation and can be recalled for only a few seconds, usually no more than 30 seconds; retention of about seven items at a moment in time.

Spinal Cord: noun - the thick, whitish cord of nerve tissue that extends from the medulla oblongata down through the spinal column and from which the spinal nerves branch off to various parts of the body.

Synapse: noun - a region where nerve impulses are transmitted and received, encompassing the axon terminal of a neuron that releases neurotransmitters in response to an impulse, an extremely small gap across which the neurotransmitters travel, and the adjacent membrane of an axon, dendrite, or muscle or gland cell with the appropriate receptor molecules for picking

up the neurotransmitters. *Image 1*

Sympathetic Nervous System: noun - the part of the autonomic nervous system originating in the thoracic and lumbar regions of the spinal cord that in general inhibits or opposes the physiological effects of the parasympathetic nervous system, as in tending to reduce digestive secretions or speed up the heart during times of stress and arousal.

Temporal Lobe: noun - the lobe of each cerebral hemisphere lying to the side and rear of the frontal lobe; controls hearing and some aspects of language perception, emotion, and memory. *Image 2*

Thalamus: noun, plural - the part of the vertebrate brain that lies at the rear of the forebrain; relays sensory information to the cerebral cortex and regulates the perception of touch, pain, and temperature; maintains a central role in alertness and awareness.

Ventral Tegmental Area (VTA): noun - part of the midbrain, in which it is rich in dopamine and serotonin neurons and is part of two major dopamine pathways: one pathway connects the VTA to the nucleus accumbens and the other pathway connects the VTA to the cortical areas in the frontal lobes; part of the pleasure system, or reward circuit, which is one of the major sources of incentive and behavioral motivation.

Ventricle: noun - any of four fluid-filled cavities in the brain of vertebrate animals. The ventricles are filled with cerebrospinal fluid.

Wernicke's Area: noun - an area located in the rear of the left temporal lobe of the brain. It is associated with the ability to recognize and understand spoken language.

White Matter: noun - The whitish tissue of the vertebrate brain and spinal cord, made up chiefly of nerve fibers (axons) covered in myelin sheaths.

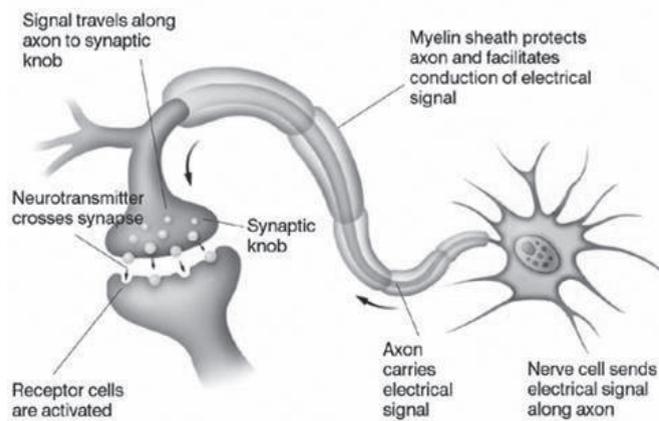


Image 1

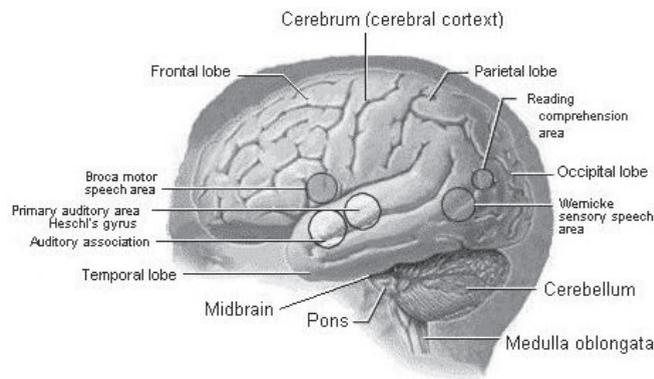


Image 2

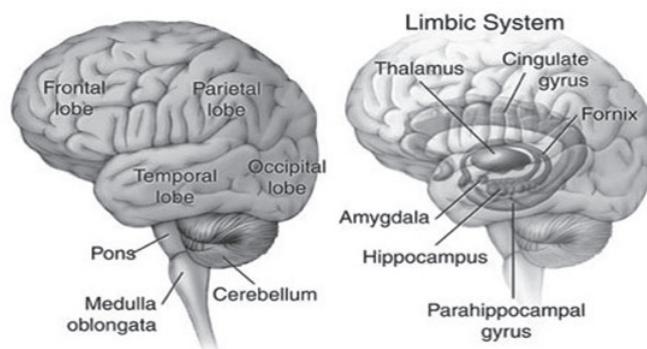


Image 3

Neurotransmitters and neurohormones play a vital role in the relief and reward pathways within the Limbic System. As indicated in the above terms and definitions, the relief and reward pathways play a role in the formation of addiction(s). *Image 7*

Cortisol: noun - the principal steroid hormone produced by the adrenal cortex. It regulates carbohydrate metabolism and the immune system and maintains blood pressure. When natural or synthetic cortisol is used as a pharmaceutical, it is known as hydrocortisone; in humans, it is secreted in the greatest quantities before dawn, readying the body for the activities of the coming day; a stress hormone that assists with fight-or-flight and is beneficial in real-time, dangerous situations but is harmful when produced long-term.

Dopamine: noun - a catecholamine neurotransmitter in the central nervous system, retina, and sympathetic ganglia, acting within the brain to help regulate movement and emotion; its depletion may cause Parkinson's disease; assists with motivation to achieve goals and released when motivated behavior occurs, such as checking off items on a to-do list, completing a project, or getting social media alerts; it feels "good," thus participating in activities that release Dopamine can be highly addictive.

Endorphins: noun - any of a group of peptides occurring in the brain and other tissues of vertebrates, and resembling opiates, that react with the brain's opiate receptors to raise the pain threshold; enables individuals to persist during exercise, resulting in a "runner's high" and enduring difficulties, such as deadlines, long work days, and "pushing through."

Epinephrine: noun - a hormone secreted by the adrenal medulla upon stimulation by the central nervous system in response to stress, as anger or fear, and acting to increase heart rate, blood pressure, cardiac output, and carbohydrate metabolism; a hormone which is quickly released into the bloodstream during times of stress and serves to put the body into a general state of arousal, which enables it to cope with the challenge.

Norepinephrine: noun - a neurotransmitter, also called noradrenaline, released by adrenergic nerve terminals in the autonomic and possibly the central nervous system, that has such effects as constricting blood vessels, raising blood pressure, and dilating bronchi; involved in arousal and sleep regulation, mood, and blood pressure.

Oxytocin: noun - A polypeptide hormone secreted

by the posterior portion of the pituitary gland which stimulates the contraction of smooth muscle of the uterus during childbirth and facilitates ejection of milk from the mammary glands; a powerful hormone that assists with pair bonding and acts as a neurotransmitter in the brain that increases when humans hug, touch and/or kiss a loved one; also referred to as the "bonding hormone" or "cuddle hormone"; assists in creating a sense of intimacy, trust and safety, as well as boosting the immune system, assist with positive emotions, and can counter Dopamine, which can be responsible for addiction.

Serotonin: noun - A monoamine substance that is formed from tryptophan and found in many animal tissues, including the intestine, heart and central nervous system. In the brain, serotonin acts as a neurotransmitter that is involved in the control of pain perception, the sleep-wake cycle, and mood. Serotonin is also produced in some bacteria and plants; provides the feeling of significance, pride and status, thus drives us to seek the recognition of others and to "want to do it" for others, such as partners, children, friends, and colleagues; reinforces the sense of relationships with the group, tribe, family and/or allegiance.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. How much does an adult human brain weigh?**
 - a. 2.6 pounds
 - b. 3.3 pounds
 - c. 8.1 pounds
 - d. 4.4 pounds
- 2. What is the cerebellum responsible for?**
 - a. Higher order functioning
 - b. Understanding language
 - c. Control and coordinate movement
 - d. Voluntary behaviors
- 3. Which part of the brain is the amygdala located in?**
 - a. Midbrain
 - b. Limbic System
 - c. Brain Stem
 - d. Prefrontal Cortex
- 4. What is the function of the hippocampus?**
 - a. Memory storage
 - b. Learning
 - c. Emotion
 - d. All of the above
 - e. None of the above
- 5. What is the role of the prefrontal cortex?**
 - a. "Lower" brain functions
 - b. Planning, Reasoning, Judgement
 - c. Control of appropriate social behaviors
 - d. Both B & C
- 6. How does the Basal Ganglia contribute to addiction?**
 - a. Reward and Reinforcement
 - b. Habit formation
 - c. Both A & B
 - d. None of the above
- 7. Which part of the brain is considered primitive?**
 - a. Prefrontal Cortex
 - b. Brain stem
 - c. Limbic System
 - d. Cerebellum
- 8. Which part of the brain is considered responsible for consciousness?**
 - a. Gray Matter
 - b. Prefrontal Cortex
 - c. Limbic System
 - d. Brain Stem
- 9. What is the role of Dopamine?**
 - a. Motivation
 - b. Arousal
 - c. Fight-or-flight
 - d. Trust and Safety
- 10. What purpose does Serotonin play?**
 - a. Motivation
 - b. Arousal
 - c. Sense of relationships
 - d. Trust and Safety

Review Question Answers:

1. b 2. c 3. b 4. d 5. d
6. c 7. c 8. b 9. a 10. c

Basic Neurobiology & Neuroscience of Addiction:

To assist in retaining the above terms and definitions, the following is an additional explanation that includes information described above.^{xxviii} The brain has three major areas: the hindbrain, midbrain and forebrain. *Image 2*

Hindbrain: This is the oldest part of the brain. It is located at the top of the spinal cord. It controls the most basic body functions and includes three structures:

- **Medulla Oblongata:** The medulla helps control our heart rate, blood pressure and breathing. It is located directing above our spinal cord. An injury to this part of the brain would likely be fatal.
- **Pons:** The Pons is located just above the medulla and it helps coordinate the hindbrain with the midbrain and forebrain. It is also involved in facial expressions.
- **Cerebellum:** The Cerebellum is located at the back of our brain, on the bottom. Its shape resembles the entire human brain. The Cerebellum assists in coordination, balance and fine motor and/or muscle movements. The Cerebellum enables successful hand-eye coordination.

Midbrain: Located in the interior of our brain, the midbrain has many functions:

- The midbrain helps coordinate sensory information from the five senses with simple movements, such as tracking with your eyes and moving your head, via your neck muscles, to hear. Your midbrain is assisting you as you read this content, as your eyes are moving and you are adjusting your head. Reading this text now, you are using your midbrain to keep your eyes and head moving. It is not uncommon for individuals to interchange the term midbrain for the limbic system since the limbic system is located in the middle of the brain. As you have read, the midbrain and limbic system are two distinct structures.

Forebrain: The forebrain consists of the most recently evolved structure, as well as primitive structures. It has four main parts:

- **Prefrontal Cortex:** The last part of the brain to develop, it is responsible for executive functions, such as planning and decision making. It is the conscious part of the brain and will “think out” decisions. The Prefrontal Cortex, also called the Frontal Lobe, can override decisions made by the Amygdala, or unconscious brain.
- **Thalamus:** The thalamus is the operator or switchboard of our brain. Any sensory information (sights, sounds, touch, tastes) go

to the Thalamus initially. The Thalamus then sends the information to the coordinating parts of the brain. Smell is the only sense that does not go through the Thalamus. Smell is processed through the Olfactory Bulb, located near the Amygdala.

- **Limbic System:** The Limbic System has been termed the emotional regulation center. It assists in feeling raw emotions. The Limbic System is made up of several structures, including the following:
 - **Hypothalamus:** A very important structure of the brain. It is the “thermostat” and is involved in controlling thirst, hunger, body temperature, sexual arousal and the endocrine system.
 - **Hippocampus:** Responsible for the consolidation of information from short-term memory to long-term memory, as well as spatial navigation.
 - **Amygdala:** The amygdala works closely with the Hippocampus. The Amygdala constantly scans for risks and threats. It determines if certain risks are potential threats, in which it signals other regions of the brain, such as the Cerebellum, to initiate physiological responses, such as fight or flight. It is the unconscious part of the brain and makes reactive decisions, sometimes overreactions.
 - **Basal Ganglia:** Regulates the initiation of movements, balance, eye movements, and posture. They are strongly connected to other motor areas in the brain and link the thalamus with the motor cortex. The basal ganglia are also involved in cognitive and emotional behaviors and play an important role in reward and reinforcement, addictive behaviors and habit formation.

