2022-12

EXPLORING THE POTENTIAL OF PSYCHEDELIC-ASSISTED THERAPIES FOR SUICIDE PREVENTION IN SOCOM

Albert, Patrick; Trivellin, Coty R.; Stanley, Thomas M.

Monterey, CA; Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

EXPLORING THE POTENTIAL OF PSYCHEDELIC-ASSISTED THERAPIES FOR SUICIDE PREVENTION IN SOCOM

by

Patrick Albert, Coty R. Trivellin, and Thomas M. Stanley

December 2022

Thesis Advisor:	Siamak T. Naficy
Co-Advisor:	Matthew R. Zefferman
Second Readers:	Shannon C. Houck
	Thomas Jamison

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE	*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** December 2022	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE EXPLORING THE POTENTIAL OF PSYCHEDELIC-ASSISTED THERAPIES FOR SUICIDE PREVENTION IN SOCOM	**5. FUNDING NUMBERS**
6. AUTHOR(S) Patrick Albert, Coty R. Trivellin, and Thomas M. Stanley	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

A U.S. Special Operations Command (SOCOM) funded study completed in 2017 found that U.S. special operations forces (SOF) have a 30% higher suicide rate than the U.S. military average. Nearly half of the twenty-nine suicide cases explored in the psychological autopsy study had a diagnosed mental health disorder. These findings underscore how suicide, and its contributing factors, are a growing threat to the health of the force and combat readiness across SOCOM. This thesis examined psychedelic-assisted therapy as a component of an overall holistic approach to addressing mental health conditions and combatting suicide across SOCOM. We reviewed two emerging psychedelic treatments for ameliorating mood and trauma-based mental health disorders, comparing them to two in-use novel therapies. Notwithstanding limits to existing data, our review found that psychedelic-assisted therapies show potential in three critical ways. There is a rapid and sustained decrease in disorder-related symptoms, exhibited efficacy in treatment-resistant cases, and minimal adverse events when administered in a controlled environment. Alone, no single weapon or piece of technology has ever won a war, and in a similar fashion, successful mental health treatment models for suicide prevention strategies require a multi-faceted approach. While psychedelic therapies are not a panacea for the mental health crisis within the military, they carry emended potential to be another tool for treatment and recovery.

14. SUBJECT TERMS psychedelics, therapy, psilocybin, MDMA, suicide, PTSD, anxiety, depression, SOCOM, Special Operations Command, SOF, special operations forces	**15. NUMBER OF PAGES** 115
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release. Distribution is unlimited.

EXPLORING THE POTENTIAL OF PSYCHEDELIC-ASSISTED THERAPIES FOR SUICIDE PREVENTION IN SOCOM

Patrick Albert
Major, United States Army
BBA, Loyola University, Chicago, 2011

Coty R. Trivellin
Major, United States Army
BS, Citadel, Military College of South Carolina, 2011

Thomas M. Stanley
Major, United States Army
BS, Michigan State University, 2011

Submitted in partial fulfillment of the
requirements for the degrees of

MASTER OF SCIENCE IN INFORMATION STRATEGY AND POLITICAL WARFARE

MASTER OF SCIENCE IN DEFENSE ANALYSIS (IRREGULAR WARFARE)

MASTER OF SCIENCE IN APPLIED DESIGN FOR INNOVATION

from the

NAVAL POSTGRADUATE SCHOOL
December 2022

Approved by:

Siamak T. Naficy
Advisor

Matthew R. Zefferman
Co-Advisor

Shannon C. Houck
Second Reader

Thomas Jamison
Second Reader

Carter Malkasian
Chair, Department of Defense Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

A U.S. Special Operations Command (SOCOM) funded study completed in 2017 found that U.S. special operations forces (SOF) have a 30% higher suicide rate than the U.S. military average. Nearly half of the twenty-nine suicide cases explored in the psychological autopsy study had a diagnosed mental health disorder. These findings underscore how suicide, and its contributing factors, are a growing threat to the health of the force and combat readiness across SOCOM. This thesis examined psychedelic-assisted therapy as a component of an overall holistic approach to addressing mental health conditions and combatting suicide across SOCOM. We reviewed two emerging psychedelic treatments for ameliorating mood and trauma-based mental health disorders, comparing them to two in-use novel therapies. Notwithstanding limits to existing data, our review found that psychedelic-assisted therapies show potential in three critical ways. There is a rapid and sustained decrease in disorder-related symptoms, exhibited efficacy in treatment-resistant cases, and minimal adverse events when administered in a controlled environment. Alone, no single weapon or piece of technology has ever won a war, and in a similar fashion, successful mental health treatment models for suicide prevention strategies require a multi-faceted approach. While psychedelic therapies are not a panacea for the mental health crisis within the military, they carry emended potential to be another tool for treatment and recovery.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

ARSOF	Army special operations forces
CAPS	clinician-administered PTSD scale
CRADA	cooperative research and development agreement
DARPA	Defense Advanced Projects Research
DEA	Drug Enforcement Agency
DMN	default mode network
DOD	Department of Defense
FDA	Food and Drug Administration
fMRI	functional magnetic resonance imaging
LSD	lysergic acid diethylamide
MAPS	Multidisciplinary Association for Psychedelic Research
MDD	major depressive disorder
MDMA	Methylenedioxymethamphetamine
MRI	magnetic resonance imaging
NDAA	National Defense Authorization Act
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
PFC	prefrontal cortex
POTFF	Preservation of The Force and Family
PTSD	post-traumatic stress disorder
RCT	random-controlled trials
SGB	stellate ganglion block
SSRI	selective serotonin reuptake inhibitors

TBI	traumatic brain injury
TRD	treatment-resistant depression
UCMJ	Uniformed Code of Military Justice
USASOC	United States Army Special Operations Command
USSOCOM	United States Special Operations Command
VA	Department of Veterans Affairs
WEIRD	Western, Educated, Industrialized, Rich, and Democratic societies

EXECUTIVE SUMMARY

A U.S. Special Operations Command (USSOCOM) funded study completed in 2017 found that U.S. Special Operations Forces (SOF) have a 30% higher suicide rate than the U.S. military average.[1] Nearly half of the twenty-nine suicide cases explored in the psychological autopsy study had a diagnosed mental health disorder. Additionally, the study acknowledged systemic barriers to seeking adequate mental health treatment. While the USSOCOM study provided an in-depth assessment of nearly 30 suicides from 2007–2015, it stopped short of providing tangible treatment methods to counter the oft-cited comorbidities linked to individual suicide cases. To fill this gap, this thesis examines psychedelic-assisted therapy as a component of an overall holistic approach to address mental health conditions and combat suicide across SOCOM.

As of late 2019, the FDA designated MDMA (Methylenedioxymethamphetamine, aka "ecstasy") and psilocybin—psychedelic substances—as breakthrough treatments for post-traumatic stress disorder (PTSD) and major depressive disorder (MDD). The 2019 decision enabled numerous U.S. and international research institutes to achieve Phase II and III human clinical trials with promising initial results.[2] While pharmacotherapy and psychotherapy represent the gold standard for mental health treatment, the recent trials concerning psychedelic-assisted therapies underscore their potential as alternative treatments for those that fail to respond to traditional treatment methods. Other novel treatments, such as the stellate ganglion block (SGB) or ketamine infusion therapy, offer similar rapid-acting effects and increased efficacy compared to traditional methods. Following our research question and approach, we reviewed published clinical trials examining MDMA and psilocybin-assisted therapies as two emerging psychedelic treatments for ameliorating mood and trauma-based mental health disorders, comparing

[1] "Psychological Autopsy Study of Suicides Among U.S. Special Operations Forces" (United States Special Operations Command, December 15, 2020), https://www.socom.mil/FOIA/Documents/Psychological%20Autopsy%20Study%20of%20Suicides%20among%20United%20States%20Special%20Operations%20Forces.pdf.

[2] Catherine I. V. Bird, Nadav L. Modlin, and James J. H. Rucker, "Psilocybin and MDMA for the Treatment of Trauma-Related Psychopathology," *International Review of Psychiatry* 33, no. 3 (April 3, 2021): 229–31, https://doi.org/10.1080/09540261.2021.1919062.

them to two in-use novel therapies and traditional treatment methods. In assessing the efficacy of these treatments, we reviewed publicly published peer-reviewed sources, including systematic reviews, individual randomized controlled trials, and retrospective case studies, concentrating primarily on the past ten years of research.

