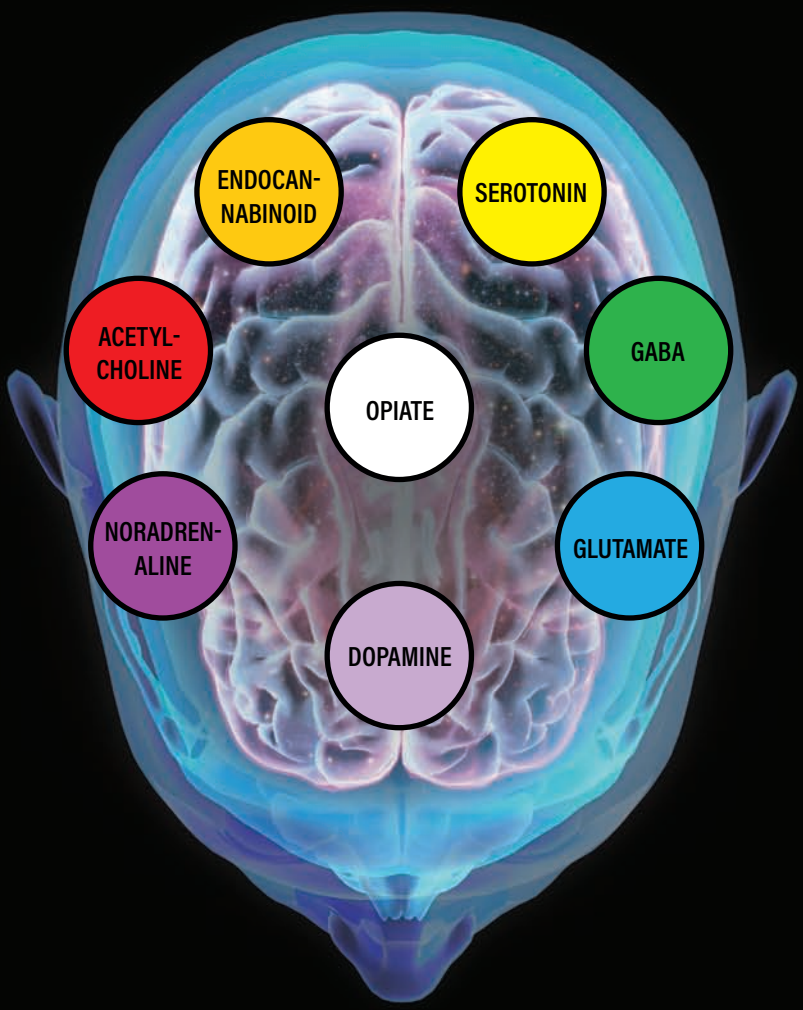
FIRST EDITION

REACTIVATING THE ADDICTED BRAIN

A Workbook and Practical Guide for Understanding the Genetics and Neurochemistry Behind Addiction and Recovery



JEFF SANDOZ, Ph.D.

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First Edition

Jeff Sandoz, Ph.D.

Troy University

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This book is dedicated to Dr. Fred Von Stieff.

Contents

Foreword

According to the 2023 United Nations Office on Drugs and Crime *World Drug Report*, almost 40 million people globally suffer from drug use disorders, with less than one fifth in treatment. In 2015 alone (Peacock et al 2018), alcohol and tobacco use caused the loss of over a quarter of a billion disability-adjusted life years worldwide, with tens of millions more due to illicit drug use. Behind these statistics lie countless human stories of the physical, social, psychological, and spiritual damage caused by addiction. For those who are fortunate enough to enter recovery, whether by way of professionally led treatment or mutual help programmes, there is a steep learning curve. This process of learning and relearning how to manage life in recovery has to be negotiated by the addicted brain just at that very point in time when it is most compromised by the damage caused by addiction.

Recovery from addiction is a complex, lifelong, biopsychosocial process within which a spiritual transformation takes place. Or, perhaps, we might say that it is a spiritual transformation that triggers a complex lifelong interplay of biopsychosocial processes. From a human vantage point, it is hard to say which way around things really are. As a theologian, I tend to prefer the latter account, but I studied science before theology and I'm wary of the dualism that sees spirituality as something incorporeal and ungrounded in our material universe. Few people have the spiritual, academic, and practical grounding to really see the whole picture and to integrate the neurochemical, psychological, pharmacological, genetic, and anatomical processes within the human narrative, but this is exactly what Jeff Sandoz has achieved in this book. He is able to do this not only because of his clinical, theological and scientific training but also because of his first-hand experience of working, and working with others who are working, the Twelve Step programme. Jeff literally knows the Steps inside out.