The terms, definitions and concepts applicable to this course have been described and reviewed. This next section will tie the terms into describing the neuroscience of addiction based on the knowledge that I have gained as a clinical social worker. Upon completing a comprehensive clinical biopsychosocial assessment, if the person meets criteria for a substance use disorder (mild, moderate or severe), behavioral addiction, or has a high predisposition risk for a severe substance use disorder, I explain the diagnostic criteria in the DSM-5^{xxix} as well as the very information that will be explained below. It is curious how many individuals seek mental health and/or substance abuse services, in which they have a history of treatment and are unclear of their prior diagnosis. Furthermore, if they do know of a diagnosis, they usually do not understand the diagnostic criteria for said diagnosis. Returning to the medical analogy, the average person will look

up signs (objective; can be observed) and symptoms (subjective; experienced internally) of physical concerns on the internet before the medical appointment. During the medical appointment, best practice would include the medical professional describing the medical function and, possible dysfunction, of the physical concern. Upon receiving the medical diagnosis and after the medical appointment, many individuals will look up additional facts online about the diagnosis. I have observed that this is often not the case with many mental health and substance use signs, symptoms and diagnoses. Additionally, just like a medical concern, it is critical to not only address the resulting concerns and consequences that usually bring an individual to seek services, but also the underlying causes. If a person does not understand substance use disorders or addiction, it is more difficult to successfully address the signs and symptoms. For example, if a person has a symptom of lightheadedness and they think the symptom is related to diabetes, they will apply interventions according to diabetes. Suppose that the lightheadedness due to undiagnosed, or misdiagnosed, hypertension, the interventions for diabetes may not be successful. Correct knowledge is powerful when individuals choose to apply the knowledge. It is up to the clinicians to offer correct diagnosis and corresponding explanations of the diagnosis.

To review, information moves from the hindbrain, the midbrain, through the limbic system, to the forebrain. The frontal lobe does not fully develop until the age of 25 or 26.^{xxx} The caveat is that the the development can be stunted, or paused, if there has been complex grief, trauma and chronic substance use. The brain is not damaged. The IQ is not lowered. Rather the emotional maturity does not develop according to the individual's chronological age. Their ability to reason, use logic and problem solve gets arrested. For example, if a person began using substance at the age of 13, in which they move through the Addiction Timeline rapidly and begin using substance daily while in adolescence, their frontal lobe development will likely get stalled. Fast forward and that same individual is now 38 years old. If they did not receive treatment, they did not develop adaptive coping skills or self-care tools. Essentially, they have not developed wellness to counter the severe substance use, their emotional maturity will often mirror that of a 13 year old. They could be very intelligent and skilled; however, relationally, self-awareness and impulse control, essentially their Emotional Intelligence, will appear more immature than their chronological age.

As mentioned above, typically, information travels from the hindbrain, the midbrain, brain, through the limbic system, to the forebrain (*Image 4*). Individuals are moving around, taking in oxygen, pumping blood through their body, while taking in visual information, processing sensory stimuli, scanning for threats, and ultimately pulling all of that data together to make a judgement or decision.

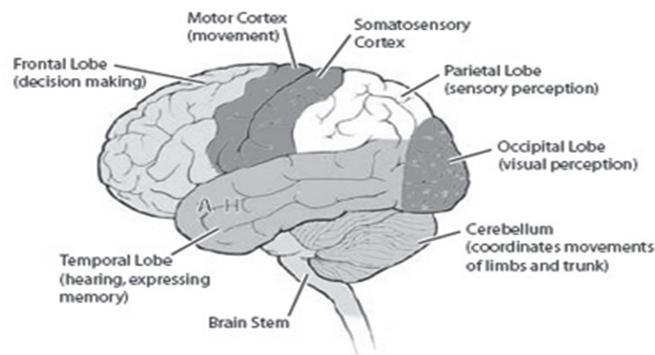


Image 4

When someone is addicted, information does not travel in the typical path. Many can relate to this alter in information processing even if they have not personally experienced an addiction. To refer back to the Addiction Timeline, suppose an individual identifies as a “social drinker,” in which they might have an Alcohol Use Disorder, Mild secondary to binge drinking when they do drink alcohol once a month. Suppose that person decided to meet friends after work on Friday evening, in which they decided to only have two mixed drinks. Perhaps the company and conversation is energizing, in which the individual orders a third drink, then a fourth. Now, imagine that the frontal lobe has a dimmer light switch for those who do not have a true addiction. As the individual consumes a couple alcohol units (one unit equates to one and a half ounces of 80 proof liquor; 12 ounces light beer; or five ounces of wine), that metaphorical dimmer switch is gradually turning off, thus logical decision making, emotional self-awareness and impulse control lessens. As they continue to drink, their emotional regulation and sensory process begins to change. They are laughing more, smiling bigger, talking louder, missing some stimuli and/or focused on other stimuli. As that person drinks further, to the point of intoxication, their vision might change and their physical self-awareness changes (bumping into things, stumbling). Finally, if the person consumes a dangerous amount of alcohol, or experience alcohol poisoning, their respirations and heart rate slow. The altered information processing is not moving from the hindbrain to the forebrain. Rather, from the forebrain to the hindbrain (*Image 5*). For those who have never consumed alcohol to this degree or used an illicit substance to intoxication, most have consumed far too much food during a holiday celebration. One knows that they have more food on their plate than they typically consume. Upon completing that plate and feeling rather uncomfortable, they decide, with altered decision making, to get second helpings of the delicious food. The metaphorical dimmer switch is slowing turning off in those situations, too.

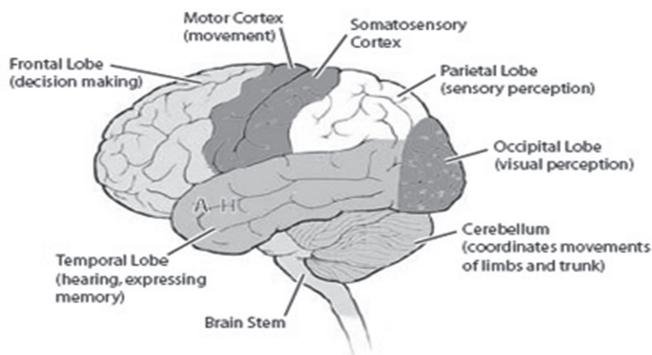


Image 5

For that person who has a true addiction or experiencing a Substance Use Disorder, Severe, their frontal lobe has a metaphorical light switch that turns “on” or “off”, not a dimmer switch that slowly adjusts. Even if the person is not actively using a substance in that moment, that metaphorical switch is turned “off”. The frontal lobe is stunted, in which the individual’s Emotional Intelligence does not appear to match their chronological age. Effective problem solving abilities, use of logic and impulse control appear consistently lacking while an individual is in active addiction. The spectacular news is that once the individual seeks treatment and consistently applies adaptive interventions and action based coping skills, in approximately one to one and a half years^{xxxi} of sobriety and wellness (not solely being clean and/or abstaining from the substance(s)), that metaphorical switch in the frontal lobe will gradually turn back “on”. The individual’s brain will process information from hindbrain to forebrain, by way of the midbrain, as neurologically intended.

The next section of the brain to discuss is the limbic system. As described above, the limbic system is crucial for emotional regulation, autopilot, intricate fight or flight, pleasure via rewards and arousal. It is considered the unconscious and primitive part of the brain, in that it has gone unchanged for over 50,000 years. Within the limbic system is the hypothalamus, which is that master gland, or figurative thermostat, that assists in emotional regulation by releasing neurohormones and neurotransmitters. If the limbic system, specifically the amygdala, is scanning for threats and overreacts to a possible threat, the hypothalamus coordinates the release of adrenaline. As the frontal lobe realizes that there is not a factual threat, it overrides the amygdala. The hypothalamus produces other neurohormones and/or neurotransmitters to assist in calming down and relaxing. All of this can occur in mere seconds. The hypothalamus produces and regulates estrogen, androgen, insulin, adrenalin, oxytocin, et cetera.

The amygdala is complex and located in the limbic system and directly communicates with the hypothalamus. It is almond shaped and it’s responsible for scanning for risks and initiating intricate fight or

flight. When one is suddenly startled, there is a very brief pause which allows the amygdala to discern whether the cause of the startle is a true threat. If it is, or if the amygdala overreacts, the amygdala determines whether to respond with fight, flight, or freeze, and then sends the appropriate message to the hypothalamus and hindbrain. It is also responsible for autopilot. Think of when you drive a familiar route and while you are driving, you are thinking about the tasks that need to be accomplished throughout the day. Time appears to speed up, in which you think to yourself, “Wow, I arrived here quickly,” or “I don’t remember passing through that final traffic light. I hope the light was green?” That is an example of autopilot. Your frontal lobe is focused on other thoughts, yet you were able to drive your vehicle without known errors. Next time you notice this phenomenon, you can thank your limbic system for keeping your vehicle on the road. Your amygdala maintains productive movement, which assists with in survival, while your frontal lobe is managing competing thoughts. The amygdala is also responsible for processing emotions, including fear-related and uncomfortable emotions, such as shame and guilt. In present times, humans are not surviving in the same fashion that they did thousands of years ago. For instance, in primitive times, when a tribe member was bit by a long, rod-shaped creature, quickly became ill and died. The other tribe members would fear all similarly long, tube-shaped creatures, currently known as snakes.

Although humans do not need to survive predators like sabretooth tigers currently, the limbic system, including the amygdala does not discern the type of threats, rather whether or not there is a threat, perceived or factual. The amygdala is also responsible for arousal. It assists the brain in being alert in order to scan for and react to threats. Finally, the amygdala is one of the structures that are responsible for reward processing. This part of the brain assists in finding things that produce pleasure and reward. For instance, studies find that the limbic system, the amygdala, is hard-wired to crave sweets, salt and high concentrations of animal fats. In primitive times, a great deal of time and energy would be spent to acquire any of the items and the quantity would be limited. As mentioned earlier, about 80% of the products in the average grocery store has food product, or processed food, which contains a great deal of sugar, salt and animal fat. Whether in primitive times or present time, when those ingredients are ingested, the brain rapidly experiences pleasure and reward. Comfort food is soothing secondary to the amygdala feeling rewarded.

Adjacent to the amygdala is the hippocampus. As mentioned above in the defined terms, the hippocampus is the seahorse shaped part of the brain. The amygdala is activated at birth, whereas the hippocampus does not begin processing memory until the age of two, on average. Certainly, some

individuals have memories prior to the age of two and other individuals may not remember much of early childhood. This is likely for evolutionary purposes, as well. Envision remembering your birth. Or being distressed as an infant when your needs of hunger must be met. Imagine being able to recall the frustrations, trials and tribulations of learning how to walk. Once memory formation does begin, the hippocampus is an early storage place for long-term memory. It assists in transitioning long-term memory into lasting, permanent memory. The memories are not functional memories, such as remembering language or mathematics. Instead, the emotional memories associated with life events. The hippocampus also plays a significant role with spatial navigation.

The other configuration in the limbic system that is responsible for reward, and relief, is the basal ganglia. The basal ganglia are a group of structures within the limbic system that link the thalamus with the motor cortex. It is involved in cognitive and emotional behaviors, as well as having a significant role in reward and reinforcement, addictive behaviors and habit formation can be understood by understanding having an itch.^{xxxiii} If the tip of your nose itches, this structure creates the pathway for your hand to rise up to your nose, scratch the itch and then recognize the relief that is felt. Suppose your nose does not itch for another 15 years, then all of a sudden, that itchy nose returns. Since the reward and relief pathway was created 15 years earlier, you do not have to relearn that pathway. You immediately know how to sooth that discomfort. This is the case for addiction, both active addiction and while the addiction is in remission. If adaptive coping skills are not implemented consistently, a mental relapse will lead to the behavioral relapse.