While the body of data from individual trials are limited due to relatively small sample sizes, multiple systematic reviews of MDMA-assisted therapy over the past three years have highlighted clinically significant decreases in Clinician-Administered PTSD Scale (CAPS) scores, denoting its potential for further study.[3] In the case of the largest published multi-site phase 3 trial to date, Mitchell et al. 2021, researchers noted a equally significant treatment-arm decrease in CAPS scores, with observed effects after the first dosing session.[4] In a similar fashion to MDMA-assisted therapy, recently published psilocybin-assisted therapy trials noted rapid decreases in GRID-Hamilton Depression Rating Scale (GRID-HAMD) scores, with clinically significant response rates within the first week of treatment.[5] Equally important to the efficacy and rapid decrease in PTSD and depression symptoms, both psychedelic-assisted therapies exhibited limited serious adverse effects across the various controlled trials, further emphasized by the steady progression towards larger phase 3 trials. Notwithstanding limits to existing data, our review of published clinical trials found that MDMA and psilocybin-based psychedelic-assisted therapies show potential in three critical ways: a rapid and significant decrease in

[3] Anees Bahji et al., "Efficacy of 3,4-Methylenedioxymethamphetamine (MDMA)-Assisted Psychotherapy for Posttraumatic Stress Disorder: A Systematic Review and Meta-Analysis," *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 96 (January 10, 2020): 109735, https://doi.org/10.1016/j.pnpbp.2019.109735; Benjamin JG Illingworth et al., "A Comparison of MDMA-Assisted Psychotherapy to Non-Assisted Psychotherapy in Treatment-Resistant PTSD: A Systematic Review and Meta-Analysis," *Journal of Psychopharmacology* 35, no. 5 (May 1, 2021): 501–11, https://doi.org/10.1177/0269881120965915; Kimberly W. Smith et al., "MDMA-Assisted Psychotherapy for Treatment of Posttraumatic Stress Disorder: A Systematic Review With Meta-Analysis," *The Journal of Clinical Pharmacology* 62, no. 4 (2022): 463–71, https://doi.org/10.1002/jcph.1995.

[4] Jennifer M. Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD: A Randomized, Double-Blind, Placebo-Controlled Phase 3 Study," *Nature Medicine* 27, no. 6 (June 2021): 1029, https://doi.org/10.1038/s41591-021-01336-3.

[5] Natalie Gukasyan et al., "Efficacy and Safety of Psilocybin-Assisted Treatment for Major Depressive Disorder: Prospective 12-Month Follow-Up," *Journal of Psychopharmacology* 36, no. 2 (February 1, 2022): 153, https://doi.org/10.1177/02698811211073759; Alan K. Davis et al., "Effects of Psilocybin-Assisted Therapy on Major Depressive Disorder: A Randomized Clinical Trial," *JAMA Psychiatry* 78, no. 5 (May 1, 2021): 486, https://doi.org/10.1001/jamapsychiatry.2020.3285.

disorder-related symptoms, exhibited efficacy in treatment-resistant cases, and minimal serious adverse events when administered in a controlled environment. Our review also found that while these findings are promising, experts urge caution in terms of implementation based on historical missteps in the field of psychedelics, relative unknowns regarding long-term efficacy, and the inherent methodological difficulties associated with studying psychedelics.[6]

Despite these potential shortfalls—for those with severe and potentially life-threatening symptoms associated with mental illness—additional treatment options offer avenues for much-needed help. And for an intrepid and human-centric organization such as USSOCOM, these pioneering treatment options exhibit the potential to address both readiness concerns and meet the ethical imperative of protecting the force's health. Lastly, we advocate for a measured approach towards implementation, working in concert with academia and private industry to leverage both the innovative nature of SOCOM and the expansive resources being put forth by researchers in the public and private sectors to broaden existing psychedelic studies. Alone, no single weapon or piece of technology has ever won a war, and in a similar fashion, successful mental health treatment models for suicide prevention strategies require a multi-faceted approach. While psychedelic therapies are not a panacea for the mental health crisis within the military, they carry emended potential to be another tool for treatment and recovery.

[6] Nick Zagorski, "Psychedelic Therapy Hits Another Milestone, But Caution Urged," *Psychiatric News* 56, no. 8 (July 22, 2021): 14, https://doi.org/10.1176/appi.pn.2021.7.14.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

"What we change inwardly will change outer reality."

— Plutarch

The issue of suicide in our ranks has caught the attention of our leaders. Special Operations Command (SOCOM) service members are tasked to carry out missions worldwide with the highest levels of secrecy, compartmentalization, and often limited time between deployments. Those battling mental health problems either never come forward before it is too late or are sidelined from a deployment to receive prolonged care. How does SOCOM provide ethical, fast-acting, efficacious, and long-lasting treatment options for the root cause of mental health disorders, rather than the symptoms, to return servicemembers to their units of action and accomplish missions directly affecting U.S. National Interests?

Data suggests the use of psychedelics and traditional therapy for the broader civilian population to help with PTSD, depression, addiction, stress, and anxiety to be more substantial than therapy alone. However, little research has been done on U.S. special operations forces, "who are at increased risk for various mental health problems and cognitive impairment associated with military service."[1] U.S. special operations forces have unique psychological profiles which demand unique treatments.[2] The audience for this thesis is the active-duty service member, the military medical community, and every leader in SOCOM to provide objective information for novel and taboo treatment methods that may hold the potential to curb the suicide epidemic in the active-duty population.

A. PROBLEM STATEMENT

A SOCOM-funded research project completed in 2017 by The American Association of Suicidology found that U.S. special operations forces have a 30% higher

[1] Davis et al., "Psychedelic Treatment for Trauma-Related Psychological and Cognitive Impairment Among U.S. Special Operations Forces Veterans," *Chronic Stress* 4 (January 2020): 55, https://doi.org/10.1177/2470547020939564.

[2] Davis et al., "Psychedelic Treatment for Special Operations Forces," 57.

suicide rate than the rest of the U.S. military.[3] Compared to the rest of the U.S. population, this number rises to 47%.[4] As of October 2022, the Department of Defense's (DOD) daily casualty report shows that over 30,000 post-9/11 active-duty service members and veterans have died by suicide.[5] Over the same 21-year period, 7,057 service members were killed in combat, meaning the military suicide rate was four times higher than during combat operations.[6] The prevalence of post-traumatic stress disorder (PTSD), major depressive disorder (MDD), treatment-resistant depression (TRD), stress, and anxiety illustrate a potentially alarming issue for the U.S. military and its veterans.

In October 2021, along with SOCOM's push to curb suicide, the United States Army Special Operations Command (USASOC) released a list of ten critical research initiatives. Two research initiatives, respectively, stated, "The human is SOF's only strategic asset" and asked how SOF should "retain the right talent to build the best team for 2030?"[7] SOCOM values humans and wants research to benefit them. SOCOM also understands that SOF service members are killing themselves at a higher annual rate than combined in the previous ten years of Global War on Terror (GWOT) casualties.[8] At the next level higher, SOCOM has also invested millions of dollars and countless hours to tackle the issue of suicide. Under a $50.5 million Preservation of The Force and Family (POTFF) budget, SOCOM turns to innovative technology and treatments to recuperate and

[3] U.S. Special Operations Command. "Psychological Autopsy Study of Suicides Among U.S. Special Operations Forces," December 15, 2020. https://www.socom.mil/FOIA/Documents/Psychological%20Autopsy%20Study%20of%20Suicides%20among%20United%20States%20Special%20Operations%20Forces.pdf .

[4] America's Health Rankings, *Analysis of CDC WONDER: Suicide, Multiple Cause of Death Report*, 2019, https://www.americashealthrankings.org/explore/annual/measure/Suicide/state/ALL.

[5] U.S. Department of Defense, "U.S. Military Casualties – Operation Freedom's Sentinel (OFS) and Operation Enduring Freedom (OEF) Casualty Summary by Month and Service," February 1, 2022, https://dcas.dmdc.osd.mil/dcas/pages/report_sum_comp.xhtml.

[6] Thomas Howard Suitt, III, "High Suicide Rates among United States Service Members and Veterans of the Post- 9/11 Wars" (The Cost of War Project, Brown University, 2021), 2, https:// watson.brown.edu/costsofwar/files/cow/imce/papers/2021/Suitt_Suicides_Costs%20of%20War_June%2021%202021.pdf.

[7] United States Army Special Operations Command, "AY21-22 Priority Research Topics," January 12, 2021.

[8] U.S. Government Accountability Office, Report to the Committee on Armed Services, House of Representatives. Special Operations Forces: Additional Actions Needed to Effectively Manage the Preservation of the Force and Family (POTFF) Program, December 2021, 15, https://www.gao.gov/ assets/gao-22-104486.pdf; U.S. Department of Defense, "U.S. Military Casualties,"

return service members to fully mission-capable status as soon as possible. Prominent treatments like stellate ganglion block (SGB) and Ketamine Infusion Therapy are effective. However, they often require multiple sessions or invasive procedures that induce rapid positive results in the short term but lack sustained benefits.[9]

This thesis aims to elucidate the growing need for alternative mental health treatment methods for active-duty service members. In November 2019, the FDA designated psilocybin and MDMA (Methylenedioxymethamphetamine, aka ecstasy), psychedelic substances, as breakthrough treatments for PTSD, TRD, MDD, stress, and anxiety. The 2019 decision by the FDA has allowed numerous U.S. and international research institutes to achieve Phase II and III human clinical trials with promising initial results.[10] This thesis will illustrate the efficacy, short and long-term pros, and cons of two in-use novel treatment methods (SGB and Ketamine Infusion Therapy) and psychedelic-assisted therapies. Furthermore, we will identify and warn against pitfalls within psychedelic research and make recommendations for implementation and collaboration.

B. RESEARCH QUESTION

What is the potential for psychedelic-assisted therapy to combat suicide in SOCOM?

[9] Bratsos and Saleh, "Clinical Efficacy of Ketamine," e5189; Peterson et al., *Evidence Brief: Effectiveness of Stellate Ganglion Block for Treatment of Posttraumatic Stress Disorder (PTSD)* (Department of Veterans Affairs (US), 2017), https://www. ncbi.nlm.nih.gov/books/NBK442253/.

