

Intro to Mental Health Packet-Read first

You are receiving a packet focused on the brain and mental health. This is not a quick read and I advise you to read it slowly and perhaps read it a few times. Just reading alone without taking the time to comprehend what you are reading will not convey the depth of information shared here. I have read it through once and realize I must do it again to gather all the pieces of the puzzle shared by the authors of this packet. Mental health, moods, and feelings cannot be separated from the biology of the body. There are biological components to our mental health. Yet the article also makes clear external experience and the thoughts and feelings they create also shape our mental health.

Many of you may have signed up hoping you would get a set of tips on how to overcome the many experiences of poor mental health you witness and feel. This first packet does not provide those types of resources, but if you think about it like building a house, then explore the foundation that is being prepared for you by reading and understanding this packet. Sara and Jessica, who have been leading this project, have plans for a second, and maybe more packets.

At its heart, Prisoner Express is all about helping you sort out the traumas you have experienced in prison and out, and help you identify the part of you [we will call it your “awareness”] that is able to witness your experience as something provided to you to learn more about yourself. My experiences have shown me that most of my teaching moments have been born from surviving trauma and adversity. I wish trauma and adversity on no one, and yet everyone deals with it. Some seem to have way more sent their way than others. Why that is remain a mystery. I know aging has allowed me to be more comfortable in my own skin. I do not know if it is actually aging or rather me becoming aware of my own ability to witness my thoughts and feelings [awareness] without always being completely attached to them. After 20 years of doing that my life’s path seems clearer. My existence as Gary is a temporary condition. I am trying to enjoy the richness of this experience and trying to help others enjoy the experience as well. It does feel good to have a purpose.

After you have read the packet, I have a few requests of you, the 600 participants in this Mental Health project. We hope to continue to address mental health issue directly through other packets focused on the issue. **Let me know if this packet is useful, and what subjects regarding mental health you would like to see us explore in future packets.**

We live in trying stressful times. So much of today’s rush, rush world is predicated on having money. Without it, it is hard to navigate, and the combined stress of all the have nots, plus human’s relentless assault on nature leading to mass extinction and global climate change,

ocean acidification, collapsing eco-systems and more has certainly put a pall on life. Good mental health is not just about my success, but rather the success of my community and the web of life I live within. Yet I can still find ways to having meaning and joy in my life. How we walk that path of stress and calamity all around us and still enjoy the moment is still another mystery I cannot understand. We can compartmentalize our minds only so far before the reality of our environment has to be acknowledged. I try to drop all my grudges against those that did me wrong. It is not always easy, but it seems like the best way forward. I may not completely forgive, but I wish them no harm.

I want to know: **What strategies have you developed to help you thrive under difficult circumstances? I will collect your answers and share them with the group.** Who better than you to share the wisdom you have gleaned for what can work for you when you are feeling out of balance? What techniques can you use to change a bad mood? I know my one tested tool for when I start getting overrun by my thoughts is to square breathe. Breathe in to a count of 4. Hold to a count of 4. Exhale to a count of 4. Hold to a count of 4. Breathe in to 4 and continue like this for 5 minutes. You will be amazed at what a powerful tool your breath can be in controlling your emotional body. I know there are realms of yoga focused on enlightenment through breathing techniques.

We at PE want to help prepare you to be the best person you can, so when the time comes, and opportunity presents itself you will step forward with confidence and awareness knowing you can give it your best effort. As much as trauma from the past has affected us, it does not control us, and with awareness you too can step forward without the burden of past hardships. **I want to hear from you. Put MH on the envelope when writing back about this packet. Shine on now and forever -Gary**

Quotes below from Carl Jung- Swiss psychiatrist and psychoanalyst who founded analytical psychology. Jung's work has been influential in the fields of psychiatry, anthropology, archaeology, literature, philosophy, and religious studies

"I am not what happened to me, I am what I choose to become."

"Loneliness does not come from having no people about one, but from being unable to communicate the things that seem important to oneself, or from holding certain views which others find inadmissible."

"The shoe that fits one person pinches another; there is no recipe for living that suits all cases."

"Who looks outside, dreams; who looks inside, awakes."

"Even a happy life cannot be without a measure of darkness, and the word happy would lose its meaning if it were not balanced by sadness. It is far better take things as they come along with patience and equanimity."

Exploring the intersection of the brain and the mind through mental health

The brain is evidently incredibly complex, to say the very least. I find it amazing that evolution gave rise to something as complex as the human brain—an organ capable of regulating basic drives like hunger but also convoluted processes such as decision-making and reasoning that researchers are still trying to decipher. And unlike something rooted in purely biological mechanisms, such as cancer, many disorders of the mind are considered using the biopsychosocial approach, which accounts for the role of biological, psychological, and social factors.^{1(p266)}

As a college student, mental health is frequently a topic of discussion. The constant barrage of homework assignments and exams really take a toll on college students. There's no doubt that it's truly an art to balance academics and everything else without ever feeling stressed (I don't know if that's even possible). Here at Cornell, though, we have lots of resources we can turn to, but that's not the case in prison. That's why I wanted to start a series combining teaching and mental health to give you all a space where you feel comfortable sharing what you're going through. A lot of the time, there's not a solution, but having an environment where you feel like your feelings and experiences are valid and where you're supported can be incredibly helpful.

In reading a lot of the journal entries sent to PE, I've gotten a chance to learn about just how suffocating the prison environment can be for the mind, and of the importance of mental strength in surviving in such a place. I first mentioned the idea in the general letter sent out to everyone signed up for PE mailings and received a positive response, so I hope that this series will be helpful in learning more about mental health in relation with various body systems. Outside of exposure to biology, I hope that this newsletter can help create a dialogue and raise awareness around mental health in the prison system.