According to the Okinawa Institute of Science and Technology (2016), "In the brain, dopamine helps regulate reward and body movement. As part of the reward pathway, dopamine is produced by neurons in the ventral tegmental area (VTA) and released in the nucleus accumbens and the prefrontal cortex, leading to the feeling of pleasure. Dopamine's role in motor functions is linked to a separate pathway: first dopamine is produced in the substantia nigra and then it's released in the striatum." *Image 6*

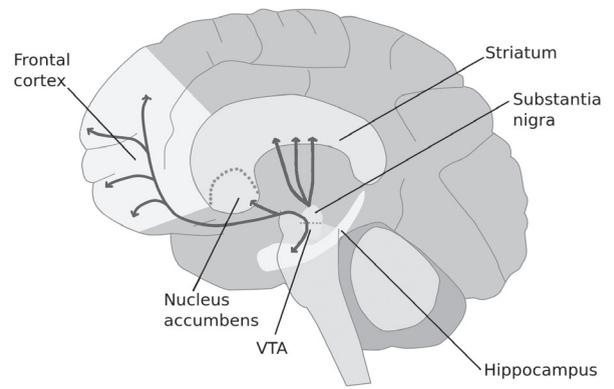


Image courtesy of Okinawa Institute of Science and Technology Image 6

The National Institute of Drug Addiction (NIDA) states, "...the reward pathway is shown along with several drugs that have addictive potential. Just as heroin or morphine and cocaine activate the reward pathway in the VTA and nucleus accumbens, other drugs such as nicotine and alcohol activate this pathway as well, although sometimes indirectly. Although each drug has a different mechanism of action, each drug increases the activity of the reward pathway by increasing dopamine transmission. Because of the way our brains are designed, and because these drugs activate this particular brain pathway for reward, they have the ability to be abused. Thus, addiction is truly a disease of the brain. As scientists learn more about this disease, they may help to find an effective treatment strategy for the recovering addict." *Image 7*

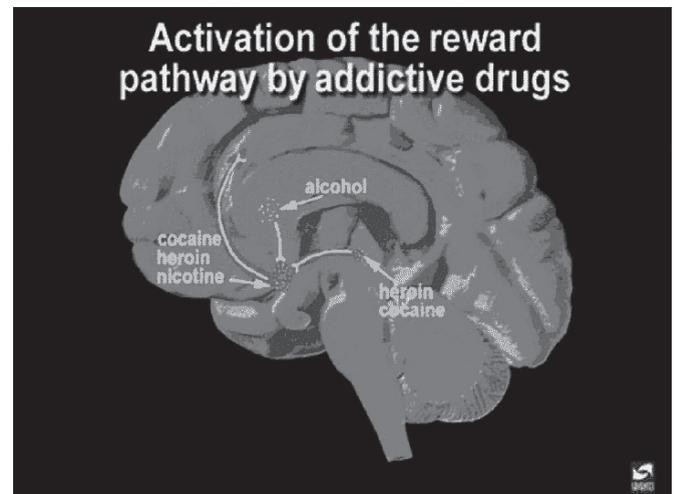


Image courtesy of National Institute of Drug Abuse (NIDA) Image 7

The below scan, Image 8, shows the long-term effects of chemical use. Once an individual becomes addicted to a drug like cocaine, your brain is affected. The National Institute of Drug Abuse explained the below brain scan as "the yellow shows a lot of brain activity in a normal person. Measured 10 days after

using cocaine, a cocaine addict's brain shows much less normal activity. For this same person, even after 100 days without using cocaine, the brain was still not back to a normal level of functioning. Scientists are concerned that areas in the brain may never fully recover from drug abuse and addiction." Given the neuroplasticity of the brain and the neuroscience that supports supportive coping skills, even if the individual's brain does not "fully recover," substantial improvement and recovery will occur if the individual fully enters recovery and wellness, in addition to abstaining from the chemicals or behaviors.

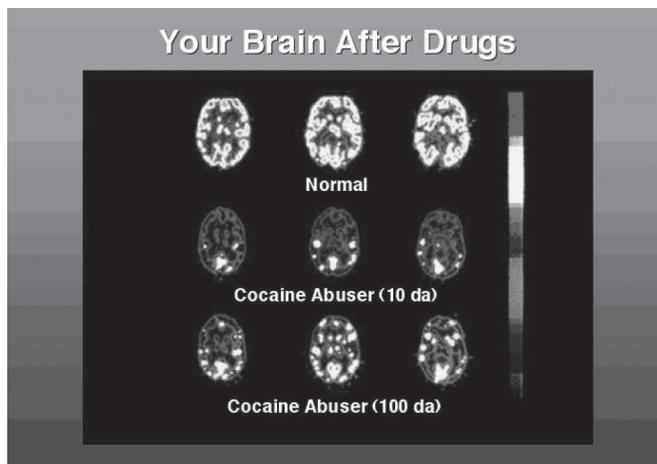


Image courtesy of the National Institute of Drug Abuse (NIDA) Image 8

The above image also points out another important aspect: 100 days is just over three months. Many individuals who experience addiction, as well as those who witness those who experience addiction, will share that the addicted individual tends to relapse 90-120 days after being "clean" from the substance. At the 100 days without using cocaine, specs of activity (yellow) are visible in the frontal lobe. As been explained, the frontal lobe is responsible of decision making, reasoning and logic. At this crucial time, the individual might begin to reflect on their past and current choices. They might begin to recognize the magnitude of the damaging choices and resulting negative consequences from those choices. They might even feel the weight of life's stressors, despite their worst day in sobriety being much better than their best day in addiction, stress triggers the limbic system, thus triggers cravings.^{xxxiii} All of these newer insights could lead to a mental relapse, which is mentally entertaining their fleeting thoughts of substance use or maladaptive behaviors instead of countering the triggers and/or cravings. If the mental relapse is not countered and continues to be nourished, the active using returns. If the person has not begun addressing the underlying issues of shame and/or have not acquired and implemented healthy coping skills, at third or fourth month mark, the likelihood of the limbic system returning to familiar reward pathway(s),

both substance use and behaviors, to find relief is higher. By the time the individual is using chemicals, they are actively using, not relapsing or "slipping." On that note, relapse is not a part of recovery. Instead, relapse is a part of addiction. Just like knowing how to scratch that itchy nose, the person who has an addiction does forget how to gain relief and reward, regardless of the harmful nature, from chemical use or maladaptive behaviors. The triggers and cravings will not cease unless the individual learns about their addiction and is taught adaptive coping skills to replace the maladaptive methods of relief and reward.

The final image, *Image 9*, per the National Institute of Drug Abuse (NIDA), "demonstrates something really amazing - how just the *mention* of items associated with drug use may cause an addict to "crave" or desire drugs. This PET scan is part of a scientific study that compared recovering addicts, who had stopped using cocaine, with people who had no history of cocaine use. The study hoped to determine what parts of the brain are activated when drugs are craved. For this study, brain scans were performed while subjects watched two videos. The first video, a nondrug presentation, showed nature images - mountains, rivers, animals, flowers, trees. The second video showed cocaine and drug paraphernalia, such as pipes, needles, matches, and other items familiar to addicts. This is how the memory of drugs works: The yellow area on the upper part of the second image is the amygdala, a part of the brain's limbic system, which is critical for memory and responsible for evoking emotions. For an addict, when a drug craving occurs, the amygdala [and basal ganglia] becomes active and a craving for cocaine is triggered. So if it's the middle of the night, raining, snowing, it doesn't matter. This craving demands the drug *immediately*. Rational thoughts are dismissed by the uncontrollable desire for drugs. At this point, a basic change has occurred in the brain. The person is no longer in control. This changed brain makes it almost impossible for drug addicts to stay drug-free without professional help. Because *addiction* is a *brain disease*."

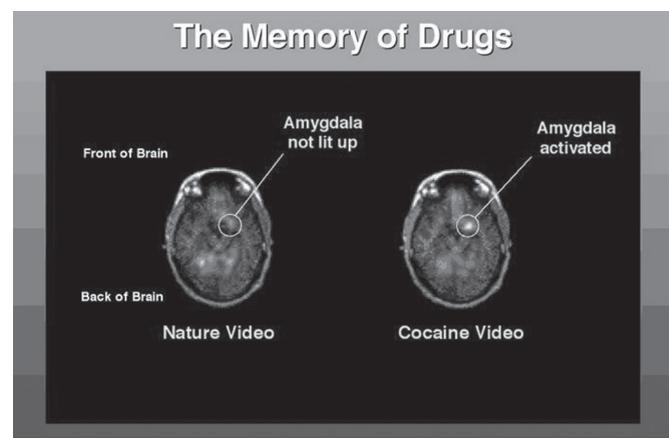


Image courtesy of the National Institute of Drug Abuse (NIDA) Image 9

To demonstrate a trigger, think of commercials and advertisements. You may have eaten and do not feel physiologically hungry. However, this commercial is for your favorite eatery. You may think, that food item would be scrumptious. If you recognize that thought, or trigger, then counter that thought with the facts that you are not hungry, the trigger will subside. Suppose that you do counter the trigger with facts, yet the trigger persists, typically distracting away from the trigger with an activity will assist the trigger to subside. Everyone can relate to being triggered by commercials and advertisements. Not everyone thinks they can relate to cravings. Most people have heard about pregnant women craving odd food combinations. Pregnant women will state that they “need” that craving immediately. That countering the desire will not suffice and the craving continues. The same is true for those with addictions. As *Image 9* shows, cravings are deep within the brain: in the limbic system. For those who have not experienced cravings from addiction, pregnancy, vitamin or mineral deficiencies, or hormonal changes, the below steps will assist in understanding cravings.

Read through all of the steps before beginning.

1. Take in a deep breath.
2. Hold your breath.
3. While holding your breath, note your thoughts, emotions and physiological response.
4. Continue to hold your breath as long as you can.
5. Continue to note your thoughts, emotions and physiological responses.
6. When the urgency to inhale is intense, take a breath and breathe normally.
7. List what your thoughts, feelings and physiological reactions below:

The amygdala within the limbic system is responsible for intricate survival. You had to take in air. If you continued to hold your breath, you would have eventually passed out due to a lack of oxygen and would have begun breathing, courtesy of your limbic system communicating with your cerebellum. Your thoughts, emotions and physiological reactions would be similar to those who are experiencing a craving

related to an addiction secondary to the limbic system being hijacked.

If a person has never experienced cravings and/or they used on a regular basis but decided to quit one day without difficulties, they may not have a hijacked limbic system. Rather, their using might have been routine and intentional, thus controlled by the frontal lobe not the limbic system’s amygdala and basal ganglia.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

1. **How does information typically travel through the brain?**
 - a. Through the Gray Matter
 - b. From the hindbrain, the midbrain, through the system, to the forebrain
 - c. From the forebrain, the limbic system, the midbrain, to the hindbrain
 - d. Through the amygdala

2. **When a person is in active addiction, how does the information travel?**
 - a. Through the White Matter
 - b. From the hindbrain, the midbrain, through the limbic system, to the forebrain
 - c. From the forebrain, the limbic system, the midbrain, to the hindbrain
 - d. Through the limbic system

3. **How does the reward and relief pathway contribute to addiction?**
 - a. The pathways leads to autopilot
 - b. The pathway leads to feeling connected to others
 - c. The pathway leads to feeling numb
 - d. The pathway leads to feeling pleasure

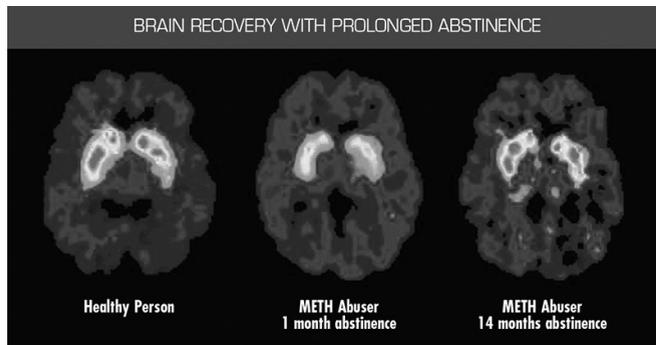
4. **How many days of abstinence are needed until the frontal lobe begins demonstrating activity?**
 - a. 10 days
 - b. 100 days
 - c. 300 days
 - d. None of the above

5. **Which parts of the brain are responsible for the the memory of drugs, or cravings?**
 - a. Prefrontal Cortex and Cerebellum
 - b. Amygdala and Prefrontal Cortex
 - c. Amygdala and Basal Ganglia
 - d. Cerebellum and Hippocampus

Review Question Answers: 1. b 2. c 3. d 4. b 5. c

Assessment Considerations

As revealed in *Image 11*, at 14 months of abstinence, just under one and a half years, the activity is increasing and balancing out in the limbic system by producing more dopamine without substances. Addiction, like many chronic diseases, can be treated and managed, in which the individual recovers emotionally, mentally, spiritually, neurologically, and physically. This next section will lead into suggested methods to replace addiction patterns with wellness patterns.



Source: Volkow, et al, 2001
Image 11

First and foremost, as stated earlier, words are important. Words turn into thoughts and thoughts become actions. Our words, thoughts and actions become beliefs. The words that professionals, the community and those who experience addiction use to describe and address addiction are important. It is not uncommon to hear, “What is your drug of choice?” Or, “My drug of choice is cocaine.” At this point in the course, it has been established that addiction is not an actual choice: an act of selecting or making a decision when faced with two or more possibilities. Using different terms that correctly represent addiction will not take away the individual’s personal responsibility. In fact, using adapted, more accurate language will assist the individual in having ownership and decreasing some of the levels of shame. Some phrases to use in place of “What is your drug of choice?” include:

- “What drug are you reliant on.”
- “What drugs have you used on a regular basis?”
- “What is your drug of preference?”
- “What substance do you rely on to cope?”

It is important to note that similar phrases could be used for behavioral addictions, such as gambling, cutting/self-injury, promiscuity, binge eating, et cetera. It is not the precise chemical being ingested or actual behavior, rather the dopamine that is produced and the reward pathway that is created.