Addiction neurochemistry is not usually an easy read, but Jeff's trick has been to integrate what he knows about the neurochemistry with his considerable skills as a teacher and his clinical knowledge of how to work with people in recovery. Consequently, this book takes advantage of colourful visual imagery and storytelling, as well as helpful "journal entry" questions at the end of each chapter. In this way, the practical relevance of the neurochemical systems that are crucial to understanding treatment and recovery are explained whilst simultaneously engaging the reader in an active way with the same learning techniques that are important to the process of recovery. Jeff has also integrated all of this with an explanation of the spiritual practices that play a central role in making recovery happen and the spiritual experiences that come about as a result of pursuing a programme of recovery. The net result is a colourful, spiritual, and practical book about how to reactivate the addicted brain. Enjoy!

Christopher C.H. Cook

Emeritus Professor of Spirituality, Theology & Health
Institute for Medical Humanities
Durham University, UK
29 February 2024

References

Peacock, A., et al. (2018). Global statistics on alcohol, tobacco and illicit drug use: 2017 status report. *Addiction, 113*(10), 1905–1926.
UNODC, World Drug Report 2023 (United Nations publication, 2023)

Introduction

While the first part of this book offers a series of foundational readings, the second part consists of additional information with accompanying activities. **Part I** is designed to assist the reader by providing background information and promoting greater understanding of the effect of mood and mind-altering substances upon the brain and its neurotransmitter systems, to place such information into a visual format, to utilize those diagrams within patient files, and to explore the effects of the recovery process. **Part II**, the workbook, is designed to promote and assist in the reactivation of those damaged or disturbed brain areas by completing certain tasks. In essence, while **Part I** prepares the groundwork, **Part II** features ways to activate an addiction-damaged brain. The book will employ a variety of teaching methods, including active learning, storytelling, and brain-based instruction. In addition, a case study, analogies, illustrations, awareness of emotional states, journaling, and other activities help to get the brain back online.

Topics presented within **Part I** can be found in Chapters 1 through 6. **Chapter 1: Understanding the Problem** explores a case study involving how brain functioning can be impaired by excess alcohol consumption. **Chapter 2: Neurotransmitter Balance: Understanding the Genetics and Neurochemistry of Addiction and Recovery** introduces Dr. Von Stieff's innovative visual format which displays the eight neurotransmitter systems that are affected by addiction. **Chapter 3: Utilizing Diagrams to Understand Neurotransmitter Imbalances** begins by analyzing patient neurotransmitter deficiencies and excesses, translates that information into various diagrams which can be used for client records, aftercare treatment planning, and monitoring patient progress. **Chapter 4: Reconsidering Brain Functioning and Neurotransmitter Shifts from Addiction to Recovery** reviews the effects of alcohol on brain functioning, along with the beneficial impact of AA's steps, sponsorship, and the spiritual experience. **Chapter 5: Narrative Storytelling in Alcoholics Anonymous** covers a wide range of topics, including the narrative pattern of AA stories along with the impact on brain function and neurotransmitter release. **Chapter 6: Addiction Recovery Factors** traverses the path of the "addiction disconnection" (which separates) and the "recovery reconnection" (which unites).

Part II includes Chapters 7 through 12. This section elaborates on several ways to activate an addiction-damaged brain. **Chapter 7: Methods of Reaching and Teaching an Addiction-Damaged Brain** presents various successful pedagogies in improving learning and enhancing memory. **Chapter 8: Utilizing Diagrams to Understand Neurotransmitter Imbalance** involves learning how the brain works by viewing the transitions of neurotransmitter levels in various charts and diagrams. **Chapter 9: Understanding Neurotransmitters** offers a closer look into how the eight neurotransmitter systems work with elaboration upon the symptoms of neurotransmitter excesses and deficiencies. **Chapter 10: My History** gets a bit personal by providing a practical

application within one's own history by offering four rounds of diagrammatic "snapshots" comparing and contrasting the shifting neurotransmitter levels throughout the addiction-recovery process. Such information helps one to examine genetic heritage, history of trauma, stress, mental illness, drugs of choice, the effects of withdrawal/detoxification, and what medications might assist in rebalancing neurotransmitter deficiencies or excesses. **Chapter 11: Countermeasures** provides an assortment of various methods and techniques that have been beneficial in the recovery process and explores actions designed to balance specific neurotransmitters without the use of medication. Such activities include meditation and prayer, 12-Step facilitation promoting a spiritual experience, and understanding the relationship between neuroplasticity and neuro-spirituality. And finally, **Chapter 12: The Future Is Now** looks at current cutting-edge concepts which probe into both future and currently available ways of resolving addiction-related problems. GARS, technological development, epigenetics-DNA damage due to alcohol and protecting future generations are explored. The final section brings the book to a close with a conclusion, a deeper examination of the mind-body-spirit unity, linkage of the AA book with Jaak Panksepp's Core Emotion Systems and ideas for future research studies.

Purpose

The purpose in developing such a workbook is manifold:

1. To present to the substance abuse professional that specific parts of the brain of the person in recovery are offline due in part to the toxic nature of substances, poor blood circulation, and disturbed production/function of neurotransmitters.
2. To reveal that the state of the brain is impaired and that one may experience learning disabilities, which prevent the person from getting the message of recovery.
3. To educate and thus empower the person in recovery with sufficient information, not only to accept responsibility for one's own recovery, but also to provide a level of understanding of brain processes previously not available for those in recovery.
4. To allow the student in class to experience specific hands-on activities that reactivate areas of the brain by utilization of techniques involved in learning, memory, and integration of the emotional aspects of recovery.
5. To integrate knowledge of the shifting levels of neurotransmitters throughout the addiction/recovery process with the use of practice sheets that graphically illustrate the process at each stage.