[10] Brooks, "Psilocybin Second Breakthrough,"

THIS PAGE INTENTIONALLY LEFT BLANK

II. LITERATURE REVIEW

A. A BRIEF PSYCHEDELIC HISTORY

Before 1970, classic psychedelics like lysergic acid diethylamide (LSD), psilocybin, and mescaline were used to treat various mental ailments, including anxiety, stress, addiction, and depression. "Research at that time, which was suboptimal by modern standards and often unethical, suggested that they were helpful for some people when administered under medical observation."[11] The stigma of psychedelic use arose from these poor research practices.

The taboo and novel topics of psychedelics and psychedelic-assisted therapy originated over 50 years ago. The War on Drugs was a joint international effort led by the United States to reduce the global illegal drug trade. The War on Drugs and the demonization of controlled substances have drastically impeded mental health rehabilitation research funding using psychedelic methods.[12] The subject of alternative approaches to mental health therapy is not new. Nevertheless, psychedelics as a viable alternative remain novel due to the counterculture surrounding their use and inclusion in the Controlled Substances Act.[13] Fortunately, the resurgence of credible research on the potential uses of psychedelics and the procedures in which they are administered continue to increase our understanding of what can be treated.

B. MILITARY MENTAL HEALTH OVERVIEW

The prevalence of mental health has unfortunately become strongly associated with the military. The conflicts in Vietnam and the more recent twenty years of war in Iraq, Afghanistan, and Syria have placed a heavy toll on active-duty service members and veterans. The U.S. Department of Veterans Affairs claimed that "30% of Vietnam

11 "Psychedelic Trials," King's College London, Research & Innovation, accessed December 5, 2021, https://www.kcl.ac.uk/research/psilocybin-trials.

12 Jahangir et al., "War on Drugs" (The Global Commission on Drug Policy, June 2011), https://www.globalcommissionondrugs.org/reports/the-war-on-drugs.

13 U.S. House of Representatives, "Comprehensive Drug Abuse Prevention and Control Act of 1970," October 27, 1970, https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1236.pdf.

Veterans, 12% of Gulf War Veterans, and 11–20% of Operation Iraqi Freedom and Enduring Freedom" Veterans experience symptoms of PTSD each year.[14] According to the PTSD Alliance, individuals with PTSD often feel misplaced guilt surrounding a given event and often fail to identify the true underlying causes of trauma, leading to delayed reactions and transgressive behavior.[15] The novel research opportunity provided by the FDA for psilocybin and MDMA may allow us to help address a growing and persistent issue within our ranks.

C. PSYCHEDELIC POTENTIAL

Psychedelics, like psilocybin and MDMA, demonstrate enormous potential for treating anxiety, depression, PTSD, and other mental health disorders. "The brain can form and reorganize synaptic connections, especially in response to learning, experiencing, or following injury."[16] The reorganization of synaptic connections is often referred to as neuroplasticity. Millions of times each day, neurons in the brain fire, and neurotransmitters travel along established neuropathways. Those neuropathways are disrupted in depression, anxiety, or PTSD patients, and neurotransmission is either reduced or stopped altogether. Psychedelics are unique compared to other therapies because they act on the default mode network (DMN), "an interconnected region of the brain that manages introspection like self-reflection and self-criticism."[17] Increased DMN activity is linked to "mind-wandering and the capacity to imagine mental states in others (i.e., theory of mind), as well as our ability to mentally 'time travel,' projecting ourselves into the past or future."[18]

---

[14] National Center for PTSD, "Moral Injury," General Information, accessed November 30, 2021, https://www.ptsd.va.gov/professional/treat/cooccurring/moral_injury.asp.

[15] "Diagnosing Posttraumatic Stress Disorder," The PTSD Alliance, January 2022, http://www.ptsdalliance.org/diagnosis/.

[16] Duncan Banks, "What Is Brain Plasticity and Why Is It So Important?," *The Conversation*, April 4, 2016, https://theconversation.com/what-is-brain-plasticity-and-why-is-it-so-important-55967.

[17] King's College London, "Psychedelic Trials,"

[18] Simon Ruffell PhD, Psychedlics and the Default Mode Network, interview by Jasmine Virdi, February 4, 2020, https://psychedelicstoday.com/2020/02/04/psychedelics-and-the-default-mode-network/.v

Scientists and researchers studying psychedelics and their effects on patients with anxiety, depression, and PTSD are discovering promising results. When psychedelics are introduced, the non-functioning neuropathways are down-regulated (less neurotransmission) and then up-regulated alongside new, fully functioning neuropathways.[19] This is particularly important within the DMN as psychedelics act like computer defragmentation. When psychedelics are introduced, the activity of the DMN is significantly decreased. Simultaneously, connectivity increases in other areas, allowing one to experience "ego death," which helps regions of the brain to communicate normally do not.[20] "Ego death" in the psychedelic research community is most referred to as a form of self-surrender and a temporary loss of biases and ego-boundaries, "Which results in a blurring of the distinction between self-representation and object-representation."[21]

Additionally, neuropathways not previously present or active before introducing psychedelics activate and enable neurotransmission to resume in brain areas, directly contributing to anxiety, depression, and PTSD.[22] An interesting finding is the duration of the effects. Clinical research data on psilocybin shows that one session of psychedelic-assisted therapy (psilocybin or MDMA) can lead to anti-depressant and addiction-breaking effects that persist for up to 12 months at a time.[23]

Psychedelic research is critical to solving the mental health epidemic. Findings suggest that psilocybin and MDMA are twice as effective in treating a much broader range of cognitive ailments than anti-depressants; they require fewer doses and have increased efficacy and duration, with a fraction of the side effects.[24] SOCOM is always looking for innovative ways to invest in its people. The opportunity to invest in a force suffering from

---

[19] Lowe et al., "The Therapeutic Potential of Psilocybin," *Molecules* 26, no. 10 (May 15, 2021): 2948, https://doi.org/10.3390/molecules26102948.

[20] Simon Ruffell PhD, Psychedelics and the Default Mode Network, interview by Jasmine Virdi, February 4, 2020, https://psychedelicstoday.com/2020/02/04/psychedelics-and-the-default-mode-network/.

[21] Nour et al., "Ego-Dissolution and Psychedelics: Validation of the Ego-Dissolution Inventory (EDI)," *Frontiers in Human Neuroscience* 10 (June 14, 2016), https://doi.org/10.3389/fnhum.2016.00269.

[22] Lowe et al., "Therapeutic Potential of Psilocybin,"

[23] Reiff et al., "Psychedelics and Psychedelic-Assisted Psychotherapy," *The American Journal of Psychiatry* 177, no. 5 (May 2020): 405.

[24] Reiff et al., "Psychedelics and Assisted Psychotherapy," 406.

the highest suicide rates in the military is available with psychedelic-assisted therapy. As the tip of the spear for America's military, SOCOM can establish relationships with leading medical and research institutes to provide service members with alternative treatment methods for mental health ailments.

D. LEGAL LANDSCAPE

If meaningful change is to occur within the Department of Defense concerning the legality of breakthrough therapies, there must be changes to current laws within the Uniformed Code of Military Justice (UCMJ). The UCMJ is the aggregate of laws that govern all individuals' conduct within the DOD enterprise, including certain civilians who support the U.S. military during war. Enacted by Congress in 1951, UCMJ is a federal law that creates uniformity across the service branches of the DOD. Congress amends it to account for evolving societal demands and morphing attitudinal changes representative of the current beliefs of the American population.[25] The ultimate constitutional power resides with the President to execute. UCMJ Article 112a, titled *The Wrongful Use, Possession, etc., of Controlled Substances,* clearly defines the ramifications for any member of the armed forces who wrongfully uses or possesses any of the illegal substances that are "listed on a schedule of controlled substances prescribed by the President, as well as those listed in Schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812)."[26]

Within the United States Army, the Army Publishing Directorate is the centralized organization tasked to authenticate and publish Army indices and publications that govern soldiers' everyday activities.[27] There are currently 493 active Army Regulations that provide military members information on topics as broad ranging from the multi-domain transformation to win in competition and conflict, regaining dominance in the Artic and

[25] Jim Absher, "The Uniform Code of Military Justice (UCMJ)," Military.com, July 30, 2021, https://www.military.com/join-armed-forces/the-uniform-code-of-military-justice-ucmj.html.

[26] "UCMJ Article 112A – Wrongful Use, Possession of Controlled Substances," Crisp and Associates Military Law, 2022, https://mymilitarylawyers.com/practice-areas/ucmj-articles/ucmj-article-112a-wrongful-use-possession-controlled-substance/.

[27] "Publishing Guidance," Army Publishing Directorate, n.d., https://armypubs.army.mil.

biological defense strategies to Army notarial services, nutritional standards, and how to handle intellectual property. For most basic societal functions, an Army Regulation, publication, or governing manual likely exists to outline the parameters for how members of the United States Army can legally act within the scope of military law.

Of the many existing Army Regulations, one is specifically relevant when discussing the use of psychedelic substances to address mental health for the preservation of the force. Army Regulation 40-7 titled, *Use of U.S. Food and Drug Administration-Regulated Products in Humans Including Schedule I Controlled Substances.* Published on October 10th, 2009, *AR* 40-7 was, and still is, foundational for its implications on the active-duty military population. The regulation "reaffirms Army compliance with U.S. Food and Drug Administration rules and regulations on the use of investigational products" in human subjects, and precisely Schedule I controlled substances, of which psychedelics are a part.[28]

[28] Department of the Army, "Army Regulation 40-7: Use of U.S. Food and Drug Administration-Regulated Investigational Products in Humans Inlcuding Schedule I Controlled Substances," October 19, 2009, https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ r40_7.pdf.