ANATOMY OF THE BRAIN

There's an overwhelming amount of information on the brain that is worth sharing, but of course space is of essence, so I'll just touch on a few important/relevant points here. I thought a good place to start would be the anatomy of the brain. Broadly, the brain can be divided into three regions: the cerebrum, the brainstem and the cerebellum.²

The cerebrum encompasses a lot of what we consider to be uniquely human abilities in areas like reasoning and learning.² It is divided into two different hemispheres (the left and the right) that are connected by a nerve bundle

called the corpus callosum.^{2,3} Interestingly, the corpus callosum can facilitate the transmission of seizures from one hemisphere to the other, so severing this nerve bundle can help mitigate spreading.³

Outside of the cerebrum, we have the brainstem, which consists of the midbrain (containing areas involved in responding to visual/auditory cues),^{1(p14)} the medulla oblongata, and the pons.⁴ This area is involved in regulating processes including respiration (this is specifically under the control of the medulla oblongata) and in transmitting sensory information regarding different modalities such as temperature and pain.⁴

The third and last section is the cerebellum, which functions in posture/balance and assists with voluntary muscle movements.⁴ Alcohol exposure can affect the cerebellum, which manifests as impaired balance and speech.^{1(p14)}

The brainstem notably serves as an intermediary between the cerebrum/cerebellum and the spinal cord, which is the second part of the central nervous system (CNS).² The part of the brain that is of most interest to us here in this newsletter is the cerebrum, which consists of several different lobes in each hemisphere: the frontal lobe, the parietal lobe, the occipital lobe, and the temporal lobe.²

The frontal lobe acts in a number of processes including problem solving, decision making, is implicated in concentration and our sense of awareness, and also encompasses Broca's area (involved in language production).² There is also evidence that the frontal lobe is involved in personality, as illustrated by Phineas Gage. A railroad worker in the mid-19th century in Cavendish, Vermont, Gage was working one September day when a tamping iron (an iron rod basically) went through his cheek, into his brain, and out through his skull.⁵ In what is really nothing short of a miracle, Gage somehow survived, but his personality was significantly altered.⁵ His skull is actually on display at the Warren Anatomical Museum (Harvard Medical School campus) along with the infamous iron rod.⁵

The parietal lobe contains the somatosensory cortex, which enables us to internalize and make sense of sensory information regarding different modalities like pressure and pain from around the body.^{1(p25)} Another key function of the parietal lobe is spatial discrimination.²

The third lobe is the occipital lobe, which is where visual processing largely takes place and the fourth is the temporal lobe, which contains Wernicke's area (how we comprehend language) and is involved in memory and hearing.² It can be difficult to keep track of all the moving parts in such a complex organ, so I've included a diagram

here that may be helpful:

THE NERVOUS SYSTEM

In order to understand how the brain is able to receive and respond to information, it's important to understand the nervous system in brief. This will also be important in the discussion of important disorders like depression and schizophrenia later on, as they are thought to be caused (in part at least) by neurotransmitter imbalances. In my own experience, I'm used to seeing things through a biological lens, meaning that any condition can be traced back to some sort of physiological imbalance, but what's interesting about psychiatric conditions and mental health is that this isn't necessarily

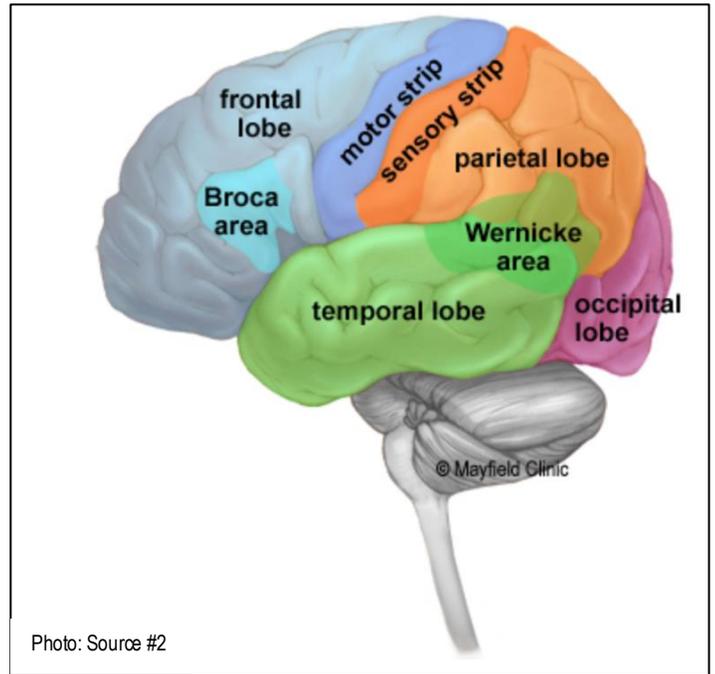
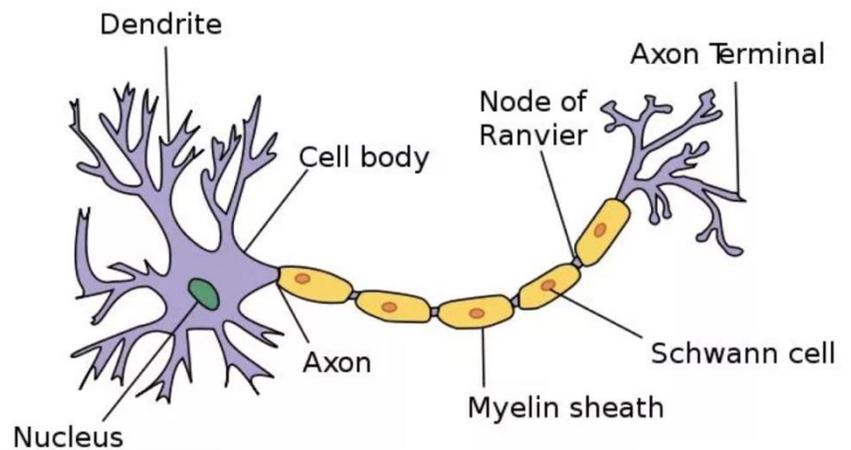