Taken together, the extensive array of activities in this workbook are designed to fill in some of the missing pieces of the addiction/recovery process.

Jeff Sandoz, PhD
Troy University, Alabama
May 16, 2024

Preface

Congratulations! By opening this book, you are opening up the possibility of a profound, new understanding of the addiction/recovery process. **This book will change your ideas about addiction and the resulting effects upon the brain and neurotransmitters.**

In the form of a brief overview: Most physicians, family therapists, and other health care professionals do not understand how the patient's neurochemicals are affected by detoxification and addiction. Therefore, it is the **purpose of this book** to fill the void of understanding; educate substance abuse professionals, students, and those in recovery. The **primary learning objective** is to provide an understanding of **HOW THE BRAIN WORKS**. Specifically, this objective is attained by making sense of how brain imbalance is related to addiction—a process achieved by viewing neurotransmitter levels of the person struggling with addictive substances.

What do we intend to accomplish with the publication of this workbook? By completing the activities in this workbook, we hope to raise the level of understanding for the professional and the patient of how neurotransmitters change in addiction and recovery. In addition, these activities are designed to activate areas of the brain that have become dormant due to poor circulation, inactivated by toxicity, or have been slowed by disturbances in the functioning of specific neurotransmitters.

What methods are used? Learning by doing—this is an *activity* book. The twofold process involves putting together pieces of the brain puzzle through graphic representation and by viewing changes in patient neurotransmitter levels when diagnosing and providing treatment. This workbook illustrates both genetic and neurochemical imbalances throughout the addiction/recovery process in four steps: specifically, how the neurotransmitters interact with 1) genetic deficiencies, mental illness, stress, and trauma; 2) self-medication; 3) through withdrawal and detoxification; and 4) during stabilization with medications designed to block intoxication and cut craving.

Having worked for over three decades with those who struggle with alcohol and drug issues, there was an area that I found noticeably lacking in the field of addiction and recovery—an area involved with the changes that occur in brain chemistry. Similarly, having taught graduate and undergraduate students in psychology and counseling during the same period, I felt that academics covered the subject matter of addictions quite well, but still there was the same missing element.

As I read Dr. Fredrick Von Stieff's book ***Brain in Balance***, I felt that the missing piece of the puzzle had finally been found. My enthusiasm grew as I prepared PowerPoint slide shows and lectures for my substance abuse classes. The student response was electric and far beyond what I expected. Several of my students have endured the ravages of chemical addiction and are well on their way to recovery with years of being "clean and

sober." One student, with several years of recovery, shared with me at the end of the course that the diagrams of changes in neurotransmitter levels were akin to the Rosetta Stone. Specifically, she now understood the changes in neurotransmitter levels in her brain during three crucial areas: 1) her genetic and mental illness, which pushed her to experiment with drugs; 2) her attempts at self-medication with various substances; and 3) how her neurotransmitter levels were altered during withdrawal and detox. She also mentioned that the material in the course and the book provided insights into her level of craving—an aspect that had baffled her over the years.

On a more personal note, as a child I struggled with ADHD (Attention Deficit Hyperactivity Disorder). My mother, realizing that her youngest child was different from the older siblings, was determined to teach her son (me) how to learn more quickly, effectively, and efficiently. The process involved a wide array of methods that were designed to improve retention. Quietly, throughout my years in formal education, I used these techniques with great success. Years later while in graduate school, one of my classmates, Jackie Brown (not his real name), approached me in tears. He said that he just realized that he was an alcoholic and believed that he had damaged his brain as evidenced by an inability to comprehend what he was reading and feared that he would miss the message of recovery (Sandoz, 2005, doi:10.1300/J062v08n01_06 61). [See Sandoz, C. J. (2005). Getting the Message of Recovery. *Journal of Pastoral Counseling,* 8(1), 61–66.] I assured him that he had a study partner who would work with him through a really tough course in which the two of us were enrolled. At the same time, he was attending Alcoholics Anonymous meetings and found success in improving his reading comprehension. Jackie and I employed a variety of study techniques—techniques that he also utilized while attending "Big Book Studies," which promoted his understanding of what he needed to know in order to recover.

The result was that we set the curve so high for the final exam in Physiological Psychology that the professor had to adjust the grades for the remainder of the class, which was 20 points lower! What Jackie and I slowly realized at that time (1980s) was that these active-learning techniques were "reactivating" areas of his brain that were slowed, somehow laden with "cognitive cobwebs" or in a state of "mental fog." Fast forward to the era of brain scans in which we are able to see active functioning through brain imagery. Certain areas of Jackie's brain (angular gyrus and frontal cortex) were affected by toxicity, poor circulation, and a disruption of levels of neurotransmitters due to years of drinking (see Chapter 1).