THIS PAGE INTENTIONALLY LEFT BLANK

III. RESEARCH APPROACH

To answer the question, *"what is the potential for psychedelic-assisted therapy to combat suicide in SOCOM?"* we conducted an extensive literature review to identify the efficacy, acute and long term, of current treatment methods against psychedelic-treatment methods. The primary source of data collection for this research was existing peer-reviewed articles. The two research eras that were expanded upon were from 1950–1970 and the "Second Wave" of psychedelic research from 2006-present.[29] Articles and publications for review were chosen based on the following criteria:

- Did the research come from a reputable source?
- Was the research focused on an FDA "Breakthrough" Approved psychedelic? (i.e., Psilocybin[30] and MDMA[31])
- Did the research focus on PTSD or TBI?
- Did the research address the comorbidities of PTSD?
- Did the research use standardize pre-and post-psychedelic-treatment questionnaires?
- Did the research provide acute data following psychedelic treatment (< 1 week)?
- Did the research provide long-term data following psychedelic treatment (>4 weeks)?

[29] Robin L. Carhart-Harris and Guy M. Goodwin, "The Therapeutic Potential of Psychedelic Drugs: Past, Present, and Future," *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology* 42, no. 11 (October 2017): 2105–13, https://doi.org/10.1038/ npp.2017.84.

[30] Brooks, "Psilocybin Second Breakthrough,"

[31] Feduccia et al., "Breakthrough for Trauma Treatment: Safety and Efficacy of MDMA-Assisted Psychotherapy Compared to Paroxetine and Sertraline," *Frontiers in Psychiatry* 10 (2019): 650, https://doi.org/10.3389/fpsyt.2019.00650.

The research eras chosen for this literature review attempted to account for changes in demographics, lifestyles, and biases from the researchers over 36 years. The research focused on FDA "Breakthrough" Approved psychedelics for two purposes. Firstly, it maintained a manageable size and scope for the topic. Secondly, FDA-approved psychedelics have the legal backing of the federal government for research. This thesis specifically addresses the topics of PTSD, anxiety, depression, and suicide within the SOCOM community.

IV. THE ISSUES

A. PTSD, DEPRESSION, ANXIETY, AND THE DEFAULT MODE NETWORK

1. PTSD

Posttraumatic stress disorder is categorized in the DSM-5 as a "trauma and stressor-related disorder" brought upon by exposure to one or more traumatic events, such as combat-related trauma or sexual assault.[32] Following a singular event or series of traumatic events, those with PTSD often experience symptoms ranging from avoidance behaviors or disassociation to hyperarousal and intrusive memories.[33] Additional symptoms include hypervigilance, increased reactivity, and sleep-related issues. The complex convergence of these PTSD symptoms—over 630,000 different symptom combinations according to DSM-5 criteria—negatively impacts social and occupational functioning, especially when coupled with common comorbidities such as depression and substance abuse.[34] The frequency of PTSD diagnoses associated with the symptoms varies significantly across different demographics. Notably, for the military-related population, the prevalence of PTSD among active-duty military and veterans is twice as high as the general population.[35] Combat exposure and environmental stressors further exacerbate the likelihood of developing PTSD, highlighted by the steadily increasing incidence rate of clinically diagnosed PTSD for active-duty military personnel from 2002 to 2016.[36] Despite the debilitating nature of symptoms and the marked prevalence of diagnosed PTSD amongst active-duty and veteran populations, PTSD is generally underdiagnosed or misdiagnosed

---

[32] *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*, 5th ed (Washington: American Psychiatric Association, 2013), 271, 275.

[33] Judkins et al., "Incidence Rates of Posttraumatic Stress Disorder Over a 17-Year Period in Active Duty Military Service Members," *Journal of Traumatic Stress* 33, no. 6 (2020): 994, https://doi.org/10.1002/jts.22558.

[34] Isaac R. Galatzer-Levy and Richard A. Bryant, "636,120 Ways to Have Posttraumatic Stress Disorder," *Perspectives on Psychological Science* 8, no. 6 (November 1, 2013): 651–62, https://doi.org/10.1177/1745691613504115.

[35] Judkins et al., "Incidence Rates of PTSD," 994.

[36] Judkins et al., "Incidence Rates of PTSD," 1000.

as depression or another disorder.[37] Advanced neuroimaging technologies and improved diagnosis criteria have aided our growing understanding of the complex biological and psychological effects of traumatic experiences and PTSD.

Leveraging these advances in neuroimaging, established models associated with PTSD center on the three regions of the brain: the amygdala, prefrontal cortex (PFC), and hippocampus.[38] The amygdala is a portion of the brain responsible for threat assessment, fear expression, and emotional memory encoding.[39] The PFC is principally responsible for executive functioning, higher-level skills, critical thought, and other functions, such as mediating the amygdala's fear response.[40] Lastly, the hippocampus is associated with episodic and environmental memory encoding, providing context and long-term recall.[41] Neurobiological brain models associated with hyperarousal PTSD highlight an increased reactivity in the amygdala, hypoactivity in the prefrontal cortex, and decreased volume in the hippocampus—the opposite reactions typically occur in PTSD linked to dissociative symptoms.[42] Along with changes in neurotransmitter and neurohormonal functions in the brain, these trauma-induced neurobiological changes impede proper fear responses and lead to chronic states of hyperarousal or dissociation and detachment.

---

[37] Davis et al., "The Economic Burden of Posttraumatic Stress Disorder in the United States From a Societal Perspective," *The Journal of Clinical Psychiatry* 83, no. 3 (April 25, 2022): 7, https://doi.org/10.4088/JCP.21m14116.

[38] James H. Lynch, "Stellate Ganglion Block Treats Posttraumatic Stress: An Example of Precision Mental Health," *Brain and Behavior* 10, no. 11 (2020): 2, https://doi.org/10.1002/ brb3.1807; Marisa C. Ross and Josh M. Cisler, "Altered Large-Scale Functional Brain Organization in Posttraumatic Stress Disorder: A Comprehensive Review of Univariate and Network-Level Neurocircuitry Models of PTSD," *NeuroImage: Clinical* 27 (January 1, 2020): 2, https://doi.org/ 10.1016/j.nicl.2020.102319.

[39] Pitman et al., "Biological Studies of Posttraumatic Stress Disorder," *Nature Reviews. Neuroscience* 13, no. 11 (November 2012): 8, https://doi.org/10.1038/nrn3339.

[40] Lisa Y Maeng and Mohammed R Milad, "Post-Traumatic Stress Disorder: The Relationship Between the Fear Response and Chronic Stress," *Chronic Stress* 1 (February 1, 2017): 2–3, https://doi.org/10.1177/2470547017713297.

[41] Pitman et al., "Biological Studies of PTSD," 8.

[42] Ross and Cisler, "Altered Functional Brain Organization," 2.

2. Depression & Anxiety

PTSD, depression, and anxiety are highly comorbid. As such, there is a significant crossover of symptoms and mechanisms of disorder associated with the diagnosis for all three disorders. In MDD, symptoms range from loss of interest or pleasure in activities to hopelessness, fear of the future, insomnia, restlessness, and suicidal ideations.[43] According to DSM-5 diagnostic criteria, these symptoms must be chronic, occurring steadily for at least two weeks. Over a five-year surveillance period from 2016–2020, depressive disorders accounted for over 16% of active-duty mental health diagnoses or 130,000 diagnoses.[44] Another study (n = 664) found that 50% of combat veterans had a diagnosis of triple comorbidity (PTSD, depression, anxiety). The prevalence of the disorder, along with the cost and debilitating nature of MDD and anxiety symptoms, highlights the pressing need to treat all three disorders effectively. The key to this may lie in their mechanisms.

Like PTSD, the regions of the brain that contribute to anxiety and depression are the amygdala, PFC, and hippocampus. Individuals suffering from chronic anxiety often have a smaller hippocampus and less PFC activity (processing and memory regions).[45] One study noted that the hippocampus of veterans with PTSD was, on average, six percent smaller than those without PTSD and those individuals also suffered from elevated levels of stress and anxiety.[46] The hippocampus degeneration and downregulation of the PFC lends itself to the amygdala becoming dominant and driving behavior. The increase in amygdala activity creates rigid responses where the brain will perceive non-threatening

[43] Karni Ginzburg, Tsachi Ein-Dor, and Zahava Solomon, "Comorbidity of Posttraumatic Stress Disorder, Anxiety and Depression: A 20-Year Longitudinal Study of War Veterans," *Journal of Affective Disorders* 123, no. 1–3 (June 2010): 249–57, https://doi.org/10.1016/j.jad.2009.08. 006.

[44] Armed Forces Health Surveillance Branch, "Update: Mental Health Disorders and Mental Health Problems, Active Component, U.S. Armed Forces, 2016–2020," *Medical Surveillance Monthly Report* 28, no. 8 (August 2021): 4.

[45] Linda Mah, Claudia Szabuniewicz, and Alexandra J. Fiocco, "Can Anxiety Damage the Brain?:," *Current Opinion in Psychiatry* 29, no. 1 (January 2016): 56–63, https://doi.org/10.1097/YCO.0000000000000223.