Next, it is necessary to meet the person where they are at. As emphasized previously, relapse is a part of addiction. Relapses will likely occur while treating

those in recovery from addictions. Understanding what the individual is experiencing interpersonally, professionally, socioeconomically, culturally, and so on, is vital. As fellow social workers know, this is the Person in Environment (PIE) approach. Gathering the information firsthand, in real-time. Think of how much you have changed, desirable or undesirable, over the past six-months. What changes have occurred over the past year? Imagine how much the individuals we work with change over six-month or a year. Also, consider how you perceive information and how others might formulate a completely different perception about the exact information. Our perceptions are based off our past experiences and our beliefs. Knowing that change is constant, that social workers are agents of change, and that our perception about the same bits of data may differ, it is crucial to conduct the biopsychosocial assessment yourself. I rarely request records from previous providers or work off of prior diagnoses without conducting an assessment myself. It is not that I do not trust my colleagues’ judgement and diagnostic skills, rather I know that the individual who I am assessing has experienced change since their last assessment.

Throughout the process of conducting biopsychosocial-spiritual assessments, the clinician is building rapport. During the assessment, not only are you gathering data about why the individual is seeking treatment, but also discovering themes that reveal the underlying facets, which frequently include co-occurring disorders. There is a high correlation, and perhaps causation, between having history of trauma, experiencing persistent trauma responses and meeting criteria for a substance use disorder.^{xxxiv} It is rare that an individual will have a diagnosis of a substance use disorder without a co-occurring diagnosis. Therefore, it is important that the professional becomes aware of the reported biological, psychological, spiritual and cultural predisposing factors of the individual early in the treatment process. The DSM-5 specifies concepts of distress based on culture.^{xxxv} One’s culture and differences will influence the individual’s treatment experience, such as their decision to seek treatment, the gender of the professional they will work with and the desired level of family involvement.

When arriving at a diagnosis, the clinician MUST rule out medical conditions first. This would include a referral to a medical professional if it is suspected that a medical condition is present. Then, Substance Use Disorders would be ruled out or ruled in next, before arriving at a mental or emotional disorder diagnosis. Both disorders would be treated simultaneously. This might seem like common sense; however as mentioned earlier, there was a time in the not too distant past where clinicians would treat one diagnosis and refer out for another diagnosis. Or, treat one diagnosis first before addressing the other diagnosis. The following are DSM-5 diagnoses that are associated with Substance Use Disorders.^{xxxvi}

- Bipolar Related Disorders
- Depressive Disorders – Approximately 15 percent of the population reports depressive signs and symptoms^{xxxvii}
- Anxiety Disorders – Approximately 20 percent of the population reports anxiety signs and symptoms^{xxxviii}
- Obsessive-Compulsive and Related Disorders
- Sleep Disorders
- Sexual Dysfunction
- Neurocognitive Disorders
- Trauma- and Stress-Related Disorders – Approximately 90 percent of individual will experience traumatic event(s)
- Neurodevelopmental Disorders
- Personality Disorders
- Schizophrenia Spectrum and Other Psychotic Disorders

Dr. Brian King^{xxxix} stated, “The vast majority of depression cases are stress related.” He explains that depressive reactions are often learned thought and behavioral patterns. This explanation resonated, as I have had many clients seek therapy, report a previous diagnosis of “depression,” “major depression,” “clinical depression” and/or “depression-anxiety,” in which they did not meet the true diagnostic criteria for a Depressive Disorder. Many individuals reported symptoms and displayed signs that could meet the diagnostic criteria for a Depressive Disorder if further inquiries did not occur. Many met diagnostic criteria for an Adjustment Disorder, Acute Stress Disorder, or Posttraumatic Stress Disorder. Others did not meet criteria for a mental health diagnosis; rather they were grieving a loss. Others landed on the introverted end of personality and were operating in life based on the expectations of appearing more extroverted. Others did not understand their stress responses, did not have adaptive stress management skills, in which the stress manifested through physical symptoms that could not be medically explained.

Once the thorough assessment is completed and a diagnosis is understood, treatment planning is next. Treatment planning should include treatment goals and measurable objectives. The goal is typically broad and the objectives are specific and describe the steps that will be taken to reach the goal. The treatment plan needs to indicate the frequency of treatment interventions and/or sessions, as well as the theoretical approach, which ideally includes evidenced based practices^{xl} that will be utilized. Evidenced based treatment modalities and practices include, but are not limited to, Cognitive Behavioral Therapy, Mindfulness, Brief Intervention, Motivational Enhancement Therapy, and Multisystemic Therapy. The treatment goals and objectives should align with the indicated

theoretical approach. The suggested action-based coping skills, or adaptive coping skills, in the next section derive from a Cognitive Behavioral Therapy approach.

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

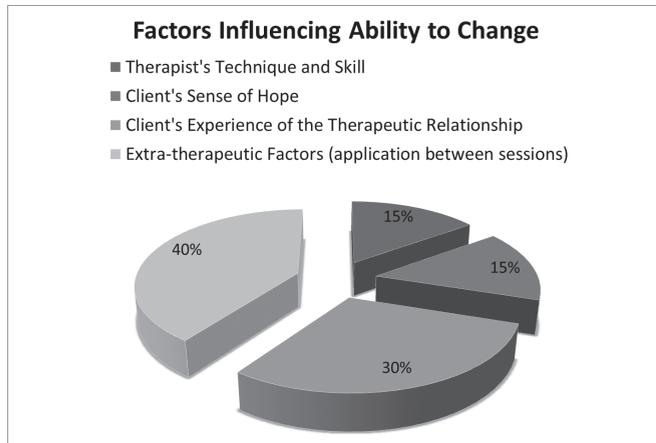
1. **Using phrases other than “Drug of choice?” takes away personal responsibility.**
 - a. True
 - b. False
2. **What does PIE stand for?**
 - a. Person In Euphoria
 - b. Person In Extremes
 - c. Person In Ecosystems
 - d. Person In Environment
3. **What diagnosis can have depressive signs and symptoms and often get misdiagnoses as Depressive Disorder?**
 - a. Posttraumatic Stress Disorder
 - b. Brief Psychotic Disorder
 - c. Both A & B
 - d. None of the above
4. **Which is not an evidenced based modality?**
 - a. Cognitive Behavioral Therapy
 - b. Multisystemic Therapy
 - c. Motivational Enhancement Therapy
 - d. Movement Behavioral Therapy

Review Question Answers:
1. b 2. d 3. a 4. d

Action-Based and/or Adaptive Coping Skills

Even with gaining awareness about the neurobiology and the neuroscience of addiction, the actual concepts may be difficult to apply in practical terms for clinicians and clients, alike. Understanding the therapeutic factors influencing one’s ability to change^{xli} could assist in removing some of the intimidation of this new information. The clinician’s technique and skill account for 15 percent of an individual’s ability to change. The client’s sense of hope is another 15 percent, the client’s experience of the therapeutic relationship is 30 percent, and the extra-therapeutic factors are the final 40 percent. This validates that the theoretical approach is not as important as what the client applies between sessions. For optimal and

sustained success, the client needs to have a supportive natural support system to rely on and adaptive coping skills to implement between sessions.



Source: Hubble, M., Duncan, B., & Miller, S. (1999) Image 12

While suggesting adaptive coping skills for those entering or maintaining recovery, it is critical to create and suggest skills that the individual will be able and willing to apply between sessions. Some might think that discussing the neurobiology and the neuroscience of addiction with clients is too cerebral. This is not the case. In fact, sharing the science of addiction, and recovery, becomes empowering and liberating for the majority of individuals. Certainly, the descriptions would need to be adjusted for age and cognitive abilities. Luckily, all of the above terms do not need to be covered, rather the terms and functions specific to the limbic system's amygdala, basal ganglia structures, hippocampus, as well as the frontal lobe. Discovering metaphors that your clients can relate to according to their culture, subculture, ethnicity, community, belief system or religion practice, gender roles, cohort differences, and socioeconomic status, while explaining addiction, as well as the recommended adaptive coping skills, will be extremely useful.

For instance, using an adult as a metaphor for the frontal lobe and a toddler as a metaphor for the limbic system, specifically the amygdala and basal ganglia, seems to work well:

- Frontal Lobe – An adult
- Amygdala & Basal Ganglia – A toddler who is soothed easily with rewards
- Hippocampus – A photo album or flash drive that stores the emotional memories and is referenced by the toddler

In unwellness terms, including addiction, the frontal lobe is not a nurturing adult. Think of the average person and the unkind, impatient, bullying thoughts that one might tell themselves. How about the thoughts that you initially think of others? Humans will make an intimal judgement of others within

seven seconds. At times, the judgement(s) of self and others can be quite harsh. Would you ever state those same internal thoughts about self or others aloud to others? When asked that question, most individuals state a firm, "No!" Yet, individuals have an ongoing monologue of those messages running in their minds. Continuing with the metaphor, the limbic system is a very upset, unsatisfied toddler in the midst of a tantrum building into a meltdown. Tantrums can often be deterred by giving into the toddler's demands; whereas meltdowns are rarely soothed by the classic items or acts. Think back to the craving example when you held your breath. Now imagine an upset toddler, moving from a tantrum into a meltdown. Experiencing the urge to take in a deep breath after holding your breath is primal and subconscious, not cerebral and conscious. Deciding whether or not you could hold your breath a few more seconds is a conscious process. The limbic system, like a toddler, wants what it wants, at the exact time that it wants it. It is considered the "lower" thought process due to that primitive nature. This part of the brain seems evident in toddlerhood, in adolescents, as well as with addictions. This is due to the frontal lobe not being fully developed for the first two and not being fully engaged for the latter, thus the limbic system is "in charge." Additionally, the limbic system does not process time in a chronological manner, thus any memory appears to be occurring in real-time. The frontal lobe, on the other hand, distinguishes between yesterday, today and tomorrow. That frontal lobe is cerebral and conscious, the "higher" thought process, thus it is like an adult, whose frontal lobe has fully developed.

When thinking about implementing action-based, or adaptive, coping skills, the coping skills do not "cure" the addiction. Rather, they are taught and practiced to replace the harmful, or maladaptive, coping skills of using substances or behaviors. The adaptive coping skills often address underlying issues that trigger the harmful coping skills since refraining from substance use or maladaptive behaviors should never be the only treatment method. Retraining the limbic system takes a great deal of time and energy practicing the new coping skills. Clients will indicate that the new skills are difficult. They are difficult. However, the new skills will not take more energy to implement than the familiar maladaptive coping skills did. Since the learning is new learning, it feels as though more energy is being used. Whereas, is reality, portable fMRI machines were accessible, it might be noted that consistently implementing adaptive coping skills in place of maladaptive coping skills takes less energy. The suggested adaptive coping skills assist with rewiring that limbic system, intricate survival center and reward pathways. They are not created for busy work or to pacify the individuals, rather to tie in the neuroscience of addiction with the neuroscience of adaptive coping skills. Adaptive coping skills should encourage thriving in place of mere surviving. In other words, teaching

and supporting active sobriety in place of purely being “clean” or abstaining from a substance. As helping professionals, you are encouraged to practice the techniques yourself to assist with underestimating them, which increases the effectiveness of explaining the skills in a way that is authentic to you and your style. Brene’ Brown^{xiii} wisely advises, “You can’t take people professionally where you’re not willing to go personally.”

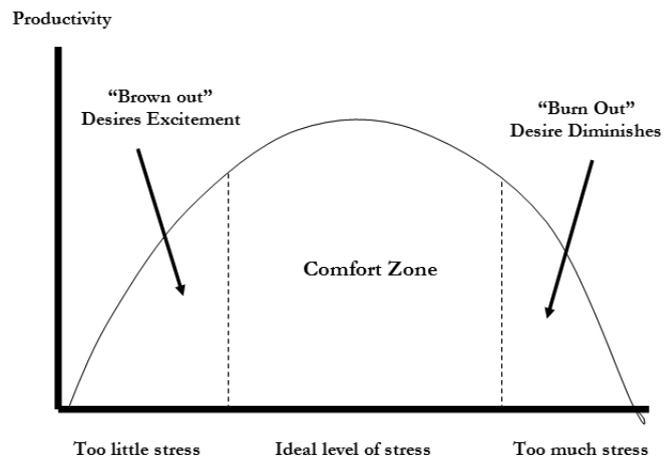
The following suggestions are not in any particular order of greatest significance or benefit. While selecting adaptive coping skills to teach and practice with the individual, it is essential to consider the individual’s culture, subculture, ethnicity, community, belief system or religion practice, gender roles, cohort differences, personality, temperament and socioeconomic status. The action-based coping skills are intentional adaptive coping skills that could be helpful in “resetting” emotional overreactions. However, this could backfire if the coping skill is not a good fit for the individual. Furthermore, the individuals’ application and presentation of coping, adaptive and maladaptive, will differ based on their cultural uniqueness.