Within this workbook, one will find a treasure trove of activities, designed to activate brain areas that have been affected by chemical addictions. Such activities include "coloring in" the specific neurotransmitter circles to match the Von Stieff diagram (see Chapter 2), journaling, sharing insights with peers in recovery, and/or medical professionals in the addiction field. Another crucial affective factor is monitoring the level of unpleasant emotions before and after each activity. The wide array of learning activities utilized in the workbook are based on storytelling, active learning, and brain-based instruction. Furthermore, these activities are designed to present the Von Stieff diagram model, to promote easy retention of the material, to enhance both the learning and memory process, as well as to share this information with others in recovery.

It is my hope that this book may not only help those in the field of substance abuse counseling and medical care for people with addictions, but also assist those individuals, who, like Jackie Brown, have experienced temporary learning and/or reading comprehension disabilities due to alcohol and drug abuse.

Jeff Sandoz, PhD, LMHC, MAP, ICDAC

Part I

Foundational Readings

CHAPTER 1

Understanding the Problem

Introduction

The purpose of this chapter is to promote an understanding of how alcoholism damages specific areas of the brain. As those key brain areas targeted by addiction become disabled, the process of recovery appears to be more distant and remote. The reason for the apparent hopelessness of the person struggling with addiction is this: the person's brain is not working and those damaged areas of the brain need to be fully operational so that the person can understand the message of recovery.

A Case Study

My 31-year-old classmate sat alone in a darkened college classroom in defeat and desperation. His shoulders drooped in despair. His quivering body rocked back and forth in agitation, while his hands stroked his upper arms in apprehension and fear. His unfocused eyes looked off in the distance and he appeared to be lost in thought.

"My God! Jackie, what's wrong?"

My abrupt words startled him, snapping his body into attention and I was taken aback by the depth of his worry, evidenced by his deeply furrowed brow.

"I think I broke my brain by drinking!" he said in tearful anguish.

"What are you saying?"

"When reading from the course textbook, I just don't get it. I don't understand what I'm reading. My reading comprehension is shot. Maybe I can't cut it in grad school."

"Well," I quipped, "I was ADHD before it was cool. Do you want to study together?"

Again, his body bolted upright, but this time his eyes widened in hope and in relief, perhaps in disbelief. "You'd do that for me?"

"Sure," I said, with an understanding smile. "We gotta stick together in order to make it in this program."

Author's Note

That conversation, transpiring some 40 years ago, changed the trajectory of my future studies, career, and life. Little did I realize that a chance encounter would shape my interest in research as well as my practice as a clinician. At that time, I saw a fellow classmate in crisis. He confided in me that he had joined a 12-step group called Alcoholics Anonymous and that he was experiencing difficulty in reading comprehension. Also, despite a dozen readings from the same paragraph in the book *Alcoholics Anonymous*, he failed to get the gist of what he read.

Jackie's fear was manifold. First, he was afraid that he had damaged his brain beyond repair by excessive drinking over the years and that the injury was permanent. Second, he feared that with such a damaged brain he would fail to comprehend the message of recovery and would never attain sobriety. Third, he and I were enrolled

in arguably one of the most difficult classes in the graduate program, Physiological Psychology, a course which provided understanding of how the brain and neurotransmitters work. Finally, he was in despair and felt hopeless about passing the course, much less graduating.

While in graduate school four decades ago, there were certain unknowns due to the lack of research and the level of medical technology. Although the era of brain scan imagery had just begun, the concept of neuroplasticity had not gained acceptance in psychological journals at that time. Some of the unknowns in addictions in the 1980s included:

1. How does alcohol addiction damage the brain?
2. How does alcoholism bring about learning impairments?
3. What areas of the brain are affected by excessive alcohol consumption?
4. How can the alcohol-impaired brain become reactivated in recovery?

Twenty years after that meeting with Jackie, the author felt prompted to publish a case study entitled "Getting the message of recovery" (Sandoz, 2005). The article centered on strategies aimed at brain activation, specifically focusing on active learning techniques, brain-based instruction, and the processes Jackie used in AA's "Big Book Study" meetings.

Today, single-photon emission computerized tomography (SPECT) scans are commonplace. This brain imagery mechanism, along with a radioactive tracer, allows medical professionals to observe how blood circulates within tissues and organs. Specifically, SPECT scans reveal how blood flows through brain arteries and veins. As such, SPECT scan imagery appears to be more sensitive in revealing brain injury than either MRI or CT scanning due to the ability to detect reduced blood flow to injured sites.

Also, SPECT scan images display what appears to be physical holes in the brain which might resemble the holes in a block of Swiss cheese. Instead, what these images reveal are functional holes that indicate that certain areas of the brain are not working due to poor circulation, impaired neurotransmitters, or a buildup of toxic substances in the brain due to excessive drinking. More detailed information about the changes of neurotransmitter levels of the brain during addiction and recovery will be revealed in the next two chapters.