Photo: Source #2

the case. And that's something that's addressed by the biopsychosocial model, which posits that conditions aren't strictly the product of biological imbalances but are also the result of sociological and psychological factors. In that regard, the "psycho" component could include thoughts, emotions, etc. and the "social" component includes things like family situations or even culture.⁶

This here is what I would consider the fundamental component of the nervous system—the neuron. Neurons are cells, and we can see that the nucleus is located in the center of the cell body. The cell body, unlike other cell types, is surrounded by lots of branches called dendrites, which are involved in receiving

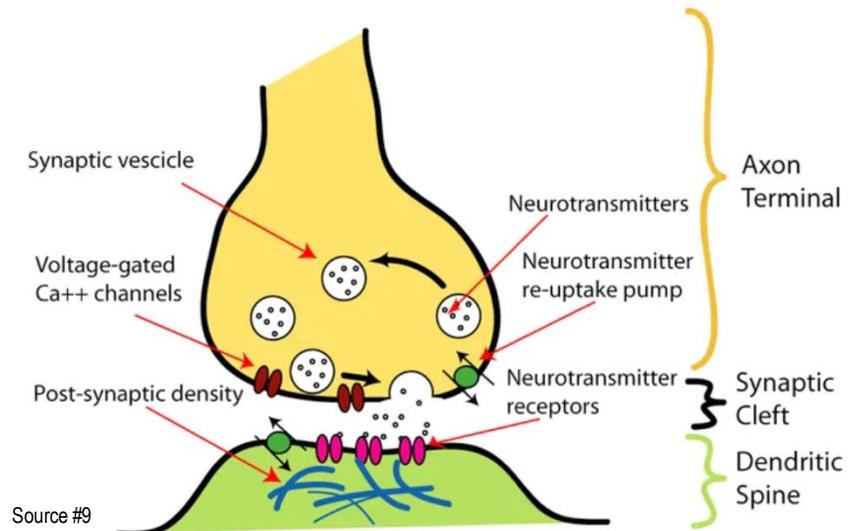


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signals.^{8(p136)} After integration, the neuron can transmit its own electric signal using its axon, which we can see is

surrounded by a lipid-based myelin sheath that insulates the axon and allows for faster transmission.⁷ The other end of the neuron is depicted as the axon (aka nerve) terminal and is where neurotransmitters can be released into an area called the synaptic cleft.^{8(p137)} These neurotransmitters, which include dopamine, epinephrine, and acetylcholine, can then bind to receptors on the postsynaptic cell (basically the other neuron that this neuron is communicating with) and trigger a response.^{1(pp28-29),8(p137)}

On the right we have a visual depiction of the synaptic cleft, and there are a lot of details here, but the main point is that nerve impulses (transmitted as action potentials) stimulate the release of neurotransmitters otherwise contained in vesicles that basically serve as a chemical messenger system between pre- and post-synaptic neurons.⁹



And while we are going to discuss neuronal function in the context of mental disorders and mental health here in this newsletter, neurons are responsible for practically every response, so I want to briefly discuss the nervous system and how it's organized.

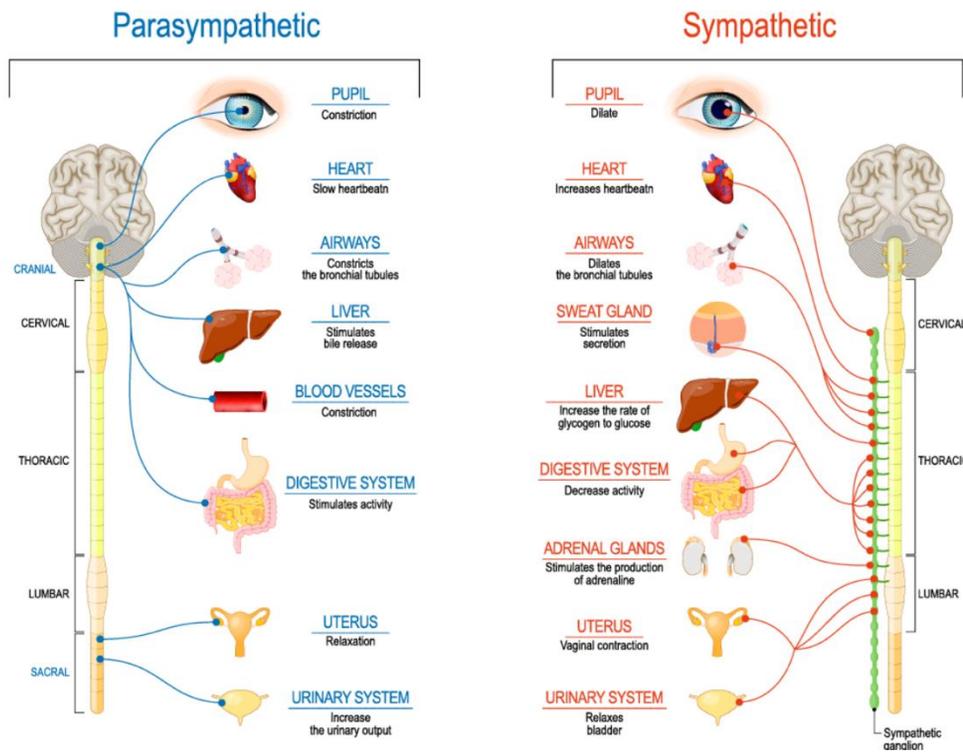
DIVISIONS OF THE NERVOUS SYSTEM

When we touch something that is hot (like a hot pan on the stove, for example), we immediately pull our hands away. This is actually an incredibly simple neural circuit and involves sensing and responding to a stimulus, which describes the basic function of the nervous system.¹⁰