Ideally, one would choose to engage in healthy distractions prior to entering a crisis, which could include feeling emotions at a crisis level of 10 or checking out and feeling nothing, thus a zero. On a scale from zero to 10, feeling emotions vacillate with in the three to seven ranges is healthy and necessary. When individuals begin moving beyond a three toward zero (avoiding) or past the seven toward 10 (crisis), healthy coping skills should be implemented. The coping skills will not solve the issues, rather assist in the emotions regulating, which then increases Emotional Intelligence and effective problem solving, which correlates with Critical Thinking Skills. If a person is highly emotional and their limbic system is in overdrive, their decision making, housed in the frontal lobe, will be narrowed. The frontal lobe can override the limbic system, especially when the tools are acquired and utilized. This will take practice, as there is not a “quick fix” that has healthy consequences. Abstinence from the substances or behaviors should never be the only wellness or treatment option. It is necessary for the individual to understand their underlying issues, triggers, and emotions to apply effective action-based coping skills.

Stress Identification and Management

As humans, our stress responses are primitive, or unconscious. As stated previously, we do not have the same threats that we did in primitive times, however our limbic system responds as though that same level of threat exists. Being frustrated in congested traffic becomes interpreted as a sabretooth tiger, until one understands this overreaction, builds

stress resiliency and/or chooses to cope with the stress in adaptive fashions. Stress as a response to a perceived threat, challenge, or change.^{xliii} There is 1) Eustress (constructive), which is considered positive stress, or beneficial stress, that is essential for a full and productive life. It increases creativity, productivity, ability to adapt, and happiness; 2) Distress (destructive), that is viewed as negative aspects of stress that can become a destructive force when it gets “out of control,” thus having a negative impact on health, personalities, families and jobs. Stress is essential for life; however distress is harmful. Keep in mind that stress is stress: Little stuff wears us out. Big stuff knocks us down. The below bell curve shows that stress is necessary, however too little or too much is not helpful.



Source: Sidbury & Owens, 2005

There are a variety of contributors to stress responses:

- Environmental – noise, clutter, dust, traffic, small spaces, temperatures, extreme weather conditions, rapid decision making, et cetera
- Psychosocial – family relationships, conflicts with co-workers, conflicts with bosses, lack of appreciation, disrespectful peers, et cetera
- Personal Mentality – unable to say “no,” need to be liked, feelings of guilt or shame, anxiety over professional competencies, negative outlook on situations, sensitivity to criticism, high expectations for self, guilt from mistakes or not being perfect, et cetera

The above stress responses could build up and result in Cumulative Stress, or outer stressors, in which work and non-work stressors build up. Intrapersonal Stress is an internal stress that occurs when individuals are not living the lives in the way, or style that is encouraged based on character or personality. As day-to-day stressors build, signs and symptoms result. Said symptoms could result in an interference of functioning.

- Physical – pupils dilate, saliva thickens, acid in

the stomach increases, digestion slows, blood flow changes, cholesterol increases, heart rate increases, muscles tighten = (“Fight or Flight”)

- o Intervention – exercise, relaxation, proper diet/ water, nutrition, sleep
- Mental – decreased memory, decreased concentration, decreased attention span (10-12 min.), slowed learning speed, decreased problem solving ability, impaired decision-making, decreased self-awareness, feelings of indispensability (“I need to do it since no one else can.”)
 - o Intervention – be patient with self and others, be systematic, take notes, increase awareness regarding thought patterns and counter maladaptive patterns, develop and practice mindfulness
- Emotional – feeling isolated, depressed, anger (results from fear or sadness), bitterness (burn out), decreased interaction with co-workers, friends, and family
 - o Interventions – talk about stress with natural supports and/or professional supports, discuss thoughts, feelings and/or reactions with natural supports and/or professional supports, find resolutions (big or small), accept feedback from others

Deep Breathing

Learning how to monitor and control breaths has many benefits. It is an accessible coping skill since we breathe automatically. The challenging aspect is learning how to recognize and adapt one’s breath patterns. Many individuals breathe from their chest, in which the breath is shallow and rapid. Breathing quickly and shallowly sends a message to the autonomic nervous system to alert the sympathetic nervous system, which is scanning for threats. Keeping in mind, the limbic system often overreacts to perceived threats, challenges and changes, thus producing a fight-or-flight response to stressors that are not actual threats. Controlling breaths and slowing breaths, as described below, enacts or “turns on” the parasympathetic nervous system, which promotes relaxation. Slowing and controlling the breaths assists the brain in derailing the fight-or-flight reaction since such a reaction is not possible while breathing slowly and controlled. The key is to follow the below instructions, without adaptations.

- Breathe in and out from your diaphragm (not chest).
- Based on your preference, you can breathe in through your nose and out through your mouth, or in and out through your nose or mouth. Do not get too caught up on the mouth versus nose details in the beginning.

- Feel free to add in those layers, which could include intonations, as you master the basic deep breathing sequence.^{xliv}

1. Breathe in for four (4) seconds, in which your belly should balloon out secondary to the diaphragm pushing down.
2. Breathe out for four (4) seconds. Pulling your belly button toward your spine will assist in expelling all of the air as the diaphragm pushes up.
3. Breathing in for four (4) seconds and out for four (4) seconds is one (1) cycle.
4. Complete at least six (6) cycles, 12 cycles would be even better. This will equate to one to two minutes of controlled, diaphragmatic breathing.

The controlled breathing changes the blood flow from your chest, heart and lungs, which are preparing for the survival response of fight-or-flight, to your extremities (arms and hands), which cues the brain that it is no longer in survival, or fight-or-flight, mode. It engages your frontal lobe by counting in for four, out for four and keeping track of the six to 12 cycles. The human brain cannot worry while counting or organizing.

Healthy Distraction & Frontal Lobe Engagement

The limbic system cannot scan for threats and emotionally obsess, or worry, if the frontal lobe is organizing or counting. Intentional, adaptive coping skills are helpful in “resetting” emotional reactions. The below suggestions would be implemented intentionally, with the goal of taking a break from the stressor, in order to regulate the emotional response. Once the emotional response is regulated, the individual should return to the stressor to develop a realistic solution. This could increase the emotional response, in which the individual would intentionally distract until the emotions are regulated and a solution is being sought. Just as worrying thoughts are repetitive; choosing healthy distractions to create solutions will take repetition and practice.^{xlv}

Counting

Adding

Subtracting

Organizing

Alphabetizing

Listening to music

Word Searches – Store-bought or create your own on-line

Jigsaw Puzzles – Store-bought or create your own on-line

Coloring/Painting/Drawing

Building models

Crafting

Balancing on one leg

Hopping on one leg

Progressive Relaxation

Researching/Learning New Information – Curiosity increases dopamine, thus creating a reward

Countering fears or worries with facts

Counting out of order (1,2,3,6,8,4)

Starting at 100, subtract by intervals of three or seven (100, 97, 94, 91, ...)

This type of action-based coping pulls energy to the frontal lobe, the thought and control center of the brain, and away from the Limbic System, the intricate survival and fight-and-flight center.

Mindfulness

Mindfulness is the ability to sustain concentration and attention on a particular activity, thought or feeling that is in the moment. Mindfulness also involves learning to minimize negative judgmental thoughts. This does not include judging or shaming oneself if you cannot maintain attention. The frontal lobe analyzes information and the limbic system scans for risks. Distracting thoughts will happen. Notice that you had a distracting thought, thank your brain for doing its job, and then direct yourself back to the mindfulness task. Be gentle and realistic with yourself when you are practicing mindfulness. Practicing mindfulness is like building a muscle that is underdeveloped. It takes time, practice and patience.

During mindfulness activities, you want to use as many of your five senses (sight, smell, taste, touch and hearing) as possible.^{xlvi} Mindfulness can be done everywhere.

- Walking – Pay attention to your larger leg muscles, your feet making contact with the ground, what you see, what you smell, the temperature and movement of the air. Be aware of your breaths and adjust quick, shallow breaths to slowed, intentional breaths.
- Cooking – How does the items feel, look, and smell before they are cut, after they are cut and while they cook?
- Eating – What does the meal look and smell like? How does it sound when you eat it? How do the flavors change as you eat the meal? Do the smells change? What are the temperatures and textures?
- Imagery – Look at and direct your attention towards a picture or photograph of a beautiful or calming scene. What do you see? What would it sound like? What would it feel like?
- Seeing Meditation – Fix your gaze on an object in your line of vision, take several deep belly breaths and glue your eyes on the object. Let it capture your interest as though it were the only object

around you. Try not to judge what you are seeing or the distracting thoughts that might pop up. Rather, redirect your thoughts gracefully and just look.

Grounding

Grounding skills are often used as an initial skill to be built upon by other adaptive coping skills. Grounding assists in reconnecting the individual to the present moment, the here and now, if they are avoiding, seem disconnected or disassociating. Unlike mindfulness, grounding usually uses one of the five senses at a time. Grounding would be an opening coping skill that would lead into mindfulness, deep breathing, intentional distractions, et cetera. It allows the frontal lobe to override the limbic system, and then continue to remain in control by implementing additional adaptive coping skills.^{xlvii}

See – Look at a picture, shell, quarter, et cetera.

Describe the visual details as if you were describing the item to a blind person who once had sight.

Smell – Smell something strong, like essential oils, candles, cinnamon, coffee, vanilla, and/or mint.

Touch – Touch and focus on different textures, such as sandpaper, yarn, cotton. Or bring your attention to your body in the chair or feet on the ground.

Hear – Focus on a person's voice, the tempo of music, or any sound in the environment.

Taste – Taste a strong flavor like a strong mint (breath mint or chewing gum).

Some individuals will use grounding as follows: Look for five items; Listen for four sounds; Smell three scents; Touch two textures; Taste one item. This is a nice blending of grounding with counting, thus more emphasis on engaging the frontal lobe.

Daily Gratitude List

Gratitude counters fear, since fear and gratitude cannot be experienced at the same time. It has been stated that practicing gratitude builds stress resiliency, thus becomes a protective factor.^{xlviii} Writing the below Gratitude List, on a daily basis, proves to have therapeutic value. Writing over typing is necessary since writing assists communication between the right and left hemisphere of the brain, as well as pulls energy from the hindbrain to the forebrain.

1. What was a success/positive from today?^{xlix}
2. What was a challenge/negative from today?
 - a. How did I cope with the challenge or negative aspect?
3. What am I grateful for today?

Be creative with this response. Think of the "score" moments of the day.

Humor

Laugh! Smile! It is not uncommon for individuals who have high levels of shame to experience blunted emotions. If the limbic system is overreacting to threats, there is little room for experiencing emotions. Thus, retraining emotional identification and regulation is a must. If one is in an irritable mood, the mere act of smiling, which engages minute muscles in the face, tricks the limbic system into feeling safer and relaxed. If you are not convinced about the powerful impact of smiling or laughing, take a moment and Google “funny dog video” or “funny cat video.” The internet has humor resources, literally, at your fingertips. Additionally, smiling is contagious and could be an easy act of kindness.

Kindness

Speaking of kindness: Acts of kindness releases Oxytocin. Oxytocin, the bonding hormone, assists in feeling good, safe and connected. High levels of Oxytocin reduce addiction tendencies; boost the immune system and leads to more happiness.¹¹ Happy people live longer. Not only does doing a kind act for some release Oxytocin, but so does witnessing another person doing a kind gesture. Be kind to yourself and others!

Biofeedback Mantraⁱⁱⁱ

Biofeedback is a technique that is used to teach individuals to control their body's functions, such as their heart rate and breath rate. With biofeedback, the individual is connected to electrical sensors that help the individual receive information (feedback) about their body (bio) in real-time on a computer screen.

The below mantra is used in biofeedback. It could be successful even though there are not sensors connected to the individual.

“My mind is quite quiet.
My hands are warm and heavy.”

While repeat the above mantra, visualize your hands glowing bright yellow, red or any color that represents warmth. Feel your hands warming up and being weighted down.

This mantra and visualization changes the blood flow from your chest (heart and lungs = Fight-or-Flight or Survival) to your extremities (arms and hands), which cues the brain that there is not an actual threat.

This can be used as a preventative or reactive action-based coping skill. Data indicates that this exercise assists in preventing:

- Migraines
- High Blood Pressure
- Anxiety and Stress Responses
- Chronic cold hands and feet could be a sign of anxiety.

- Headaches
- TMJ

Stress & Anxiety Management Mantrasⁱⁱⁱⁱ

Affirmations need to be believable. If the person is quieting their inner critic every time they implement the affirmation, it may not be the best fit. Mantras are statements that are simple, factual and catchy. They assist in derailing the limbic system and engaging the frontal lobe to work toward creating a tangible solution.

“Fear is not real. Danger is real.”

“Feelings are not facts. What facts counter or validate my feelings?”

“Anxiety is my fear, linked to the future, linked to my imagination. What is happening in the here and now?”

“What are the facts that counter my fear/anxiety/stress responses?”

“Focusing on anxious thoughts is similar to wishing for the very thing that I fear.”