[46] Apfel et al., "Hippocampal Volume Differences in Gulf War Veterans with Current versus Lifetime Posttraumatic Stress Disorder Symptoms," *Biological Psychiatry* 69, no. 6 (March 15, 2011): 541–48, https://doi.org/10.1016/j.biopsych.2010.09.044.

situations as dangerous, thus initiating the fight or flight reaction.[47] Mechanistically, depression is like anxiety. Reduction in the size of the hippocampus and PFC is common with depression but different due to the chemical imbalance caused by the dominant amygdala. Cortisol (stress hormone) from the hippocampus causes it to shrink, impedes neural activity, and increases the amygdala size.[48]

3. The Default Mode Network

When comparing PTSD and other disorders, traditional models identified hyperactivity in the amygdala as a prominent source of emotional dysregulation and negative memory recall.[49] Newer models expand upon this concept, detailing functional irregularities associated with depression and anxiety within large-scale brain networks, specifically the DMN. The DMN is the interconnected region of the brain that controls one's thoughts and reactions. Over time, the brain develops a pattern in responding to stimuli, developing habitual communication pathways between brain regions that eventually become constrained.[50] It is the auto-pilot function of our brains. The nature of PTSD, anxiety, and depression involves states of "rumination," negative thought loops that disrupt normal cognition and lead to a fixation on negative thoughts, stress, and anxiety.

With PTSD, depression, and anxiety, the DMN will be biased toward the trauma. Autopilot will take over, causing individuals to re-experience traumas or triggers with the same maladaptive responses if the trauma goes untreated.[51] Through fMRI, psychedelics potentially turn the autopilot off, downregulating the amygdala (fear response) and

---

[47] Apfel et al., "Hippocampus and Gulf War Veterans," 542.

[48] Pandya et al., "Where in the Brain Is Depression?," *Current Psychiatry Reports* 14, no. 6 (December 2012): 634–42, https://doi.org/10.1007/s11920-012-0322-7.

[49] J. Paul Hamilton, Matthias Siemer, and Ian H. Gotlib, "Amygdala Volume in Major Depressive Disorder: A Meta-Analysis of Magnetic Resonance Imaging Studies," *Molecular Psychiatry* 13, no. 11 (November 2008): 993–1000, https://doi.org/10.1038/mp.2008.57.

[50] Carhart-Harris et al., "Neural Correlates of the LSD Experience Revealed by Multimodal Neuroimaging," *Proceedings of the National Academy of Sciences* 113, no. 17 (April 26, 2016): 4853–58, https://doi.org/10.1073/pnas.1518377113.

[51] Reuveni et al., "Anatomical and Functional Connectivity in the Default Mode Network of Post-Traumatic Stress Disorder Patients after Civilian and Military-Related Trauma: Anatomical and Functional Connectivity in PTSD," *Human Brain Mapping* 37, no. 2 (February 2016): 589–99, https://doi.org/10.1002/hbm.23051.

upregulating the PFC and hippocampus, allowing individuals to re-experience past traumas and re-process them without fear.[52]

B. PTSD AS A CORRELATE OF SUICIDE

"The prevalence of PTSD in the adult U.S. population ranges from 4% to 6% for men and 8% to 13% for women."[53] In the U.S. military, PTSD prevalence ranges from 9% to 12% in men [54] and 18% to 20% in women.[55] The violence-related trauma is lifelong and can be unbearable for some survivors. Comparable rates of PTSD are observed in SOF; however, SOF personnel are, "Selected based upon indicators of superior physical and psychological resilience and trained to endure the challenges of repeated deployments."[56]

Though comparable PTSD rates exist, suicide rates remain higher within the SOCOM community than conventional forces. This comparison may highlight that SOF personnel's resilience to challenges is fundamental to treatment reluctance.[57] It may also indicate that the problem is worse than can be measured. Undiagnosed PTSD increases the risk of suicide in service members. Despite this, the hesitancy to come forward creates a limited understanding of the actual status of mental health within the formation.[58] Without

---

[52] Carhart-Harris et al., "Neural Correlates of the Psychedelic State as Determined by FMRI Studies with Psilocybin," *Proceedings of the National Academy of Sciences* 109, no. 6 (February 7, 2012): 2138–43, https://doi.org/10.1073/pnas.1119598109.

[53] Lehavot et al., "Do Trauma Type, Stressful Life Events, and Social Support Explain Women Veterans' High Prevalence of PTSD?," *Social Psychiatry and Psychiatric Epidemiology* 53, no. 9 (September 2018): 943–53, https://doi.org/10.1007/s00127-018-1550-x.

[54] Magruder et al., "Prevalence of Posttraumatic Stress Disorder in Veterans Affairs Primary Care Clinics," *General Hospital Psychiatry* 27, no. 3 (June 2005): 170, https://doi.org/10.1016/j.genhosppsych.2004.11.001.

[55] Dobie et al., "Posttraumatic Stress Disorder in Female Veterans: Association with Self-Reported Health Problems and Functional Impairment," *Archives of Internal Medicine* 164, no. 4 (February 23, 2004): 395, https://doi.org/10.1001/archinte.164.4.394.

[56] Davis et al., "Psychedelic Treatment for Special Operations Forces," 56.

[57] Hing et al., "Special Operations Forces and Incidence of Post-Traumatic Stress Disorder Symptoms," *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 12, no. 3 (2012): 25; Kemplin et al., "Resilience and Suicide in Special Operations Forces: State of the Science via Integrative Review," *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 19, no. 2 (2019): 58.

[58] Spoont et al., "Impact of Treatment Beliefs and Social Network Encouragement on Initiation of Care by VA Service Users With PTSD," *Psychiatric Services* 65, no. 5 (2014): 661, https://doi.org/10.1176/appi.ps.201200324.

new treatment methods and a system-wide reform of the military and veteran mental health system and its taboos, research and treatment for PTSD and suicide will continue to fall behind.

Several extensive studies have documented consistent evidence of a strong association between PTSD and suicide. One study (*n*=199,306) used the Danish national healthcare registry to examine all suicide deaths from 1994 to 2006.[59] It noted that people with PTSD were as much as ten times more likely to die from suicide than those without a PTSD diagnosis.[60] A follow-up study (*n*=508,315) expanded the timeline and scope to include demographic adjustments and pre-existing comorbidities. That study from 1995 to 2011 found that individuals with a PTSD diagnosis were 13 times more likely to commit suicide than those without PTSD.[61] The relationship between suicide and PTSD is strong in the military and veteran communities. One study (*n*=874) found that U.S. Army service members who committed suicide were "13 times more likely to have PTSD than all other service members in the same period" (2001-2009).[62]

A 2017 advisory panel for the Department of Veterans Affairs (VA) Office of Research and Development noted that "there is a crisis regarding the limited number of effective therapies available for those with PTSD and argues that PTSD should be considered a national mental health priority."[63] Investigation into novel pharmacotherapies and psychiatric techniques is needed, considering the significant number of active military and veterans who have PTSD and overwhelming rates of suicide, along with other psychiatric problems. Furthermore, it is also possible to increase adherence and outcomes

[59] Gradus et al., "Posttraumatic Stress Disorder and Completed Suicide," *American Journal of Epidemiology* 171, no. 6 (March 15, 2010): 721–27, https://doi.org/10.1093/aje/kwp456.

[60] Jaimie L. Gradus, "PTSD and Death from Suicide," *PTSD Research Quarterly* 28, no. No.4 (2017), https://www.ptsd.va.gov/publications/rq_docs/V28N4.pdf.

[61] Gradus et al., "Trauma, Comorbidity, and Mortality Following Diagnoses of Severe Stress and Adjustment Disorders: A Nationwide Cohort Study," *American Journal of Epidemiology* 182, no. 5 (September 1, 2015): 451, https://doi.org/10.1093/aje/kwv066.

[62] Black et al., "Prevalence and Risk Factors Associated with Suicides of Army Soldiers 2001–2009.," *Military Psychology* 23, no. 4 (2011): 433, https://doi.org/10.1037/h0094766.

[63] Krystal et al., "It Is Time to Address the Crisis in the Pharmacotherapy of Posttraumatic Stress Disorder: A Consensus Statement of the PTSD Psychopharmacology Working Group," *Biological Psychiatry* 82, no. 7 (2017): e52, https://doi.org/10.1016/j.biopsych.2017.03.007.

to PTSD treatment by pairing novel therapies, such as psychedelics, with trauma-focused psychotherapy.[64] This would be an effective treatment plan, given the high rate of suicide, PTSD, and nonresponse and the dropout rate for conventional therapies among the activity duty and Veteran populations.[65]

[64] Davis et al., "Psychedelic Treatment for Special Operations Forces," 64.

[65] Davis et al., 66.

THIS PAGE INTENTIONALLY LEFT BLANK

V. THE TREATMENTS

A. OVERVIEW

These sections are provided to familiarize the reader with emerging PTSD, depression, and anxiety treatments. The two FDA-breakthrough treatments (MDMA and Psilocybin-assisted therapies) provide three critical commonalities: rapid decrease in depression, anxiety, and PTSD scores from baseline; serve as a bridge to long-term psychotherapy; and noted efficacy in treatment-resistant cases.