The nervous system can be divided into two main branches: the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS consists of the brain and the spinal cord, and the PNS is everything else that works to transmit information from other parts of the body to the CNS where it can be processed and responded to efficiently.¹¹ The PNS can be partitioned into two sub-systems—we have the somatic system, which is under voluntary control (so think skeletal muscle movements...something like moving your leg to walk, for example), and

the autonomic system, which is under involuntary control (cardiac muscle function to move blood throughout the body, for example).¹¹

The autonomic nervous system can be subdivided further into the sympathetic and parasympathetic nervous systems. The sympathetic nervous system controls what we refer to as the “fight or flight response,” readying the body to respond to a threat by increasing heart rate, or dilating the pupils, just as a few examples.^{11,12} The parasympathetic nervous system controls the opposite response, which is termed “rest and digest.” This includes encouraging digestion and slowing down the heart rate.^{11,12}



Source #12

PATHOPHYSIOLOGY OF DISEASE

While the sections above focus on what occurs when the nervous system functions as intended, there are unfortunately numerous ways in which the precarious balance in the body (commonly referred to as homeostasis) becomes disrupted, leading to complications. The interesting thing about mental health is that, while other conditions may have a purely physiological cause, the brain is incredibly complex, which brings me back to the biopsychosocial model. So, while I will briefly discuss the biological basis of a few key conditions, it is super important to note that conditions like depression are further shaped by sociological and psychological factors that may not have a biological explanation.

The first set of conditions I want to talk about are depression and mania, because we'll see that they are closely related in terms of their physiological underpinnings. Depression (clinically termed major depressive disorder) is often characterized by a loss of interest in activities that were once stimulating, sadness, guilt, and suicidal thinking, among other symptoms.^{1(p271)} Mania is essentially the opposite of depression (though they can present together as bipolar disorder), and manifests as a prolonged good mood, so to speak, leading some to risky behaviors.^{1(p272)} Interestingly, reduced levels of serotonin and norepinephrine (neurotransmitters) can contribute to depression and elevated amounts may lead to mania—this is the premise of the monoamine theory of depression.^{1(p273)}

Schizophrenia and Parkinson's are linked in a similar fashion as evidenced by the dopamine hypothesis of schizophrenia.^{1(p29)} For starters, schizophrenia is classified as a psychotic disorder and describes a break from reality (in contrast with other conditions like depersonalization disorder for example, which is sort of like a break/splitting from yourself).^{1(p269,276)} Schizophrenia is often associated with hallucinations (typically auditory) or a lack of organization in thought and behavior (rigidity or mixing random words together in what's called a word salad), or even blunting, where emotional expressivity is considerably reduced.^{15(pp269-271)} Parkinson's disease, prevalent among older individuals, occurs with reduced dopamine production in the basal ganglia. Because the basal ganglia are notably involved in making our movements smooth, a loss of dopaminergic neurons in those with Parkinson's means that they often present with symptoms like rigidity.^{15(pp285-286)} The dopamine hypothesis, on the other hand, suggests that schizophrenia may originate from increased sensitivity to/elevated amounts of dopamine, which parallels the relationship observed with depression and mania in the previous paragraph.^{1(p29)}

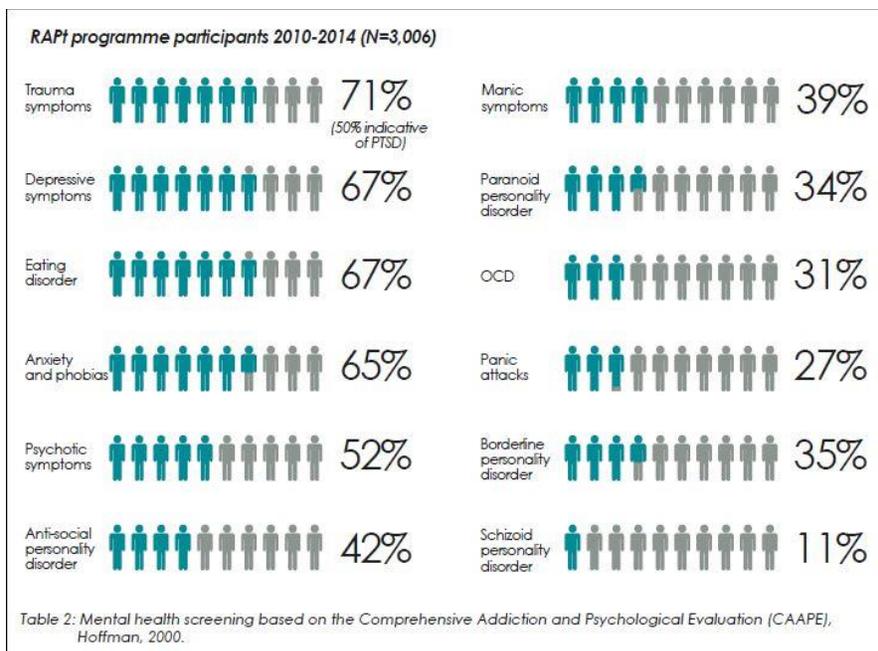
Conditions like schizophrenia and depression are actually quite common among incarcerated individuals. In fact, 1/7 of all prisoners have major depression or psychosis. Additionally, more than 1/10 of inmates suffer from schizophrenia, manic depression, or major depression, the three most severe illnesses.¹³ The majority of mentally ill inmates are diagnosed with ADHD and personality disorders,¹³ which brings me to our next topic: personality disorders.