F.E.A.R. = Forget Everything and Run; False Evidence Appearing Real

OR

F.E.A.R. = Face Everything and Recover; Face Everything and Rise

“H.A.L.T. = Hungry, Angry, Lonely (feeling insecure, doubtful or uncertain), Tired”

Do not make major decisions or act on impulses if H.A.L.T, applies, as your limbic system will be more likely to overreact and take over due to you feeling more vulnerable.

“Anger is a reaction that stems from fear or sadness. What am I feeling?”

“What you focus on grows.”

“Energy flows where attention goes.”

“Focus on micro moments of success.”

“Whether it is a good day or a bad day, it is the same day. You get to choose.”

“Compassion counters anger. Anger and compassion cannot be experienced at the same time.”

Danger Sequence to Counter Stress, Anxiety & Trauma Responses

(Created by Jessica Holton, MSW, LCSW, LCAS)

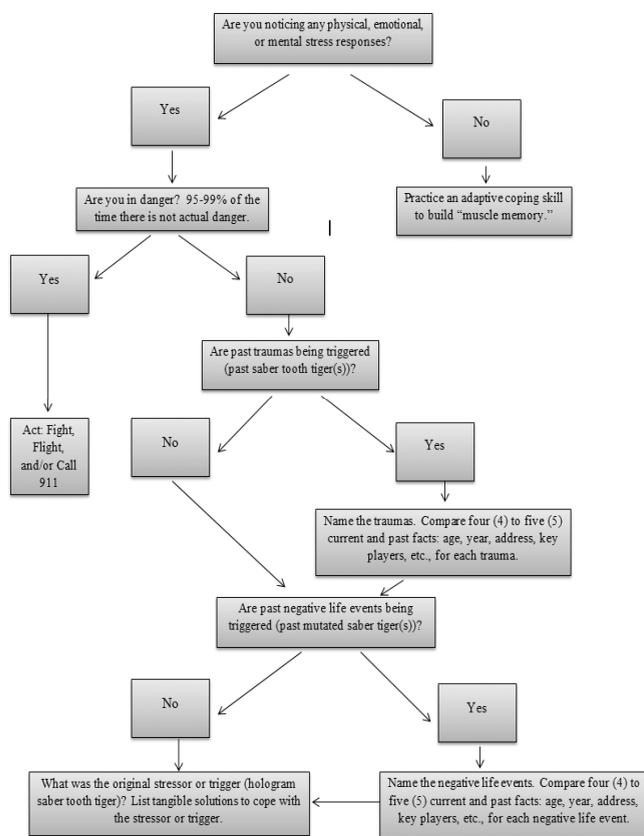
Follow sequence, without adaptations. Repeat often. Practice on small stressors in order to build “muscle memory” to counter small and large stressors, trauma triggers, and/or crisis that might occur. Below, the Danger Sequence is in a step-by-step outline, as well as a decision tree, to offer options for varying learning styles.

Danger Sequence

- 1) Name the stressor or trigger.
- 2) Am I in danger? Fear is not real. Danger is. 95-99% of the time, there is not actual danger.
The answer is NO.
- 3) Are past traumas (real saber tooth tigers behind you) being triggered?
If yes, counter with facts: Age, location, year, individuals involved, actions, et cetera.
If no, move to #5.
- 4) Are past negative life (mutated saber tooth tigers off to the side of you) events being triggered?
If yes, counter with facts: Age, location, year, individuals involved, actions, et cetera.
If no, move to #5
- 5) What are the specific stressors (hologram saber tooth tigers in front of you)?
- 6) What are the tangible solutions (not anxiety or fear based) that you will implement?

Danger Sequence

Created by Jessica Holton, MSW, LCSW, LCAS



This sequence gets the attention of the limbic system, validates that past triggers contributing to current reactions, and uses comparing and contrasting to assist the limbic system via gradual memory exposure to realize that the past memory is not currently happening. By going through the sequence, the energy allocation is being transitioned from the limbic system (emotional and impulsive) to the frontal lobe (logic and control). This assists in utilizing Emotional Intelligence to regulate emotions and Critical Thinking to develop and adhere to solutions.

Craving Sequence (Counter Addiction Triggers & Cravings)

(Created by Jessica Holton, MSW, LCSW, LCAS)

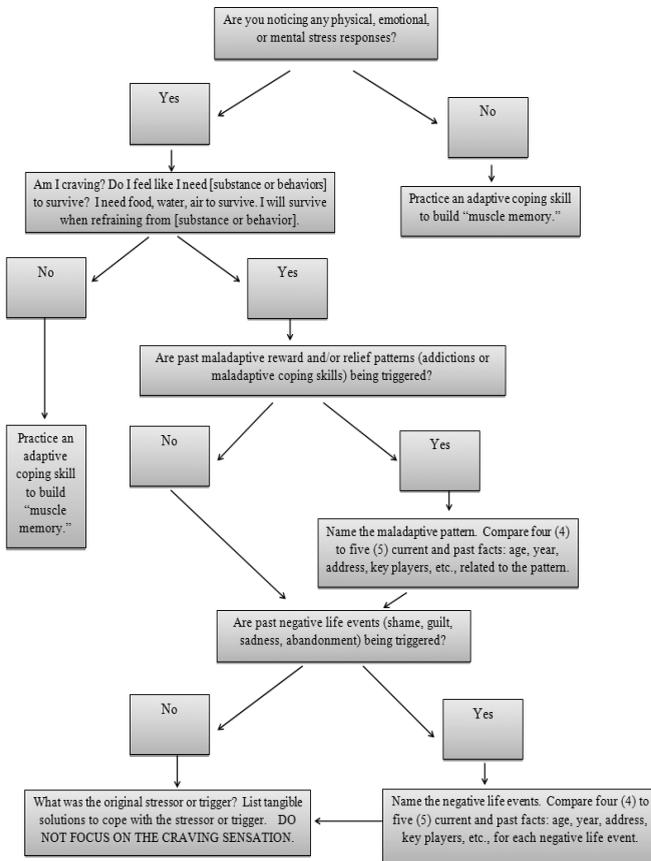
Follow sequence, without adaptations. Repeat often. Practice on insignificant triggers in order to build "muscle memory" for more significant triggers (emotional, mental, environmental, et cetera). Below, the Craving Sequence is in a step-by-step outline, as well as a decision tree, to offer options for varying learning styles.

Craving Sequence

- 1) Name the trigger (stressor, person, place, thing, thought).
- 2) Am I in craving? Do I feel like I need [substance or behaviors] to survive? I need food, water, air to survive. I will survive when refraining from [substance or behavior].
If yes, proceed to #3
- 3) Are past maladaptive reward and relief patterns (addictions or maladaptive coping skills) being triggered?
If yes, counter with facts: Age, location, year, individuals involved, actions, et cetera.
If no, move to #4.
- 4) Are past negative life events (shame, guilt, sadness, abandonment) being triggered?
If yes, counter with facts: Age, location, year, individuals involved, actions, et cetera.
If no, move to #5.
- 5) What are the specific stressors (triggers, emotions, tasks)?
- 6) What are the tangible solutions (not anxiety or fear based)?

Craving Sequence

Created by Jessica Holton, MSW, LCSW, LCAS



This sequence gets the attention of the limbic system, validates that past triggers contributing to current reactions, and uses comparing and contrasting to assist the limbic system in realizing that the past memory is not currently happening. By going through the sequence, the energy allocation is being transitioned from the limbic system (emotional and impulsive) to the frontal lobe (logic and control). This assists in utilizing Emotional Intelligence and Critical Thinking when developing solutions.

Grieving Process

“The most beautiful people are those who have known struggles, have known loss, and have found their way out of the depths.” Elisabeth Kubler-Ross

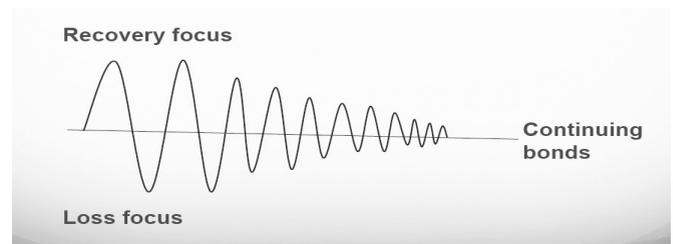
Grieving is undervalued. It is a process that does not have a time-limit. Raw grief, if actively addressed, will begin feeling less confusing one to one and a half years after the loss. It is essential that individuals are asked about areas that they are grieving: relationships, pets, jobs, identities, expectations, and addictions, to name a few. Individuals must grieve their addiction, as well as the relationships and aspects that coincided with their addiction. Below is a basic grieving model created by Elisabeth Kubler-Ross. She noticed the stages being experienced by those with terminal illnesses. The same

stages are applicable for any loss.

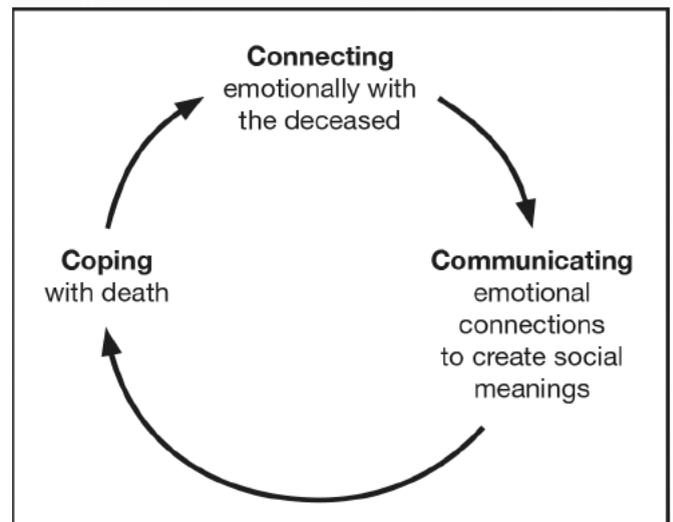
Kubler-Ross Grieving Process:

- 1) Shock/Denial – Usually short lived
- 2) Anger – Often projected out toward other; Anger stems from fear and sadness
- 3) Bargaining – “What if” and “If only” that tend to lead back to Anger
- 4) Depression – Introspection and reflection occurs during this stage, which could lead to revisiting Bargaining. Guilt and shame are often present in this stage.
- 5) Acceptance – When thinking about the loss, positive, pleasant, happy, gratitude-filled memories surface instead of the distressing, loss-focused memories.

Another grieving model is the below Dual Model.^{liv} Early on in the grieving processes, individuals tend to focus on what was loss and how life will never be the same. As time progresses, they are able to create new memories, incorporate the loss into their current life, and the emotional turmoil lessens.



Grieving is a social experience, demonstrated in the below chart.^{lv} Stages cannot be checked off and then life moves on. Rather it is a continual, interactive process.



Healing Process

The healing process is very similar to the Grieving Processes. The healing process could be better suited to implement when individuals are working through past actions that they have done, or act that have been done to them. The desire to begin healing through actions usually begins to happen near the three to four month of sobriety. Around that 100 days when the frontal lobe is beginning to regain activity. Notice that the only difference is that Bargaining and Anger have been switched in order.

Healing Process (Revised from Kubler-Ross' Grieving Process^{vi}):

- 1) Shock/Denial – Usually short lived
- 2) Bargaining – “What if” and “If only” that tend to lead back to Anger
- 3) Anger – Often projected out toward other; Anger stems from fear and sadness
- 4) Depression – Introspection and reflection occurs during this stage, which could lead to revisiting Bargaining. Guilt and shame are often present in this stage.
- 5) Acceptance/Recovery – When thinking about the loss, positive, pleasant, happy, gratitude-filled memories surface instead of the distressing, loss-focused memories.

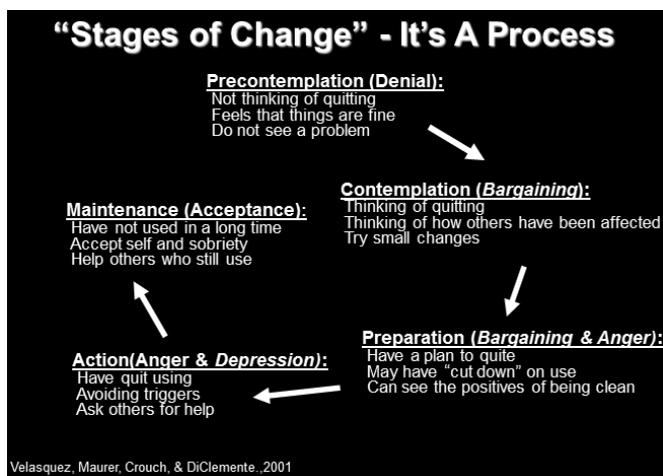
The Healing Processes aligns nicely with the Stages of Change.

Stages of Change

As mentioned earlier, change does not happen all at once. The Stages of Change^{vii} is a transtheoretical model (TTM) that describes how individuals make changes in their lives. There are several common characteristics when individuals experience successful change. In order to make and commit to change over time, the following five distinct stages come into play:

1. Precontemplation
2. Contemplation
3. Preparation
4. Action
5. Maintenance

The below model incorporates the Healing Stages with the corresponding Stages of Change. In order to move through lifestyle changes, healing and grieving must be acknowledged, explained and addressed.