First, based on recent clinical studies and research literature, both treatments elicit a rapid response in the reduction of symptoms. The response time for these treatments stands in contrast to the longer time horizon associated with the gold standard in mental health treatment, traditional pharmacotherapy, and psychotherapy. Second, because of the immediate impact, each treatment can aid the patient in overcoming the difficulties associated with starting or attempting to complete an extremely painful or taxing long-term treatment. These quick-impact treatments can potentially decrease the average therapy dropout rate and keep them engaged toward long-term well-being. Lastly, these treatments are all generally identified as effective in treatment-resistant cases, expanding the tools available to mental health professionals. The following sections will briefly address the nature of each treatment, its history, recent notable studies, and the potential path forward in future studies and implementation.

B. MDMA

1. History of MDMA

MDMA, or 3–4-methylenedioxy-N-methylamphetamine, is also known as ecstasy. A German company created it in 1912 to help synthesize medications that control bleeding.[66] It is a stimulant and a hallucinogen. Throughout the 1970s and 1980s, MDMA

[66] S. Bernschneider-Reif, F. Oxler, and R. W. Freudenmann, "The Origin of MDMA ('ecstasy')--Separating the Facts from the Myth," *Die Pharmazie* 61, no. 11 (November 2006): 966; Roland W. Freudenmann, Florian Öxler, and Sabine Bernschneider-Reif, "The Origin of MDMA (Ecstasy) Revisited: The True Story Reconstructed from the Original Documents," *Addiction* 101, no. 9 (2006): 1242, https://doi.org/10.1111/j.1360-0443.2006.01511.x.

grew a small, international following among psychiatrists as a way to facilitate psychotherapy because the compound showed promise in helping patients achieve rapid and new insights into their problems.[67] Although not approved by the U.S. Food and Drug Administration, many psychiatrists in the U.S. and abroad believed MDMA helped lower their patients' inhibitions (e.g., "ego death" via deactivation of the DMN), which allowed them to talk openly and honestly about their issues.[68]

Despite these use cases, the Drug Enforcement Agency (DEA) declared an emergency ban on MDMA in 1985 as it became more widely available on the street and proliferated into a club drug.[69] The ban on MDMA subsequently placed it on the Schedule 1 controlled substance list, defining it as a drug with "no currently accepted medical use and a high potential for abuse."[70] Like other psychedelic substances, MDMA's listing as Schedule 1 drug set research into its therapeutic potential back decades. Fortunately, MDMA-assisted therapy received "breakthrough" therapy status from the FDA in 2017. Early data on the novel treatment showed "promise above and beyond all other existing therapies for treatment-resistant PTSD and MDD."[71]

2. What does MDMA do?

MDMA-assisted therapy combines psychiatric techniques with MDMA as a pharmacological supplement.[72] MDMA works by boosting the release of three specific

[67] Lester Grinspoon and James B. Bakalar, "Can Drugs Be Used to Enhance the Psychotherapeutic Process?," *American Journal of Psychotherapy* 40, no. 3 (1986): 394, https://doi.org/10.1176/appi .psychotherapy.1986.40.3.393.

[68] Ira Byock, "Taking Psychedelics Seriously," *Journal of Palliative Medicine* 21, no. 4 (2018): 420, https://doi.org/10.1089/jpm.2017.0684.

[69] S. Bernschneider-Reif, F. Oxler, and R. W. Freudenmann, "The Origin of MDMA," 967.

[70] United States Drug Enforcement Agency, "Drug Scheduling," accessed May 19, 2022, https://www.dea.gov/drug-information/drug-scheduling.

[71] "FDA Grants Breakthrough Therapy Designation for MDMA-Assisted Therapy for PTSD, Agrees on Special Protocol Assessment for Phase 3 Trials," MAPS, August 26, 2017, https://maps.org/ news/ media/press-release-fda-grants-breakthrough-therapy-designation-for-mdma-assisted-psychotherapy-for-ptsd-agrees-on-special-protocol-assessment-for-phase-3-trials/.

[72] MAPS, "FDA Grants Breakthrough Therapy Designation for MDMA,"

neurotransmitters: dopamine, serotonin, and norepinephrine, as well as other hormones.[73] By doing so, MDMA can affect memory circuits by reducing activity and communication in some areas of the brain while increasing activity and communication in other regions.

The brain regions most affected are those dealing with expressions of fear and anxiety (amygdala and insula). The amygdala is also the origin point for the "fight or flight" reaction, which activates the sympathetic nervous system and causes a myriad of physiological responses to a perceived threat or danger. The brain regions that see increased activation include the amygdala and hippocampus.

Hippocampal function is critical in learning, emotional responses, and memory formation and storage. Magnetic resonance imaging (MRI) of PTSD patients shows that most patients have decreased hippocampal activity, suggesting a "reduced ability to recall negative or threatening memories without fear, hyperarousal, or dissociative symptoms."[74] Though the amygdala controls the "fight or flight" reaction, increased connectivity between it and the hippocampus suggests that MDMA, with associated therapy, may allow for the re-processing of traumatic memories without re-traumatization.[75] Thus allowing a way to access and cope with those memories without getting "stuck" in a "fight or flight" loop.

3. Effects of MDMA on PTSD

The acute effects of MDMA are immediate and impactful. Upon ingesting MDMA, a person may experience its effects within 45 minutes, with effects lasting three to six hours. The most common effects include euphoria, reduced fear and defensiveness,

[73] Nor Suliana Mustafa and Nasir Mohamad, "MDMA and the Brain: A Short Review on the Role of Neurotransmitters in the Cause of Neurotoxicity," *Basic and Clinical Neuroscience Journal*, November 30, 2019, https://doi.org/10.32598/bcn.9.10.485.

[74] Bromis et al., "Meta-Analysis of 89 Structural MRI Studies in Posttraumatic Stress Disorder and Comparison With Major Depressive Disorder," *American Journal of Psychiatry* 175, no. 10 (2018): 997, https://doi.org/10.1176/appi.ajp.2018.17111199.

[75] Allison A. Feduccia and Michael C. Mithoefer, "MDMA-Assisted Psychotherapy for PTSD: Are Memory Reconsolidation and Fear Extinction Underlying Mechanisms?," *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 84 (2018): 226, https://doi.org/10.1016/j.pnpbp.2018.03.003.

increased extroversion, and enhanced communication.[76] For veterans, it is a catalyst for communication, introspection, empathy towards self and others,[77] and most importantly, an openness to discuss traumas or re-experience emotionally significant memories.[78] These combined neurological effects show the potential to enhance the therapeutic process for people with treatment-resistant PTSD.

Focusing on the acute effects of MDMA, a 2021 study noted that 67% of the participants who received MDMA were in remission of a PTSD diagnosis after 18 weeks, compared to 32% in the placebo-controlled group.[79] The double-blind, placebo-controlled, multi-site, and random-controlled trial (RCT) consisted of 90 patients diagnosed with treatment-resistant PTSD and other comorbidities commonly associated with PTSD (dissociation, depression, substance abuse disorders, and childhood trauma).[80] Patients in the trial were split into two groups (dependent group and placebo-controlled group), with the dependent group receiving sub-perceptual (non-psychedelic) doses of MDMA (~80-180mg) and the control group receiving a placebo (sertraline). In that trial, it is also important to note that the average time for diagnosis of PTSD across the group was 14 years, with 65% of patients having undergone past treatments ranging from prolonged exposure therapy to selective serotonin reuptake inhibitors (SSRIs).[81]

---

[76] Liechti, "Acute Psychological Effects of 3,4-Methylenedioxymethamphetamine (MDMA, 'Ecstasy') Are Attenuated by the Serotonin Uptake Inhibitor Citalopram," *Neuropsychopharmacology* 22, no. 5 (May 2000): 517, https://doi.org/10.1016/S0893-133X(99)00148-7; Gamma, "3,4-Methylenedioxymethamphetamine (MDMA) Modulates Cortical and Limbic Brain Activity as Measured by [H215O]-PET in Healthy Humans," *Neuropsychopharmacology* 23, no. 4 (October 2000): 389, https://doi.org/10.1016/S0893-133X(00)00130-5.

[77] Hysek et al., "MDMA Enhances Emotional Empathy and Prosocial Behavior," *Social Cognitive and Affective Neuroscience* 9, no. 11 (November 2014): 1647, https://doi.org/10.1093/scan/ nst161.