PERSONALITY DISORDERS

Personality disorders are generally grouped into three clusters based on characteristic behaviors as follows: Cluster A, which includes behaviors perceived to be unusual, Cluster B, characterized by extreme behaviors, and Cluster C, which encompasses behaviors suggestive of stress.^{1(pp277-78)}

One personality disorder you may be familiar with is borderline personality disorder, which, as the name suggests, is marked by instability in various aspects of one's identity.^{1(p278)} In order to cope with these conflicting feelings, those who suffer from the disorder sometimes use splitting (which is where people are perceived as being completely good or bad).^{1(pp278)} Another one that may be somewhat familiar is OCPD (obsessive-compulsive personality disorder), which is actually distinct from OCD (obsessive-compulsive disorder).^{1(p279)} As the name suggests, OCD (NOT a personality disorder) begins with obsessive thoughts that the individual copes with using compulsions (basically anything that provides some measure of relief).^{1(p274)} OCPD has to do with a preference for order and regularity, and a key difference between OCPD and OCD is that OCPD doesn't originate with some specific thought/event while OCD does.^{1(p279)}

In the clinical setting, the DSM (Diagnostic and Statistical Manual of Mental Disorders) is used to match symptoms a patient exhibits with a possible condition and therefore plays an important role in diagnosis.^{1(p267)} Below is a graphic depicting just how commonplace mental illness is in prison—and why we need to address it. I think that American society is “ahead” in the sense that we are now getting to the place where mental health is something that is talked about and really emphasized, but I am not sure that this is the case in the prison system. Do you suffer from any of the disorders touched upon above? Or perhaps others that weren't mentioned? What has your mental health journey looked like and do you feel like your time in prison has shaped this in any way? These are some questions to think/write about as you move through this newsletter.



Graphic via <https://citizenjusticenetwork.org/2017/10/16/mentalhealthmoth-mental-health-in-prison/>

ORIGIN OF ISSUES CONCERNING MENTAL HEALTH

Consider this:

You are a college graduate married with kids. You have a stable job and life. A schizophrenia diagnosis changes all of this, causing you to lose your job and your insurance. Without insurance you can no longer afford the drugs you need to control your illness. You resort to theft to make money and become charged with illegal entry and burglary.¹³ Does this story sound familiar? Might it have happened to you, a family member, fellow inmate, or close friend?

Unfortunately, this story is not unique to Michael H. Many people become incarcerated due to problems out of their control. Michael could not control his diagnosis, let alone the events that resulted. In 1998, Los Angeles County Jail held between 1500 and 1700 inmates with severe mental illness, most of which were detained on minor charges.¹³

Mental health remains a serious issue within the prison community. Roughly 12-24% of inmates have a severe mental illness, and 50% have at least one mental condition.¹⁴ Many have referred to prison as our nation's largest mental institution.¹³

These statistics are in part due to the mass closing of mental health hospitals in the 1960s. The growing availability of antipsychotic medication was believed to be a great alternative to hospitalization for the mentally ill, and thus many of these institutions shut down. Problems began to arise as not enough clinics and halfway houses were built within communities to accommodate for the closed hospitals.¹⁴

Moreover, the War on Drugs further contributed to increased numbers of prisoners with psychiatric disorders and substance abuse problems. This government-led initiative resulted in higher rates of drug related arrests along with an emphasis on fixed sentencing as a means to stop illegal drug use, distribution, and trade. Those unable to acquire their necessary medication by legal means risked arrest to remain healthy.¹⁴ In addition, unless you are wealthy and can afford a private doctor, arrest may be the only avenue for mentally ill persons who require care.¹³

According to the World Health Organization and International Committee of the Red Cross, poor mental health within prisons is largely caused by these environmental factors:¹⁵

- Overcrowding
- Various forms of violence
- Enforced solitude: many jails and prisons are unprepared, with guards lacking the proper training to manage the mentally ill. Placing these individuals in solitary confinement is their resolution, which tends to worsen the effects of their illness.¹³
- Lack of privacy
- Lack of meaningful activity: long periods of being locked up with little activity / mental stimulation negatively impacts inmates' mental health, regardless of whether they had a prior illness.¹⁶
- Isolation from social networks
- Insecurity about the future
- Inadequate health services (especially mental health services)

OUTCOMES OF MENTAL ILLNESS

Mentally ill incarcerated individuals are at increased risk of all-cause mortality, suicide, self-harm, and victimization. They are more likely to be charged with violating rules and to be involved in violent incidents. They are

also twice as likely to be injured in a fight.¹⁷ Persons with serious mental illness have lifetime arrest rates from 42-50%.¹⁸

There are high rates of substance abuse and drug dependence, mostly for alcoholism and opiate use. Compared to the general population, the relative risk of suicide falls between 3-6 for males and typically more than 6 for females.¹⁷ 95% of those who commit suicide in jail/prison have a diagnosed mental disorder, and approximately 80% have more than one mental health problem.¹⁵

TREATMENT (OR LACK THEREOF...)