As is the case with many models, the movement is fluid. A person may move forward and revisits the stages they already moved through. That does not mean that the person is digressing, rather they are growing and evolving in the manner that is necessary for their wellness and recovery.

Communication & Boundaries

As the helping professional, we want to ensure that we are empowering the individual who we work with. Initially, the individual will likely rely on the professional for guidance. This is to be expected. As they progress in their wellness and recovery and gain adaptive coping skills, the individual should transition from relying on the professional to relying on self and their natural supports.

Communication

Often times, the individual needs assistance understanding the importance of assertive communication while interfacing with others. Additionally, they need permission to implement assertive communication with others. If individuals do not speak openly and assertively, it inadvertently gives other people implicit permission to make their own assumptions and arrive at their own conclusions. Those assumptions and conclusions are often incorrect, which could lead to the individual not feeling heard. We need to be heard to heal. The below descriptions^{viii} assists in empowering individuals to consistently communicate their needs, which leads to the individual feeling safer and liberated to speak their truths with others.

- **Passive** – Passive communication is on one end of the spectrum. It is having a good understanding of your needs and wants but assuming and acting on other's needs and wants. Over time, this leads to resentments since your needs are not being spoken, acknowledged or assumed.

- **Aggressive** – Aggressive communication is on the opposite end of the spectrum as Passive. It is knowing what your needs and wants are and not caring if others have needs and wants. This is typically a reaction from being passive, thus individuals reacting in a Passive-Aggressive manner.
- **Assertive** – Assertive communication is in the middle. You know your needs and wants. You have a decent understanding of others needs and wants. You speak your truths (not the truths of others) in a mature, professional, polite manner. You will hope that the other person will understand and agree; however you accept that they do not have to. With Assertiveness, you could be gentle or more firm. Since it is on a spectrum, there is fluidity.

Boundaries

Healthy boundaries are essential to maintain recovery and wellness. Many individuals fluctuate between enmeshed and rigid boundaries. That is exhausting and inefficient. The goal is to teach and support the consistent use of healthy boundaries. ^{lix}

- **Enmeshed** – Enmeshed boundaries are can be imagined as fence posts. There is not material connecting the posts, just the posts, thus anything can come and go. If a person is trying to protect their yard, and they do not build a more secure fence, eventually the yard is ruined. This often leads to feeling harmed, disappointments and unsure.
- **Rigid** – As a result of feeling harmed, the person will create rigid boundaries. Rigid boundaries can be likened to a 10-foot high, three feet deep, cinderblock wall. Nothing comes in, and nothing goes out. At first, this feels safe and secure. In fact, the metaphorical yard seems to grow back. Over time, due to the lack of interaction, dissatisfaction seeps in.
- **Healthy** – Healthy boundaries can be intimidating to establish and strenuous to maintain. Healthy boundaries would be like a chain length fence. It takes time and effort to install it and is essential to maintain it. The fence could be four-feet high or ten-feet high. Small, non-harmful things like butterflies, birds, and rabbits come and go. The key is that this fence has a gate. The gate can open, close, latch and lock, if needed. Rather than building rigid boundaries then tearing them down for enmeshed boundaries, with healthy boundaries, the gate opens and closes as deemed fit.

Sleep Hygiene

Effective sleep hygiene is a crucial component of wellness and a stress resiliency factor. If individuals are sleep deprived, problem solving skills decrease, emotional dysregulation increases, and perceptions alter. Individuals who are sleep deprived make more errors driving than individuals who are legally drunk (.08 Blood Alcohol Content). While individuals obtain nourishing sleep, the cerebral fluid washes the brain.

Sleep Hygiene Guidelines:^{lix}

Sleep only as much as needed to feel refreshed the following day.

Restricting time in bed helps consolidate and deepen sleep. Spending excessive time in bed can lead to fragmented and shallow sleep.

Have a routine wake up time, seven days a week.

A regular wake up time in the morning will help set your “biological clock” and leads to regular sleep onset.

Your bedroom should be comfortable, free from light and noise.

A comfortable bed and bedroom environment will reduce the likelihood that you will wake up during the night. Excessively warm or cold rooms can disrupt sleep as well. A quiet environment is more sleep promoting than a noisy one. Noises can be masked with background white noise (such as the noise of a fan) or with earplugs. Bedrooms may be darkened with black-out shades or sleep masks can be worn. Position clocks out-of-sight since clock-watching can increase anxiety about lack of sleep.

Avoid looking devices one to two hours before bed due to the blue light that is emitted from most devices promotes wake cycles.

Avoid listening to music or the television while asleep, as the brain will pay attention to the noise and remain in Alpha waves instead of moving into Theta and Delta waves.

Caffeine: Avoid Caffeine Four to Six Hours before Bedtime

Caffeine disturbs sleep, even in people who do not subjectively experience such an effect. Individuals with insomnia are often more sensitive to mild stimulants than are normal sleepers. Caffeine is found in items such as coffee, tea, soda, chocolate, and many over-the-counter medications (e.g., Excedrin).

Nicotine: Avoid Nicotine before Bedtime

Although some smokers claim that smoking helps with relaxation, nicotine is a stimulant. Thus, smoking, dipping, or chewing tobacco should be avoided near bedtime and during the night.

Alcohol: Avoid Alcohol after Dinner

For individuals who do not have an Alcohol Use Disorder, a small amount of alcohol often promotes

the onset of sleep, but as alcohol is metabolized sleep becomes disturbed and fragmented. Thus, alcohol is a poor sleep aid.

Sleeping Pills: Sleep Medications are Effective Only Temporarily

Scientists have shown that sleep medications lose their effectiveness in about two to four weeks when taken regularly. Despite advertisements to the contrary, over-the-counter sleeping aids have little impact on sleep beyond the placebo effect. Over time, sleeping pills actually can make sleep problems worse. When sleeping pills have been used for a long period, withdrawal from the medication can lead to an insomnia rebound. Thus, many individuals incorrectly conclude that they “need” sleeping pills in order to sleep normally.

Exercise/Hot Bath: Avoid Vigorous Exercise within Two Hours of Bedtime

Regular exercise in the late afternoon or early evening seems to aid sleep, although the positive effect often takes several weeks to become noticeable. Exercising sporadically is not likely to improve sleep and exercise within two hours of bedtime may elevate nervous system activity and interfere with sleep onset. Spending 20 minutes in a tub of hot water an hour or two prior to bedtime may also promote sleep.

Napping: Avoid Daytime Napping

Many individuals with insomnia “pay” for daytime naps with more sleeplessness at night. Thus, it is best to avoid daytime napping. If you do nap, be sure to schedule naps before 3:00pm.

Eating: A Light Snack at Bedtime May be Sleep Promoting

A light bedtime snack, such a glass of warm milk, cheese, or a bowl of cereal can promote sleep. You should avoid the following foods at bedtime: any caffeinated foods (e.g., chocolate), peanuts, beans, most raw fruits and vegetables (since they may cause gas), and high-fat foods such as potato or corn chips. Avoid snacks in the middle of the nights since awakening may become associated with hunger.

Avoid Excessive Liquids in the Evening

Reducing liquid intake will decrease the need for nighttime trips to the bathroom.

Do Not Try to Fall Sleep

If you are unable to fall sleep within a reasonable time (15-20 minutes) or when you notice that you are beginning to worry about falling asleep, get out of bed. Leave the bedroom and engage in a quiet activity such as reading. Return to bed only when you are sleepy.

Don't Have Worry Time in Bed

Plan time earlier in the evening to review the day, plan the next day or deal with any problems. Worrying in bed can interfere with sleep onset and cause you to have a shallow sleep.

Self-Care Tools & Personality

Most individuals will agree with working smarter, not harder. Teaching the individuals we work with self-care tools that align with their personality type accomplishes this goal. If the clinician identifies an extrovert and does not know their client's personality type, there is a high likelihood that the clinician will recommend self-care tools that will match that of an extrovert. This could lead to frustration and disappointment. In short, introverts need to think before talking and they recharge their energy by solitary activities or being in small groups. Extroverts talk to processes and they need stimuli to recharge, thus enjoy being in large groups of people. Isolation and shame feeds addiction. Utilizing a natural support system, and eventually, becoming a support for others, build resiliency and contributes to wellness. An introvert's support system and self-care tools will look different than that of extroverts. Additionally, exercise decreases stress responses and increases Endorphins; however what proves to be beneficial for an introvert (more solitary, less stimulating) may not be successful for an extroverted person. Extroverts most likely will enjoy hobbies that involve people and introverts will likely recharge with hobbies that are more cerebral and intimate. Both personality types would benefit from being in nature. An added bonus is being near bodies of water. As is the case with the majority of aspects in life, personality is on a spectrum. Individuals are not completely introverted or extroverted. Some individuals identify as ambiverts, which is in the middle. Personality will appear to alter during adolescence and early adult years, while inhibitions are lower and the frontal lobe develops. Regardless of where an individual falls on the personality spectrum, recommending, encouraging and validating self-care tools that match their personality type will assist greatly.

Resources

The following resources could assist in recommending self-care tools and adaptive coping skills:

Vitamin N: The Essential Guide to a Nature-Rich Life by Richard Louv

Quiet: The Power of Introverts in a World That Can't Stop Talking by Susan Cain

Boundaries: When to Say Yes, How to Say No to Take Control of Your Life by Henry Cloud and John Townsend

Why Zebras Don't Get Ulcers by Robert Sapolsky

The Laughing Cure: Emotional and Physical Healing by Brian E. M. King

The Self-Esteem Workbook by Glenn R. Schiraldi
www.quietrev.com

<http://www.literacynet.org/mi/assessment/findyourstrengths.html>

<https://www.16personalities.com/free-personality-test>

review questions...

The following questions will be a review of the content from this section. These questions will NOT be graded. Answers to the review questions can be found below.

- 1. How is eustress defined?**
 - a. Destructive and negative stress
 - b. Positive and beneficial stress
 - c. Complex and traumatic stress
 - d. None of the above
- 2. Which is not a listed contributor to stress responses?**
 - a. Environmental
 - b. Psychosocial
 - c. Personality
 - d. Barometric Pressure
- 3. What are interventions for emotional stress responses?**
 - a. Discuss stressors with others
 - b. Isolate for others until the stress response passes
 - c. Discover resolutions
 - d. Accept feedback from others
- 4. What percentage of therapeutic change is linked to extra-therapeutic factors?**
 - a. 15%
 - b. 30%
 - c. 40%
 - d. 100%
- 5. In the adult-toddler metaphor, what part of the brain does the toddler represent?**
 - a. Frontal Lobe
 - b. Hippocampus
 - c. Hypothalamus
 - d. Limbic system
- 6. In the adult-toddler metaphor, what part of the brain does the adult represent?**
 - a. Frontal Lobe
 - b. Hippocampus
 - c. Hypothalamus
 - d. Limbic system
- 7. Many of the suggested adaptive coping skills have a neuroscience correlation.**
 - a. True
 - b. False
- 8. Which part of the brain tends to overreact?**
 - a. Prefrontal Cortex
 - b. Hypothalamus
 - c. Limbic system
 - d. Cerebellum
- 9. Which part of the brain is engaged during the suggested adaptive coping skills?**
 - a. Prefrontal Cortex
 - b. Brain Stem
 - c. Limbic system
 - d. Midbrain

Review Question Answers:

1. b 2. d 3. b 4. c 5. d

6. a 7. a 8. c 9. a

To conclude, this quote beautifully describes those in the social work profession, as well as the individuals who are serviced:

“To laugh often and much; To win the respect of intelligent people and the affection of children; To earn the appreciation of honest critics and endure the betrayal of false friends; To appreciate beauty, to find the best in others; To leave the world a bit better, whether by a healthy child, a garden patch, or a redeemed social condition; To know even one life has breathed easier because you have lived. This is to have succeeded.”

*Ralph Waldo Emerson (1803 - 1882)
American Essayist & Poet*

I encourage you to share the knowledge that you gained during this curriculum with colleagues and clients. Please share the suggested action-based coping skills shamelessly and build upon the recommendations with your own ideas and experiences. Our goal is to work together to assist those who we serve to create a redeemed social condition; to have found success through wellness.