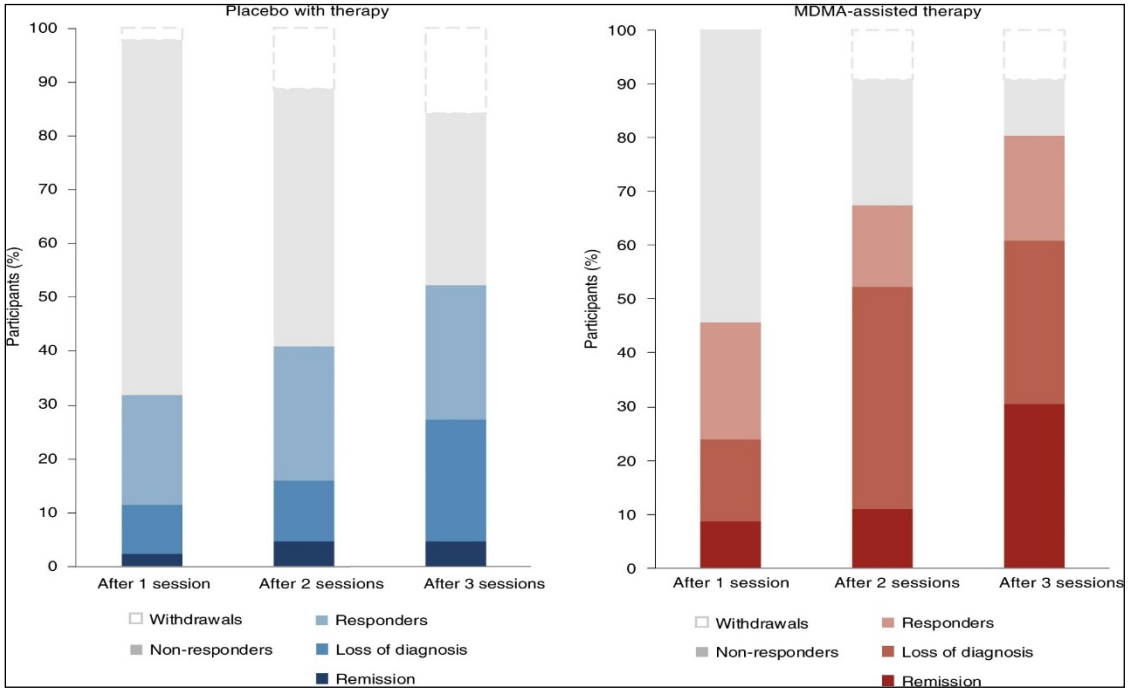
[78] Liechti, "Acute Effects of MDMA," 518; Vollenweider et al., "Psychological and Cardiovascular Effects and Short-Term Sequelae of MDMA ('Ecstasy') in MDMA-Naïve Healthy Volunteers," *Neuropsychopharmacology* 19, no. 4 (October 1998): 244, https://doi.org/10.1038/sj.npp.1395197.

[79] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD: A Randomized, Double-Blind, Placebo-Controlled Phase 3 Study," *Nature Medicine* 27, no. 6 (June 2021): 1027, https://doi.org/10.1038/ s41591-021-01336-3.

[80] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1027.

[81] Mitchell et al., 1028.

Figure 1 illustrates the potential of MDMA-assisted therapy for treatment-resistant PTSD over the placebo, which is also an FDA-approved pharmacotherapy (sertraline).[82] In comparing the baseline clinician-administered PTSD scale (CAPS-V) scores of each patient to their 18-week assessment, the effect size demonstrated between MDMA-assisted therapy and current methods with SSRIs (control group) indicates statistically significant results larger than any other previously identified PTSD pharmacotherapy.[83]



Treatment response as a percentage of total participants randomized to each arm (MDMA, $n = 46$; placebo, $n = 44$).

Figure 1. Treatment Response and Remission for MDMA vs. Placebo.[84]

[82] Mitchell et al., 1028; Feduccia et al., "Breakthrough for Trauma Treatment," 650.

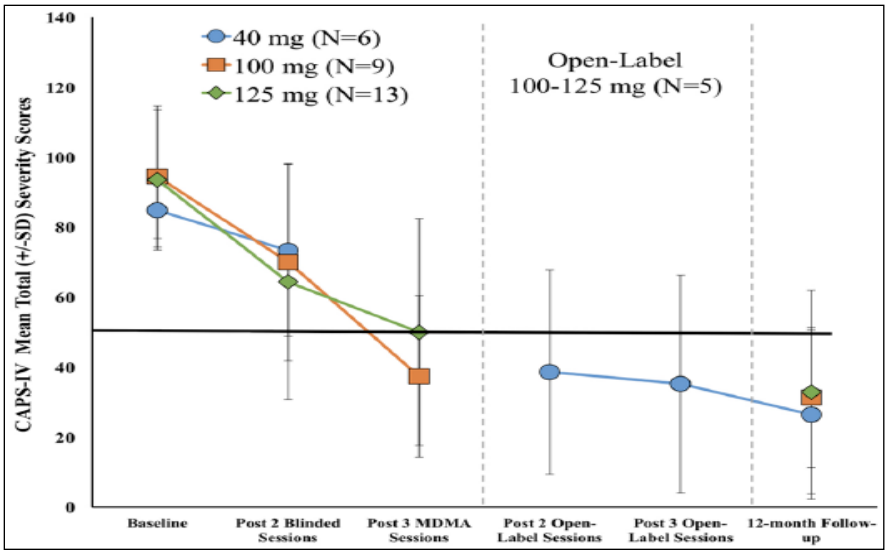
[83] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1030; Feduccia and Mithoefer, "MDMA-Assisted Psychotherapy for PTSD," 223; Lee et al., "Psychotherapy Versus Pharmacotherapy for Posttraumatic Stress Disorder: Systemic Review and Meta-Analyses to Determine First-Line Treatments," *Depression and Anxiety* 33, no. 9 (2016): 794, https://doi.org/10.1002/da.22511.

[84] Source: Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD,"

The results from this study highlight a potential treatment method for the leaders and members of SOCOM battling with PTSD. MDMA-assisted therapy to combat treatment-resistant PTSD fits the operational cycle of SOCOM members who are specially selected, trained, and driven. The unfortunate reality is that the gold standard for PTSD treatment, prolonged exposure therapy, does not support the lifestyle and operational tempo that is asked of SOCOM. Service members across the formation want to stay in the fight and remain value-adding team members. Though effective in some portions of the formation over a long duration, current treatment methods often remove the service member from their operational unit of action. Often, they are also non-deployable. MDMA-assisted therapy could provide the individual and SOCOM an opportunity to provide adequate mental health support while preserving the force and family in the short- and long-term. More pointedly, it is SOCOM's responsibility to explore what treatments could assist service members in maintaining readiness while providing them with the most effective care on the market.

Due to the FDA's recent "breakthrough" therapy designation for MDMA, the long-term effects of MDMA-assisted therapy are yet to be determined beyond a 12-month timeline. However, two studies completed in 2018 evaluated MDMA's efficacy up to one year following treatment. A significant reduction in overall PTSD scores was observed in both studies, per the clinician-administered PTSD scale (CAPS-IV). Figure 2 illustrates the decrease in CAPS-IV scores throughout the 12 months with assessments in CAPS-IV scores at the primary endpoint (2-month mark, "Post 3 MDMA Sessions") and the 12-month follow-up.[85]

[85] Ot'alora et al., "3,4-Methylenedioxymethamphetamine-Assisted Psychotherapy for Treatment of Chronic Posttraumatic Stress Disorder: A Randomized Phase 2 Controlled Trial," *Journal of Psychopharmacology (Oxford, England)* 32, no. 12 (December 2018): 1298, https://doi.org/10.1177/0269881118806297.



Change over time in Clinician-Administered PTSD Scale (CAPS-IV).

Figure 2. MDMA Long-Term Effectiveness.[86]

Of note, the gains in overall CAPS-IV scores for all participants were maintained over 12 months, at the end of which 76% (*n*=25) of individuals were still in remission of a PTSD diagnosis.[87]

> The fact that CAPS scores continued to improve between the two-month and 12-month follow-up visits supports the hypothesis that MDMA helps catalyze a therapeutic process and re-processing of past traumas that continue long after the last drug administration.[88]

Compared to the gold-standard treatment for PTSD (i.e., prolonged exposure therapy), MDMA-assisted therapy shows potential for twice the remission rate, at accelerated timelines, without invasive procedures, and with fewer side effects.[89]

[86] Source: Ot'alora et al., "MDMA-Assisted Psychotherapy,"

[87] Ot'alora et al., "MDMA-Assisted Psychotherapy," 1230.

[88] Ot'alora et al., 1230.

[89] Mithoefer et al., "3,4-Methylenedioxymethamphetamine (MDMA)-Assisted Psychotherapy for Post-Traumatic Stress Disorder in Military Veterans, Firefighters, and Police Officers;" Ot'alora et al., "MDMA-Assisted Psychotherapy," 1229.

C. PSILOCYBIN

1. History of Psilocybin

Nine hundred seventy million people worldwide are suffering from mental health ailments.[90] Rather than treating the underlying issue, society promotes the daily consumption of pharmaceuticals with a myriad of side effects to treat the symptoms rather than the root causes of the ailment. Treating isolated symptoms is burdensome on the care provider in terms of time and material, ineffective, and ultimately detrimental to the long-term health of the service member. This chapter will illustrate the potential for psilocybin to combat depression, anxiety, stress, and substance abuse. These are all markers of PTSD that many special operations service members are aware of, either personally or through a friend.

Psilocybin, or O-phosphoryl-4-hydroxy-N, is the primary chemical in psychedelic or "magic" mushrooms.[91] Used for thousands of years by ancient tribes, the earliest evidence of magic mushroom use dates back to 10,000 BCE.[92] In Ancient Greece, ritual ceremonies attended by famous figures like Plato, Homer, and Aristotle saw the consumption of psychedelic substances.[93] From the ancient Egyptians and halfway around the world to the Aztecs, Mazatecs, and Celts, psychedelic mushrooms were integral to nearly every ancient civilization for their spiritual and medicinal purposes.[94]

Terence McKenna, one of the earliest advocates for the medicinal use of psychedelics, speculated that earlier hominins (i.e., *Homo erectus*) consumed psilocybin

---

[90] Saloni Dattani, Hanna Ritchie, and Max Roser, "Mental Health," Our World In Data, August 2021, https://ourworldindata.org/mental-health#citation.