The U.S. corrections system is not designed nor equipped to provide mental health services.¹⁹ Correctional budgets have seen a consistent decline over the past 10+ years. For this reason, diagnoses may be kept low to avoid costs associated with healthcare and pharmacotherapy.²⁰ Many jails and prisons are unprepared, with easily angered guards that are unsure of how to handle mentally ill patients. While the most obviously mentally ill are often diverted to more adequate specialist facilities, inmates that are quietly depressed and/or suffer from personality/anxiety disorders are often untreated due to undetection.¹³

Compared to the general community, there is an apparent lack of mental health research in prisons. This is due to difficulty in obtaining permissions, lack of funding, perceived division of prisoner health and public health, etc. Very few medication trials have taken place, which can also be said of trials involving psychological therapies. Common therapies include cognitive behavioral therapy (CBT), group therapy, meditation therapy, etc. Research has shown these techniques to improve psychological well-being, though it is unknown if such improvements are sustained.¹⁷

Roughly 34% of U.S. jails offer substance detoxification treatment. Annually, this percentage leaves around 1 million arrestees at risk of untreated alcohol withdrawal. Psychological treatments for substance abuse include therapeutic communities (TC), CBT, and motivational interviewing. Participation in TC often increases treatment success, and if followed by community-based aftercare reduces relapse and re-incarceration. Medication assisted therapy combines pharmacological treatment and psychological treatment. Oftentimes it produces positive outcomes, preventing both relapse and reoffending.¹⁷

The issue of mental health is further complicated by the COVID19 pandemic. Specifically, the current COVID-19 pandemic has caused people around the world to experience worsened states of mental health. For myself, “Zoom University” has made learning much more difficult, and I find it hard to be away from close friends and external family members. Still, little attention is paid to the effects of the pandemic on the mental health of prisoners.

COVID-19 has given rise to an increased time spent on remand, a period in which offenders are anxious and uncertain about their future. A longer time period results in the intensification of negative emotions, amplifying the already high suicide and self-harm rates for prisoners on remand.

In addition, suspension of visitation has contributed to higher rates of poor mental health for inmates. Visitation allows offenders to maintain contact with the outside world and promotes integration back into society. Loss of these important visits lessens the use of social support necessary for coping with mental illness. On that note, what significance does visitation hold for you? Who do you enjoy visits from the most and why?

To promote social distancing, prisoners spend more time in cells/isolation, states that mimic solitary confinement. This has detrimental effects on their mental health, given solitary is associated with the following: anger, depression, paranoia, psychosis, exacerbation of underlying mental illness, and increased mortality following release.

Higher numbers of prison staff are absent from work, reducing human contact and limiting availability of support for inmates. Even worse, supervision of prisoners at high risk of suicide / self-harm has decreased. “Low-risk” offenders continue to be released to create space, which is problematic due to the substantial changes in society brought on by the pandemic. It has become harder for those released to receive physical / mental health.²¹

RESOLUTION AND REFLECTION

From Jessica:

There’s no doubt that we must acknowledge the importance of mental health in the prison community.

“Mental health in prison is a whole-prison concern. In many respects, it is not a matter of mental health - rather, ‘a humane and decent regime that is properly resourced and whose ethos is couched within a society that understands the role of prisons and its potential for benefit to communities.’”

To me, the quote here signifies the necessity of improving mental health treatment for inmates. The common view of prisoners as outcasts has created a division between public and prisoner health, which the latter being held at a lower standard.

We must appreciate that mental health does not exist in a void; rather, many problems are multi-layered. These problems must be understood in the context of society, wherein social issues responsible for prisoners' incarceration are identified.

Prisons should not be used as a place for the mentally ill that cannot be helped by society, and we should achieve to better prepare prisoners to re-enter society upon release. Given prison is a public service, inmates should have access to services available to the general public.¹⁵

My own interest in mental health within the prison community results from stigmas against prisoners in our society. Many are quick to assume the worst of all convicts, despite a large fraction being incarcerated for petty / minor crimes. Moreover, certain inequities within society serve as the basis for a significant number of convictions, such as with the case of Michael H. I have hope for the current generation in beginning to change these beliefs and improve the wellbeing of prisoners; the revolving door between homelessness and the criminal justice system shall soon close.

from Sara:

One of the things that has stood out to me is that we're really making an effort to talk about mental health. This is something I'm particularly cognizant of as a college student—On campus, we have several resources, ranging from peer-to-peer counseling to qualified professionals who are willing to listen and help. Historically, and even now in other parts of the world, mental health was/is not a topic of discussion. I think that this extends to the prison system, which is why I hope that this newsletter comes as a breath of fresh air. The goal of this newsletter is not to provide a solution—every person's situation is different, compounded by a number of factors, and there's often no easy fix. Rather, I want to let you know that it's okay to feel the way you do. It's okay to not be okay and it's okay to express those feelings. In fact, I hope that you will share what you're going through with us or with someone you trust. Maybe you don't want to share what you're going through because you feel like you're burdening the listener

with how you're feeling. I promise you that this is not the case. The people closest to you truly care about you and are there to listen and help in any way that they can—if you give them a chance.

At times, it may feel like things are never going to get better; that there's no light at the end of the darkness. I want you to take a second and remember what matters most to you. It could be a favorite spot to relax, a song, or someone you care about. THAT is reason enough to keep going. And when you feel like there isn't anything left to care about, realize that you matter to someone. Your presence is valued and with time, you will be able to move past the darkness. I'm not saying it's easy or that it'll come soon, because this is often not the case. But nothing is permanent and with time you will find strength in yourself.