Case Study Revisited

On a personal note, I cannot forget how Jackie's spirits lifted; the positive affect change in both facial expression and body language when I shared with him the story of my struggle with ADHD, the learning techniques I used, my eventual improvement in reading comprehension, and if he would be willing to join me as a study partner. He jumped at the chance like a drowning man for a life preserver. By utilizing various learning techniques, my classmate not only improved the level of his reading comprehension, but he was able to get the "message of recovery" that previously had eluded him. In the process of his own brain recovery, he experienced what was to be called neuroplasticity.

Brain Regrowth?

Brain plasticity or neuroplasticity is a natural developmental process that occurs as the brain grows and matures. There are two types of neuroplasticity. The first type, structural neuroplasticity, is the brain's adaptive response to an ever-changing environment, a process that integrates personal experiences and memories and thereby

changing the brain's physical structure. The second type, functional neuroplasticity, occurs with brain damage when the brain attempts to compensate for the loss of a specific function. With regard to alcoholism recovery, I believe that both types are in play, working together in complementary ways. Abusive alcohol consumption destroys brain cells, eventually leading to a temporary learning disability or permanent brain damage. While my classmate experienced a short-term version, had he continued drinking alcohol, I am certain that his condition would have worsened. After abstaining from alcohol from that point forward, he employed measures which reactivated specific brain areas that had gone offline.

Reactivating the Brain

Upon hearing the spoken words that were read aloud from the Alcoholics Anonymous text, Jackie's understanding improved when accompanied by other methods, including the verbal elaboration on what was read and the taking of written notes. In summary, his temporary learning disability passed as he progressed in recovery.

As he continued in his AA recovery program by attending several meetings a week and practicing daily maintenance, he had a vital spiritual experience. The reactivation of the brain and changes in neurotransmitter release involved in the spiritual experience will be discussed in other sections of the foundational readings. "The spiritual experience involves a psychic change that is sufficient to recover from alcoholism" (*Alcoholics Anonymous*, 2001, p. 567). At present, he has abstained from alcohol for over 40 years!

Getting back to the story, due to the adaptive learning exercises, my fellow student shrugged off his temporary learning disability, understood what he was reading in the AA book, and began the process of his recovery. By the way, there was evidence for a psychological transfer of learning. Such a process occurs when applying specific information, strategies, and/or skills learned in one context (attending and actively participating in AA Big Book studies) into a new situation (utilizing the same process of active learning in graduate school). Specifically, the carryover study techniques that Jackie used produced prodigious results in the Physiological Psychology class, with scores so high on the final exam that the professor had to lower the curve for the rest of the class by nearly 20 points!

Function of Specific Brain Structures

Figure 1.1 offers an illustration of the four lobes of the brain. Located adjacent to each of the major brain areas are their basic functions. Table 1.1 expands and enlarges upon the activity of the four lobes of the brain, especially with regard to crucial areas involving reading comprehension and long-term and short-term memory.

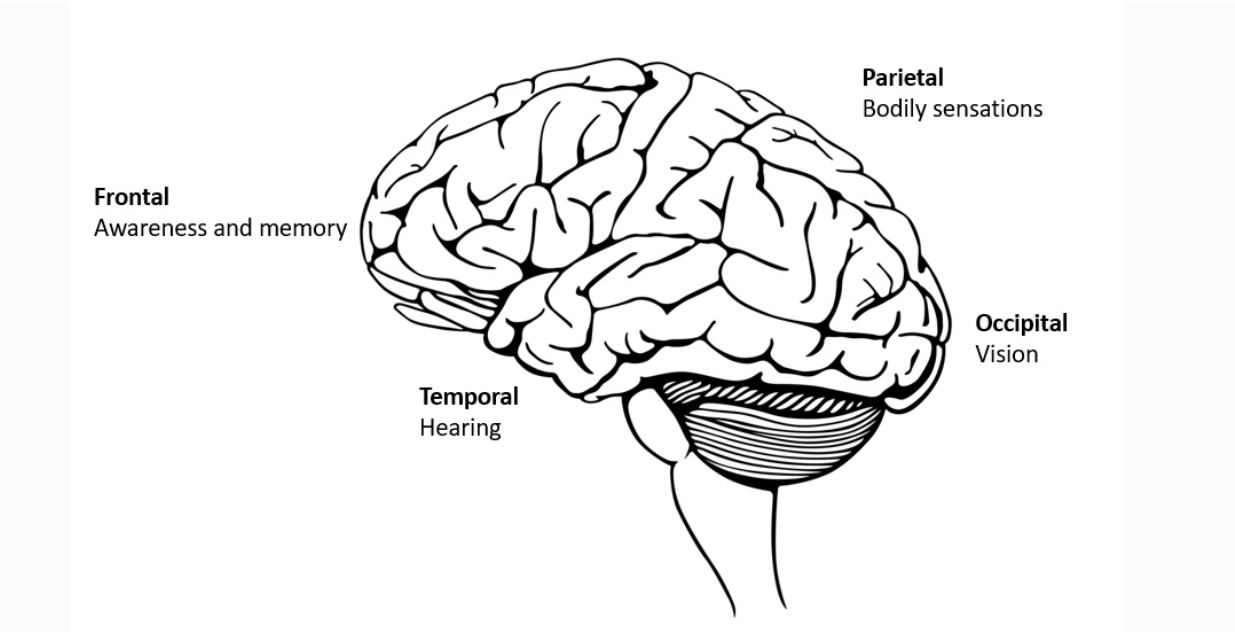

Figure 1.1 Lobes of the brain.