References

- Adiction: *The View from Rat Park (2010)*. (2016). Brucekalexander.com. Retrieved September 20, 2016
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. : Author. Arlington, VA: Author.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders (4th ed., Text Revision)*. Washington, DC: Author.
- Bromberg-Martin ES, Matsumoto M, Hikosaka O (2010a) Dopamine in motivational control: rewarding, aversive, and alerting. *Neuron* 68:815–834. 10.1016/j.neuron.2010.11.022
- Fragedakis, T. (2014). *Clinical applications of biofeedback & neurofeedback: A training protocol for stress related conditions*. Presentation sponsored by Eastern AHEC. Greenville, NC.
- Gable, R. S. (2006). Acute toxicity of drugs versus regulatory status. In J. M. Fish (Ed.), *Drugs and Society: U.S. Public Policy*, pp.149-162, Lanham, MD: Rowman & Littlefield Publishers
- Georgi, J. M. (2004). *Treatment issues for dual diagnosis: Post traumatic stress disorder and substance abuse*. Presentation sponsored by Eastern AHEC. Greenville, NC.
- Hayes, P. (2015). Many people use drugs – but here’s why most don’t become addicts. *The Conversation*. Retrieved September 1, 2016, from <http://theconversation.com/many-people-use-drugs-but-heres-why-most-dont-become-addicts-35504>
- Hopecalls: Mind: What are coping mechanisms. Retrieved June 1, 2014 from http://hopecalls.org/m_coping.html.
- Hubble, M., Duncan, B., & Miller, S. (1999). *The heart & soul of change*. Washington, DC: American Psychological Association.
- Keen, L. (2006). *Trauma focused cognitive behavioral therapy learning collaborative – pilot program*. Training sponsored by North Carolina Child Treatment Program Advanced Training Institute. Greenville, NC.
- King, B. (2016). *The laughing cure*. New York, NY: Skyhorse Publishing.
- King, B.E. (2016). *The habits of stress-resilient people*. Presentation sponsored by Institute for Brain Potential. Greenville, NC.
- Mau, F. (2015). *Addiction – It’s (not) what you think: Biochemistry, meaning, and resilience*. Presentation sponsored by Addictions Professionals of North Carolina. Wrightsville Beach, NC.
- McLellan, A.T., Lewis, D.C., O’Brien, C.P., & Kleber, H.D. (2000). Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA* 284 (13):1689-1695.
- Meaney, M.J., & Szyf, M. (2005). Environmental programming of stress responses through DNA methylation: Life at the interface between a dynamic environment and a fixed genome. *Dialogues in Clinical Neuroscience*, 7(2), 103-123.
- National Institute on Drug Abuse (NIDA). (2016). Drugabuse.gov. Retrieved September 1, 2016, from <https://www.drugabuse.gov/>
- Okinawa Institute of Science and Technology. (2016) *Oist.jp*. Retrieved September 1, 2016, from <https://www.oist.jp/news-center/photos/dopamine-pathways>
- Sapmaz, F., Yildırım, M., Topcuoğlu, P., Nalbant, D., & Sızır, U. (2015). Gratitude, Forgiveness and Humility as Predictors of Subjective Well-being among University Students. *International Online Journal of Educational Sciences*, 8(1).
- Simon Sinek: *Why Leaders Eat Last*. (2016). YouTube. Retrieved September 1, 2016, from <https://www.youtube.com/watch?v=ReRcHdeUG9Y>
- Shamp, J. (2005). *Fighting the stigma linked to addiction*. Retrieved April 18, 2005, from <http://herald-sun.com/durham/4-598156.html>
- Sidbury, L. & Owens, C. (2005). *Critical incident stress and emergency response*. Presentation sponsored by Pitt Community College. Greenville, NC.
- Steemit: Why emotional intelligence is a key factor to success. Retrieved December 19, 2016 from <https://steemit.com/life/@sirwinchester/why-emotional-intelligence-is-a-key-factor-to-success>
- Stroebe, M. & Schut, H. (1999). The dual process model of coping with bereavement: Rationale and description. *Death Studies*, 23(3), 197-224.
- Stroebe, M. & Schut, H. (2010). The dual process model of coping with bereavement: A decade on. *Omega*, 61(4), 273-289.
- Spindler, M. (2016). Assessing learning objectives with bloom’s revised taxonomy. *NACTA Journal*, 60(3), 348-349. Retrieved from <http://search.proquest.com.jproxy.lib.ecu.edu/docview/1850644014?accountid=10639>
- Turner, E. H., Matthews, A. M., Linardatos, E., Tell, R. A., & Rosenthal, R. (2008). Selective publication of antidepressant trials and its influence on apparent efficacy. *The New England Journal of Medicine*, 358(3), 1533-4406.
- Valasquez, M.M., Gaylyn, G.M., Crouch, C. & DiClemente, C.C. (2001). *Group treatment for substance abuse: A stages-of-change therapy manual*. New York: The Guilford Press.
- Volkow, N.D., Chang, L., Wang, G.J., et al. Loss of dopamine transporters in methamphetamine abusers recovers with protracted abstinence. *J Neurosci* 21(23):9414-9418, 2001.
- Volkow, N.D., R. Hitzemann, G.J. Wang, et al. “Long-term frontal brain metabolic changes in cocaine abusers.” *Synapse*. 11.3 July 1992: 184-190.

Endnotes

- ⁱ Ideally, reference sources would not be older than 2008, preferably 2010. Some of the references cited are dated before 2008. Older articles, depending on the topic and/or scaffolding of topics, often contain useful concepts and data points.
- ⁱⁱ Rieck, Callahan & Watkins (2015)
- ⁱⁱⁱ Rieck & Callahan (2013)
- ^{iv} Information gained from <https://steemit.com/life/@sirwinchester/why-emotional-intelligence-is-a-key-factor-to-success>. There are many models and measures on this topic.
- ^v Spindler, M. (2016)
- ^{vi} American Psychiatric Association (2013)
- ^{vii} American Psychiatric Association (2000)
- ^{viii} Terms gathered from http://hopecalls.org/m_coping.html. The author also includes defense mechanisms, which are equally important.
- ^{ix} The Addiction Timeline was demonstrated by my then supervisor, Michael Howard, MSW, in group therapy sessions during my year-long internship while earning my MSW. I found the visual helpful and have utilizing it in group and individual sessions.
- ^x American Psychiatric Association (2013)
- ^{xi} In the spring of 2003, I observed this while visiting Paris, France as part of a deaf culture immersion trip.
- ^{xii} This has trend has been shared at multiple professional conferences and professional meetings. I have also noted this in clients that I work with.
- ^{xiii} While serving on the North Carolina Substance Abuse Professional Practice Board for eight years, it was interesting, and at times entraining, to hear stories from the more seasoned professionals about alcohol treatment and drug treatment being separate and professionals would get into actual fist fights about the legitimacy, or illegitimacy, of the opposing treatment. Individuals would see a mental health professional for anxiety and meet with a different professional to discuss alcohol. If cocaine was being used, too, then they would see another profession to address the cocaine use.
- ^{xiv} Based on unscientific data that has been gathered throughout my career during comprehensive assessments, individual sessions, and group sessions from individuals with substance use disorders.
- ^{xv} Fed Up documentary
- ^{xvi} Jeff Georgi, M.Div., MAH, LCAS, LPC, CGP is a Consulting Associate with the Department of Behavior Science, Division of Addiction Research and Translation at Duke University Medical Center described these concepts at various professional seminars that I attended in North Carolina from 2004 to 2014.
- ^{xvii} Jeff Georgi, M.Div., MAH, LCAS, LPC, CGP explains a similar example in his professional seminars.
- ^{xviii} As presented by Jeff Georgi, M.Div., MAH, LCAS, LPC, CGP. I could not find researched literature to confirm this information; however, based on client reports, these factors appear applicable.
- ^{xix} Hayes – The Conversation (as cited in Mau, 2015)
- ^{xx} American retired soccer player, coach, two-time Olympic gold medalist and FIFA Women’s World Cup champion
- ^{xxi} Turner, Matthews, & Linardatos (2008)
- ^{xxii} On October 10, 2016, Mr. Bruce Alexander stated the following when seeking permission, “Thanks for asking. I am deliberately keeping that article un-copyrighted, so that you, and others, can use it however you like. All best wishes from Pender Island, BC.”
- ^{xxiii} Information could be found on various sites via a search engine of choice
- ^{xxiv} Definitions derived from Dictionary.com, which includes definitions cited from The American Heritage® Science Dictionary
- ^{xxv} http://www.human-memory.net/brain_neurons.html
- ^{xxvi} <https://www.scientificamerican.com/article/gut-second-brain/>
- ^{xxvii} <http://hubpages.com/education/your-second-brain-is-in-your-heart>
- ^{xxviii} <http://general-psychology.weebly.com/what-are-the-parts-of-the-brain-and-their-functions.html>
- ^{xxix} DSM-5 (2013)
- ^{xxx} This age range has been stated in various readings and presentations.
- ^{xxxi} Volkow, et al (2001) indicates that dopamine levels return to normal after 14 month of abstinence from methamphetamines
- ^{xxxii} King (2016) - Presentation
- ^{xxxiii} Paul Nagy, LPC, LCAS, CCS with Duke University’s Department of Psychiatry and Behavioral Sciences described this concept at various professional seminars that I attended in North Carolina from 2006 to 2009.
- ^{xxxiv} Paul Nagy and Jeff Georgi both emphasized the correlations between trauma and addiction
- ^{xxxv} DSM-5 (2013), page 833-837
- ^{xxxvi} DSM-5 (2013)

- xxxvii King (2016) - Presentation
- xxxviii King, (2016) - Presentation
- xxxix King (2016) - Presentation
- xl <http://ada1.washington.edu/ebp/matrix.pdf> is a matrix of Evidence Based Practices for Treating Substance Use Disorders
- xli Hubble, M., Duncan, B., & Miller, S. (1999)
- xlII Social Worker, author, public speaker
- xlIII Sidbury & Owens (2005)
- xliv This specific breath count was adapted from a description offered during a Wounded Warrior Project – Project Odyssey by a former Coordinator, John “Joe” Brazzle, MA, LMFT
- xlV The suggestions for healthy distractions has been building over the years from attending trainings, discussing adaptive distractions that clients use, as well as listing ideas that would come to mind.
- xlvi Keen (2006) – Adapted Mindfulness Coping Skill Handout
- xlVII Keen (2006) - Adapted Grounding Coping Skill Handout
- xlVIII King (2016) – Presentation; Sapmaz, et al (2015)
- xlIX I created this Daily Gratitude List for my clients to use, as it is important for individuals to also notice the benefits and challenges that they encounter during their day.
- l King (2016) – Book
- li Simon Sinek has a great TED Talk titled “Why Leaders Eat Last.” He speaks about role neurohormones play in how we respond.
- lii Learned the described biofeedback mantra from Tami M. Fragedakis, LPC, BCB, LRT in 2014
- liii Similar to the healthy distractions, the mantras have been acquired via trainings, retreats, social media, clients, books, my own imagination, to name a few.
- liv Stroebe & Schut (1999); Stroebe & Schut (2010); adapted by Robert E. Gierka, EdD, Pet Chaplin
- lv Described by Robert E. Gierka, EdD, Pet Chaplin
- lvi While working with individuals, I observed that some individuals did not identify with the grieving processes since our society seems to lump grieving with a person dying. Adjusting the order and creating the Healing Processes seemed to assist individuals in healing process.
- lvii The Stages of Change is based on the research of Prochaska and DiClemente from 1984
- lviii Communication descriptions have been gathered to date. There is not a specific source or date that can be referenced.
- lix I am a visual person and often create analogies to assist in describing a concept or pattern to clients, supervisees, participants in trainings, and colleagues. While thinking about an effective way to describe boundaries, the described analogy came to mind.
- lx Sleep hygiene guidelines recommended by Nyi N. Myint, MSW, MBA, LCAS, CSI with the Alcohol/ Drug Council of North Carolina

PARTICIPANT TRAINING EVALUATION

Course Title: Understanding the Neuroscience of Addiction to Provide Effective Treatment **Date:**

Sponsored By:

Student Name (Optional)

To the participant:

Please complete the following evaluation at the conclusion of the program. Your comments are necessary to assist us in offering the best continuing education programs possible in the future.

Use the following rating scale: 5 – strongly agree, 4 – agree, 3 – neither agree nor disagree, 2 – disagree, 1 – disagree strongly
Circle N/A if the topic is not applicable to you.

Program Content

Topic	Rating						Comment:
The stated goals and objectives of the course were met	5	4	3	2	1	N/A	
The topics were covered in sufficient detail	5	4	3	2	1	N/A	
The topics covered in this course will improve my social work practice	5	4	3	2	1	N/A	
Content was well-organized and informative	5	4	3	2	1	N/A	

Instruction/Final Exam

Orientation was thorough and clear	5	4	3	2	1	N/A	
Completion requirements were clearly stated	5	4	3	2	1	N/A	
Exam assessed stated learning objectives	5	4	3	2	1	N/A	
Exam was graded promptly	5	4	3	2	1	N/A	
The course presentation style was effective	5	4	3	2	1	N/A	

COURSE MATERIALS/CUSTOMER SERVICE

Satisfied with format of the course	5	4	3	2	1	N/A	
Satisfied with overall learning experience	5	4	3	2	1	N/A	
Sponsor was well organized and responsive to participant needs (customer service, registration, certificates, etc.)	5	4	3	2	1	N/A	
I would recommend this course to others	5	4	3	2	1	N/A	