At all times (and especially now), it's so incredibly important that you take care of yourself. In a group that I'm involved in, we actually had a stimulating discussion about self-care, how this compared to healing, and this idea that self-care is not always an individual process. The author of this article (linked below) introduces the idea that self-care can come from being with other people, as echoed in the following statement: "For my own well-being, I must remember my sense of self has always been, and needs to remain, plural."²² I thought this was interesting, since I had always viewed self-care as a very individualistic process that revolved more around grounding yourself—but not necessarily by connecting to other individuals. I completely get where the author is coming from though, especially since she is part of a community consisting of "people who see their own health as inextricable from that of a community."²² For some, self-care and rejuvenation come from reflecting alone, or perhaps reading a book, while for others this depends on being with others. In our discussion, we took some time to reflect on the distinction between healing and self-care and settled on the idea that self-care is a shorter but continuous cycle, while healing is more long-term. In sharing this with you all, I'm asking you to discover and perhaps even share what self-care looks like for you. It's easy to get caught up in our thoughts, feelings, and in the tense atmosphere around us, but even the seemingly unfazed need time to recuperate and that looks different for everyone. Though I enjoy being around others (the vast majority of the time), I too need some time to relax and often turn to art, music, or writing.

This is one of a series of newsletters focusing on different body systems as they relate to mental health. This specific one provides a brief introduction to the brain/nervous system and probably delves more into disorders than the other ones will, but each of the three to four newsletters will include a combination of teaching and reflection

(with some responses from the prior newsletter). The next one will be about immunology and I was thinking of focusing on hormones and the endocrine system or the microbiome for the following one, but any suggestions are of course welcome.

For the last bit of the newsletter, I want to bring us back to neuroscience and walk through a current paper in the field. In the natural sciences, being able to read and interpret published works (including primary research findings and literature reviews) is necessary to understand what work has already been done and what still needs to be done. It would be pretty inefficient if researchers repeated work that had already been done, and so publications serve as a way to communicate what you have found in your own research or to synthesize what other people have done (so if someone is interested in working on something in the field, they can read through your paper to get a sense of what progress has been made). Of course, this is easier said than done, because (and I can definitely attest to this!) there's usually a lot of highly technical jargon in these papers, especially if you're not super well versed in the topic.

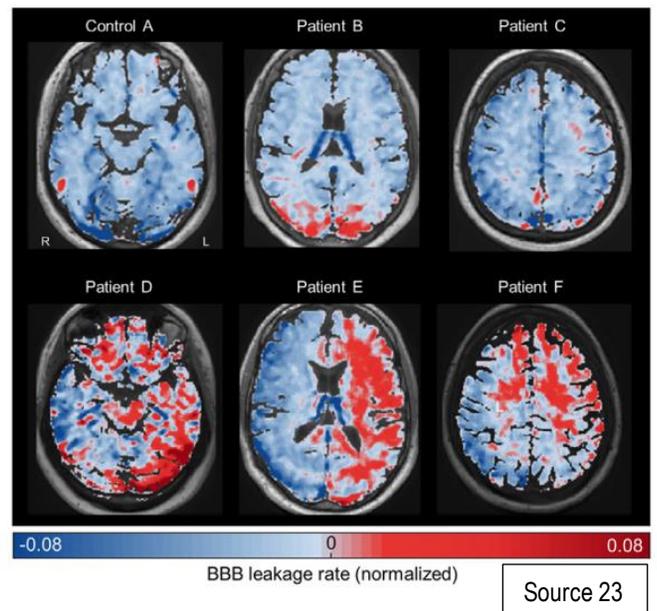
The article we'll talk about briefly is titled "Blood-brain barrier imaging as a potential biomarker for bipolar disorder progression."²³ The very first part of the paper is the abstract, a sort of "snapshot" that briefly summarizes the main findings. Looking at the abstract for this paper, we can see that, in this study, the authors examined BBB leakage using MRI in 36 bipolar patients and 14 control patients.²³ Bipolar disorder consists of both manic and depressive symptoms.^{1(p272)} The blood-brain barrier is not something I mentioned before, but it's made mostly of endothelial cells packed together tightly and protects the brain by carefully regulating what exactly can make its way from the bloodstream to the brain (and this includes blocking the transport from harmful pathogens or even neurotransmitters at times).²⁴ In doing so, the researchers found that a certain subset of the patients with bipolar disorder exhibited excessive BBB leakage, and that these same patients suffered from other mental illnesses.²³ The overall conclusion was that BBB leakage can be used to assess bipolar disorder severity.²³ A biomarker is defined as something that can be used to identify some biological state.²⁵ In this case, the authors are trying to assess severity of bipolar disorder, so the biomarker, or the "sign" is BBB leakage, and the outcome/biological state is severe bipolar disorder.²³

The next section of the paper is the introduction, which provides a pretty good introduction to the topic, describes research that has already been done in the field, and details how the research presented in the paper builds upon what is not well understood. In this case, the authors describe the prevalence of bipolar disorder, what severe forms of the disorder may include, along with dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI), a technology fundamental to this study.²³ According to the passage, DCE-MRI involves using a contrast agent and then scanning the brain to visualize changes in this agent because of BBB leakage.²³ Apparently, DCE-MRI has not yet been used to study psychiatric disorders, and so the goals of the study were twofold: 1) visualize BBB leakage in those with bipolar disorder and 2) see if there's a link between BBB leakage and bipolar disease progression.²³

The next section is the results section, and this is where the raw data are presented (which means LOTS of figures!!) Let's take a look at the one on the right, for

example. According to the figure description, the blue is brain tissue without BBB leakage, while the red occurs because of contrast agent extravasation (and therefore indicates BBB leakage).²³ I'm not sure that this will be visible in grayscale, so the three images in the bottom row have significant leakage (and red) predominantly in the right hemisphere. All of these maps are drawn from bipolar patients, which speaks to the idea that only a certain subset of patients with bipolar disorder have significant BBB leakage.²³