Table 1.1. Summary of Brain Area and Activity

Brain Area	**Activity**
Frontal Lobe	Development of Long Term Memory & Speech Production
Parietal Lobe	Bodily Movement & Sensations (tactile)
Temporal Lobe	Processing Hearing & Short-Term Memory
Occipital Lobe	Seeing & Perception of Sight

Table adapted from "Getting the Message of Recovery," Sandoz (2005).

Brain Circuitry and the Angular Gyrus

Modern brain image technology has produced great advances in understanding brain functionality since the 1980s when Jackie was in early recovery. Since the 2005 publication of Jackie's original case study, there have been additional innovative findings in brain imagery which have helped to decipher the functioning of specific areas of the brain regarding reading comprehension and memory.

Although Breedlove and Watson (2020) elaborate on how elusive the brain's language circuitry remains in the 21st century, there is a high degree of certainty that deficits in processing reading comprehension are due to damage resulting from neural disconnections among various parts of the left hemisphere. Specifically, problems with the angular gyrus "disconnect" the processing of visual and auditory systems. The angular gyrus functions as a "cross-modal hub" whereby multisensory information converges, combines, and integrates data into a comprehensible and usable form (Seghier, 2013, p. 43). However, with such disconnection problems,

difficulties can be diverted through the activation of other areas of the brain. One such activity includes reading aloud.

Jackie's Brain Revisited

While the temporal lobe decodes and discriminates various sounds, the frontal lobe coordinates speech production, reading fluency, and comprehension. However, there are two portions of the parietal lobe, the angular gyrus (Brodmann area 39) and the supramarginal gyrus (Brodmann area 40), which seem to have been damaged at least temporarily in Jackie's brain. These two areas serve as an orchestral conductor, by linking the various parts of the brain together and integrating what is being read, thus enabling one to read aloud (Sakurai, 2017).

The cumulative assault on specific regions of Jackie's brain by years of alcohol abuse disrupted the normal process of reading comprehension and memory, thus preventing Jackie from remembering what he read. It is quite possible that there was some interference in nerve message transmission among the functioning of the angular gyrus, supramarginal gyrus, and the hippocampus in the medial temporal lobe. The hippocampus helps to process and to retrieve two types of memory: declarative memories (related to facts and events) and spatial relationships. In summary, Jackie's poor comprehension of sentences seemed to have linked a sequential processing difficulty with his memory problem.

Figure 1.2 illustrates the location of various brain structures implicated in reading and hearing. In particular, Section (1) indicates the visual processing segment of the occipital cortex. Section (2) displays the angular gyrus, where word recognition recodes the visual stimuli of the printed word. Section (3), the primary auditory sector located within the temporal lobe, processes hearing along with Wernicke's area, the region responsible for receptive communication; that is, understanding and comprehending the spoken word. Also listed is Section 3A, the arcuate fasciculus, which some believe transmits information from Wernicke's area to Broca's area. Section (4), Broca's area, located in the frontal lobe, is responsible for expressive speech. Furthermore, Broca's area relays information to Section (5), the motor cortex which sends messages to the speech muscles utilized in speaking, thus enabling a person to articulate words. In summary, Figure 1.2 provides a compact image, illustrating a detailed pathway of how the brain functions in the process of reading aloud.

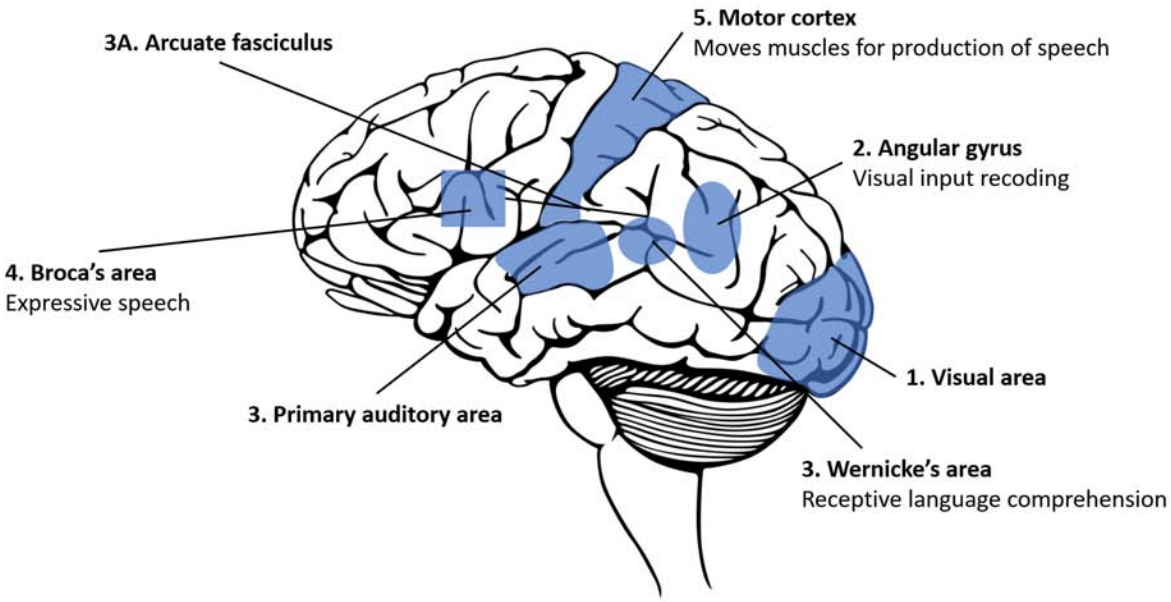

Figure 1.2 Process of reading and hearing.

Furthermore, Burns (2017) offered a poetically poignant analogy that compared the processing of the "reading brain" to the collaborative effort of a symphony orchestra, as the various parts of the brain work in concert like sections of instruments. The resulting harmony not only maintains a sense of flow, but also maximizes the brain's ability to decode the written text and to derive an understanding of what is read. Further extending the metaphor of the brain processing as a harmonious orchestra, one can only imagine how much discord would be produced during the addiction process. Moving into the realm of recovery, the brain must either work around the dysfunctional area or find a way to harmonize the functioning through activities that boost learning, memory, and reading comprehension.

Processing the Language in the Book *Alcoholics Anonymous*

Mills (1989) voiced a concern regarding comprehension of the book *Alcoholics Anonymous* and felt that in order for the book to be an effective component for recovery, the text information must be comprehensible to the reader. Furthermore, Mills suggested the use of audiotapes for those with poor reading skills. Such an adaptive learning technique would boost learning and confidence in the reader by supporting and reinforcing positive results.

Prior to the utilization of adaptive learning techniques, Jackie described feelings of frustration and futility with each failed attempt at recalling what he had read several times in rapid succession. Fear and apprehension were compounded and cumulative, as confidence in his ability to succeed plummeted with each failed attempt.

Jackie noticed that many of the AA members attending the Big Book Study meetings were unable to read from the Big Book while others were assisted through the reading of a paragraph by a peer. The process of the meeting went as follows: After a paragraph was read, one well-established AA member with lengthy sobriety and some success in working the 12-Step Program would comment on the content of the paragraph or tell of associated

ideas about a personal experience related to the meaning of the paragraph. Jackie observed that his ability to comprehend what he was reading began to improve over time. Basically, Jackie was able to grasp the ideas after hearing others read aloud from the Big Book and make additional elaborations.

Jackie's Observations and Realizations

After he had accumulated a few months of sobriety, Jackie began to piece things together, reflecting upon his reading comprehension problem with the Big Book. The reader may recall that Jackie was studying Physiological Psychology, a course that provided detailed information on the anatomy and functioning of the areas of the brain. Jackie understood that the sensory stimuli of the printed words in the text that he was reading in the Big Book would stimulate the light receptors in his eyes and pass the nerve message information onto the occipital lobe of the brain. Jackie had also learned that as the reading comprehension processing continued, there was a disconnection as the meaning of the words was lost. There was a neurological "short-circuit" as the nerve message was blocked somewhere from the occipital lobe to the frontal lobe of the brain. In time, Jackie realized that he could boost his retention by actively following the words and energetically mouth the written words or lip-read along with the reader. Inadvertently, this technique boosted his comprehension as others would read each paragraph, thus advancing his ability to comprehend the information in the book.

In summary, Jackie had an epiphany of understanding as he had stumbled upon a method to improve the level of comprehension. By active listening (receptive communication of Wernicke's area) accompanied with the paired activation of his larynx, mouth, and lips (expressive communication of Broca's area), he forced the inactive or disabled areas of his brain to become activated and his reading comprehension improved dramatically. Furthermore, Jackie's newfound ability to mentally retain the gist of the paragraph was strengthened by the stories of life experiences and comments made by the reader. Aspects of storytelling, a process that modifies neurotransmitters, are key to the recovery process and will be discussed in a later chapter.

Other Methods of Brain Reactivation

Jackie and the author were in the habit of highlighting key portions of the Physiological Psychology text with bright and contrasting colors. The highlighted hues were visually stimulating and provided a way to grab attention and focus on the importance of the information in the text. This was an adaptive technique that the author used to inject novelty to counter his ADHD zoning-out problems. Also, jotting down explanatory or elaborative notes in the margin provided another method to jog the memory and make a mental note stick.