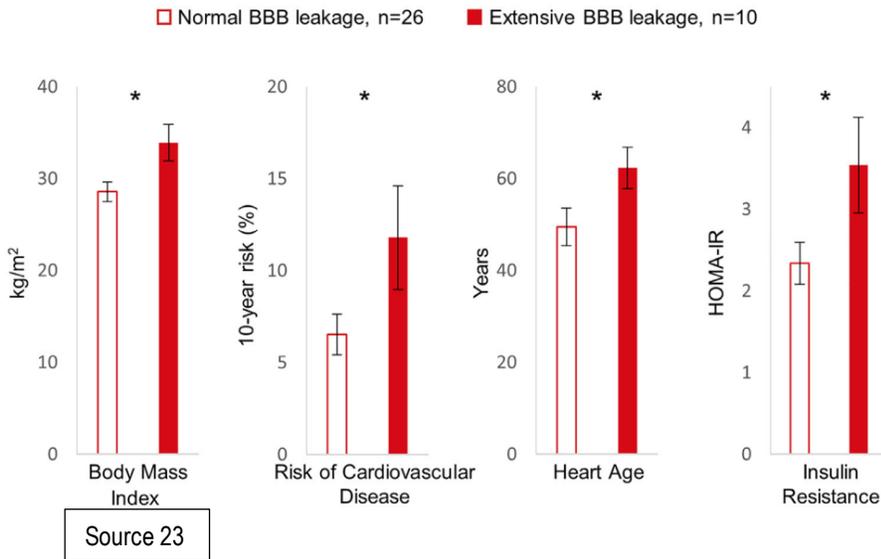
A. Representative maps of BBB leakage



The two main conclusions that the researchers reached were that BBB leakage in bipolar patients is associated with higher disease severity along with metabolic disruption.²³ Higher disease severity was assessed by examining chronicity of disease (so how frequently patients suffer from manic or depressive episodes), and if this was accompanied by anxiety, depression, or impairments in functioning.²³ Interestingly, they found that those in the bipolar cohort who suffered from extensive BBB leakage had a higher likelihood of experiencing other psychiatric

disorders, disruption in functioning, and exhibited more chronic disease.²³ In addition, these same patients showed evidence of insulin resistance and elevated BMI, among other indicators of metabolic stress.²³ The figure on the left here is a visual representation of this last conclusion and serves as compelling evidence of the association between

Metabolic and vascular correlates of extensive BBB leakage



bipolar patients with severe BBB leakage and metabolic disruption.²³ The little asterisks above the bars indicate that the p value is less than or equal to 0.05, which basically means that the results are statistically significant (so it's not likely that we would have seen these same results by chance).²³

I won't really go into the conclusion section here, but the paper essentially reinforces the findings and includes details regarding the methodology (so how exactly the visualization and analysis were done). I hope that walking through this paper was helpful and gives you a taste for what scientific literature is like, even if I wasn't able to include the full paper here. The world of scientific publishing is remarkably thorough—once submitted, papers are reviewed by experts in the field and go through revisions before being published (unless they're outright rejected). Each scientific journal is accompanied by an "impact factor," which is sort of a measure of how impactful (for lack of a better word) the journal is. At the top, we have journals like Nature and Science...these often publish groundbreaking discoveries from top-notch scientists and papers submitted go through extensive review. Then there are a number of smaller journals that have a much shorter review period and lower threshold.

Anyhow, I hope that this newsletter provides an informative introduction to the brain (and, by extension, the nervous system), mental health, and current scientific literature in the field. As you spend some time reading this newsletter, try to reflect on your own experiences and get them down on paper. Journaling is often a great technique for coping with difficult experiences, especially when it's hard to express how you're feeling verbally. Hopefully some

of you will feel comfortable sharing your experiences or even just how you're feeling with us at Prisoner Express, and I can incorporate some of these reflections (and art too!) into the following newsletter. It's incredibly powerful for those who are going through difficult times to know that they're not alone and I hope to highlight that by sharing some of these experiences.

That brings me to the end of this newsletter, which is part of a collaboration between Biology Service Leaders at Cornell and Prisoner Express. The pandemic has made us feel more isolated than ever, but hopefully this newsletter is a little bit of a respite and you'll see in upcoming newsletters that you're not alone in what you're going through. When you feel overwhelmed, take some deep breaths and remind yourself of what matters. Take a break and draw, write, read, or do whatever it is that helps you feel calm and collected. We look forward to hearing what you think and about your experiences 😊

~ Sara and Jessica

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More quotes from Carl Jung-

“A group experience takes place on a lower level of consciousness than the experience of an individual. This is due to the fact that, when many people gather together to share one common emotion, the total psyche emerging from the group is below the level of the individual psyche. If it is a very large group, the collective psyche will be more like the psyche of an animal, which is the reason why the ethical attitude of large organizations is always doubtful. The psychology of a large crowd inevitably sinks to the level of mob psychology. If, therefore, I have a so-called collective experience as a member of a group, it takes place on a lower level of consciousness than if I had the experience by myself alone.”

– **C.G. Jung, The Archetypes and the Collective Unconscious**

“It is often tragic to see how blatantly a man bungles his own life and the lives of others yet remains totally incapable of seeing how much the whole tragedy originates in himself, and how he continually feeds it and keeps it going. Not consciously, of course—for consciously he is engaged in bewailing and cursing a faithless world that recedes further and further into the distance. Rather, it is an unconscious factor which spins the illusions that veil his world. And what is being spun is a cocoon, which in the end will completely envelop him.”

– **C.G. Jung, Aion**

“People will do anything, no matter how absurd, in order to avoid facing their own souls. One does not become enlightened by imagining figures of light, but by making the darkness conscious.”

– **Carl Jung, Psychology and Alchemy**

“No tree, it is said, can grow to heaven unless its roots reach down to hell.”

– **Carl Jung**