In addition, key concepts were underlined. Important vocabulary words were circled. Taken together, these muscle-moving techniques would activate the areas of the motor cortex in the parietal lobe. Jackie utilized an array of these helpful strategies to reactivate the dormant zones of his brain. His active learning techniques boosted learning, enhanced memory, and improved the level of reading comprehension.

A Useful Analogy

Imagine an engine firing on all cylinders except one. Due to the connected structure of a gasoline-powered engine, the actively moving pistons physically force the inactive piston to move. Similarly, by stimulating various sections of the brain, the more dominant areas become activated and force activity in the under-functioning region as

in the aforementioned case study. The author described similar techniques to promote memory in patients with Alzheimer's disease (Sandoz, 1996; Sandoz, 1997; Sandoz, 2001; Sandoz, 2012).

After years of sobriety, Jackie acknowledged that he was able to finally get the AA message by listening to the reader as he followed along in his Big Book and to incorporate the comments of his fellows in recovery by hearing the stories of their experience, strength, and hope.

Rehabilitative Brain Techniques

Here is a list of activities that Jackie used to "reboot" his brain and get the message of recovery. This eightfold process should help to reactivate brains that have been slowed with addiction.

1. Frequently attend Big Book studies and read segments of the book aloud.
2. When others are reading, follow along word for word.
3. Use colorful highlighters to mark the main ideas.
4. Use a pencil to underline important words and circle the main concepts.
5. Jot down summary notes in the margin of the page for later review.
6. Move jaw and lips to silently articulate each word as the reader sounds each word aloud.
7. After the paragraph has been read, report to another person in the group what your understanding is of the paragraph.
8. Verify with another in the group if your understanding of the reading passage was accurate and precise.

Conclusion

Recovery from alcoholism is a lifelong process. However, an alcoholic may never be able to *begin* the recovery process if there is no brain rehabilitation. If the sections of the brain do not become activated and begin to function normally, then poor reading comprehension will prevent one from getting the message of recovery. This chapter offered a few simple suggestions which proved to be beneficial for my former classmate. In addition, the process of recovery continues, deepens, and expands as one gains more knowledge of brain function, including the nature of neurotransmitters. The person in recovery must continue to learn and grow and share the victory of recovery with others who still struggle with addiction. By following the simple procedures in this chapter, one may guide others into recovery and ensure that others struggling with alcohol addiction will understand the problem and pass on the message of recovery.

Looking Ahead

Chapter 2 will offer a possible solution to the problem. This approach will provide a deeper understanding of the underpinnings of brain damage that occurs during the development of the addiction process—a process that explores the nature of neurotransmitter balance.

Journal Entry

1. What is the main point of Chapter 1?
2. What concepts did you learn about how the brain is damaged with addiction?
3. What did Jackie do to get his brain working properly?
4. How would your life change if you were to discover that you had become addicted to alcohol? And what would you do to recover?
5. What were the primary emotions that you felt as you read about the struggles that Jackie encountered and overcame with his brain activation methods?
6. Take the section that evoked the greatest emotional response and teach that to another person. In your teaching, were you able to evoke the same emotion in the listener?

References

Alcoholics Anonymous. (1996). Alcoholics Anonymous World Services, Inc.

Breedlove, S. M., & Watson, N. V. (2020). *Behavioral neuroscience*. Oxford University Press.

Burns, M. (2017). https://www.scilearn.com/the-reading-brain/ Retrieved 6/27/22.

Mayfield Clinic. SPECT (single photon emission computed tomography) scan. Retrieved June 24, 2022, from https://mayfieldclinic.com/pe-spect.htm

Mills, K. R. (1989). Readability of Alcoholics Anonymous: How Accessible is the "Big Book"? Perceptual and Motor Skills, 69, 258.

Sakurai, Y. (2017). Brodmann Areas 39 and 40: Human Parietal Association Area and Higher Cortical Function. *Brain Nerve*, April 69(4):461–469. Retrieved 6/28/2022. doi: 10.11477/mf.1416200765

Sandoz, C. J. (1997). Wounded Healer: A portrait of a physician with Alzheimer's disease. *Activities, Adaptation & Aging*, *21*(4), 21–26.

Sandoz, C. J. (2001). Alzheimer's Disease Learning Enhancement Resources. *Clinical Gerontologist*, *23*(1/2), 159–164.

Sandoz, C. J. (2005). Getting the Message of Recovery. *American Journal of Pastoral Counseling*, Vol. *8*(1), pp. 61–66. www.haworthpress.com/web/AJPC10.1300/J062v08n01_06References

Sandoz, C. J. (2012). "Photography changes how memory functions in everyday life." In *Photography changes everything*. M. Heiferman (Ed.). Aperture Foundation: Smithsonian Institution, 240–241.

Sandoz, J. (1996). Photographs as a Tool of Memory Preservation for Patients with Alzheimer's disease. *17*(2), 69–71.

Seghier, M. L. (2013). The angular gyrus: Multiple functions and multiple subdivisions. *Neuroscientist 19*, 43–61. doi: 10.1177/1073858412440596

Credits