[91] Ryan O'Hare, "Magic Mushroom Compound Performs as Well as Anti-Depressant in Small Study," *Imperial College London*, April 14, 2021, sec. health, https://www.imperial.ac.uk/news/219413/magic-mushroom-compound-performs-well-antidepressant/.

[92] F.J. Carod-Artal, "Hallucinogenic Drugs in Pre-Columbian Mesoamerican Cultures," *Neurología (English Edition)* 30, no. 1 (January 2015): 43, https://doi.org/10.1016/j.nrleng.2011.07. 010.

[93] Anthony P. Bossis, "Psilocybin, Spirituality, and Palliative Care: Research and Implications," *Alternative and Complementary Therapies* 27, no. 1 (February 1, 2021): 14, https://doi.org/10.1089/act.2020.29309.apb.

[94] Froese, Guzmán, and Guzmán-Dávalos, "On the Origin of the Genus Psilocybe and Its Potential Ritual Use in Ancient Africa and Europe," 104.

mushrooms nearly two million years ago and became evolutionarily distinct.[95] He argued that by consuming the fungi, *Homo erectus* created hyper-connected neuropathways. This would likely have led to increased brain functions and size, enabling communication, innovation, and concepts like the community that ultimately jumpstarted the evolutionary leap to *Homo sapiens.*[96]

Psychedelics, writ large, became a controversial topic in the 1960s because of their association with the "hippie" counterculture. Their prolific use inspired Dr. Albert Hoffman to synthesize LSD and psilocybin, both of which became extremely popular for recreational use.[97] In 1968, the drugs' widespread use, along with provocative cultural statements like "turn on, tune in, and drop out," became an impetus for the U.S. federal ban on psilocybin and other psychedelics.[98] Two years later, psilocybin, LSD, and cannabis were labeled Schedule I drugs.[99] As a result of the ban, almost all U.S.-based research on the benefits of psilocybin came to a halt. For nearly 30 years, psilocybin-related research was non-existent until a 1997 study from the University of Zurich was published. Although small (*n=10*), the study found that psilocybin increased brain activity across neuropathways, which were previously unobserved.[100] This study catalyzed research around the world which ultimately showed that psilocybin had the potential to effectively

[95] Nicole Lopez, "An Exploration of Linguistic Relativity Theory for Consideration of Terence McKenna's 'Stoned Ape Theory' on the Origins of Consciousness and Language: Implications for Language Pedagogy," *Journal of Conscious Evolution* 16, no. 6 (November 7, 2020): 1.

[96] Lopez, "Stoned Ape Theory," 4.

[97] Dieter A. Hagenbach and Lucius Werthmüller, *Mystic Chemist: The Life of Albert Hofmann and His Discovery of LSD* (Santa Fe, NM: Synergetic Press, 2013).

[98] Sarah Riley, James Thompson, and Christine Griffin, "Turn on, Tune in, but Don't Drop out: The Impact of Neo-Liberalism on Magic Mushroom Users' (in)Ability to Imagine Collectivist Social Worlds," *International Journal of Drug Policy* 21, no. 6 (November 2010): 445, https://doi.org/10. 1016/ j.drugpo.2010.07.001.

[99] U.S. Department of Justice, Drug Enforcement Administration, "List of Scheduling Actions, Controlled Substances, and Regulated Chemicals," November 2015, https://www.deadiversion. usdoj.gov/ schedules/orangebook/orangebook.pdf.

[100] Vollenweider, "Positron Emission Tomography and Fluorodeoxyglucose Studies of Metabolic Hyperfrontality and Psychopathology in the Psilocybin Model of Psychosis," *Neuropsychopharmacology* 16, no. 5 (May 1997): 370, https://doi.org/10.1016/S0893-133X(96)00246-1.

treat numerous psychological conditions, including depression, anxiety, stress, and addiction.[101]

2. What Does Psilocybin Do?

Psilocybin-assisted therapy involves the use of psilocybin in a psychotherapeutic setting. Psilocybin-assisted therapy consists of a patient ingesting psilocybin while in the care of a therapist. The therapist facilitates the patient's experience while providing a controlled and safe environment. The session lasts four to six hours, the duration of the drug's effects. The accepted standard is a psychedelic journey accompanied by talk therapy, both during and after completion of the experience, ranging from one month to two years in some cases.

A myriad of past and current experiences shape who we are. Trauma, loss, and violence can cause negative thought processes and physiological reactions that manifest in maladaptive behavior. Psilocybin helps patients break those behaviors by addressing the root cause of problems, allowing new perspectives, and coming out of the experience with a greater sense of meaning, creativity, and belonging.[102] The goal of psilocybin therapy is to expediently impact emotional obstacles and long-term problems through a single psychedelic experience rather than months or years in talk therapy.

Psilocybin works by temporarily increasing the serotonin in the brain, which is believed to promote neuroplasticity.[103] The increase in neuroplasticity allows the brain to downregulate the DMN.[104] The reduction of activity in the DMN has also been associated with "ego dissolution" or "ego death." While on psilocybin, and for weeks to months after ego loss, new neural pathways are established, and negative thought patterns have been

---

[101] Vollenweider, "Positron Emission of Psilocybin," 373.

[102] Davis et al., "Effects of Psilocybin-Assisted Therapy on Major Depressive Disorder: A Randomized Clinical Trial," *JAMA Psychiatry* 78, no. 5 (May 1, 2021): 481, https://doi.org/ 10.1001/ jamapsychiatry.2020.3285.

[103] Matthew W. Johnson and Roland R. Griffiths, "Potential Therapeutic Effects of Psilocybin," *Neurotherapeutics* 14, no. 3 (July 2017): 734, https://doi.org/10.1007/s13311-017-0542-y.

[104] Lorenzo Pasquini, Fernanda Palhano-Fontes, and Draulio B Araujo, "Subacute Effects of the Psychedelic Ayahuasca on the Salience and Default Mode Networks," *Journal of Psychopharmacology* 34, no. 6 (June 2020): 624, https://doi.org/10.1177/0269881120909409.

reduced.[105] An overactivated DMN is often a tell-tale sign of those suffering from depression or anxiety.[106]

3. Effects of Psilocybin

With only one or two exposures, research shows that psilocybin is more effective at treating treatment-resistant depression, major depressive disorder, stress, and anxiety. About 80% of participants in one clinical trial rated their psilocybin treatment as one of their life's top five most personally and spiritually significant moments.[107] In the same study, over 90% reported increased overall life satisfaction, improved relationships, calmer behavior, and increased positivity.[108]

In a 2016 study (n=51), psilocybin was used to examine the potential for treating stress, depression, and anxiety in patients with a life-threatening cancer diagnosis.[109] In the study, patients received either a low, sub-perceptual (non-psychedelic) dose or a high dose of psilocybin. Follow-up observations were completed at the five-week and six-month marks to determine the treatment's prolonged effects. In that study, 32% of low-dose and 92% of high-dose participants "showed a clinically significant improvement in their anxiety and depression symptoms five weeks after their session."[110] Additionally, 79% of patients who received a high dose maintained substantial improvement or remission six months after treatment.[111]

---

[105] Ruffell, Psychedelics and the DMN.

[106] Carhart-Harris et al., "Psilocybin with Psychological Support for Treatment-Resistant Depression: An Open-Label Feasibility Study," *The Lancet Psychiatry* 3, no. 7 (July 2016): 620, https://doi.org/10.1016/S2215-0366(16)30065-7.

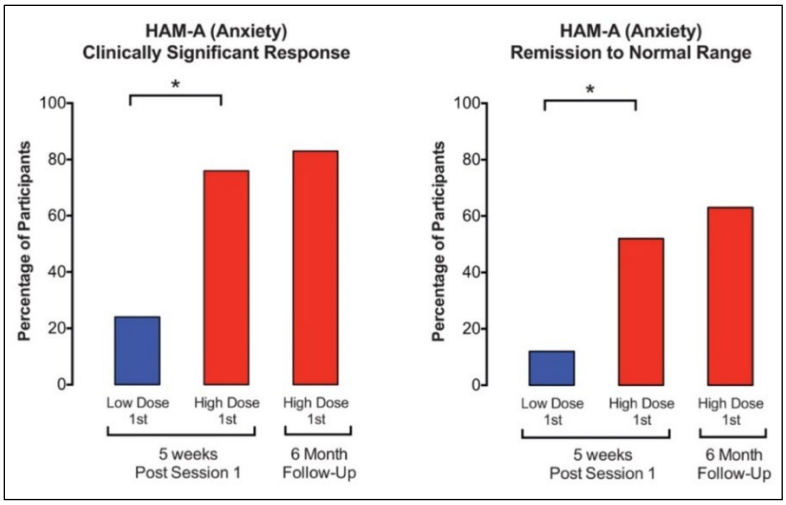
[107] Roland Griffiths, "The Science of Psilocybin and Its Use to Relieve Suffering" (TEDMED Conferences, 2015), https://www.tedmed.com/talks/show?id=526825.

[108] Griffiths et al., "Psilocybin Produces Substantial Decreases in Depression and Anxiety in Patients with Life-Threatening Cancer: Double-Blind Trial," *Journal of Psychopharmacology* 30, no. 12 (December 1, 2016): 1182, https://doi.org/10.1177/ 0269881116675513.

[109] Griffiths et al., "Psilocybin in Patients with Cancer, " 1182.

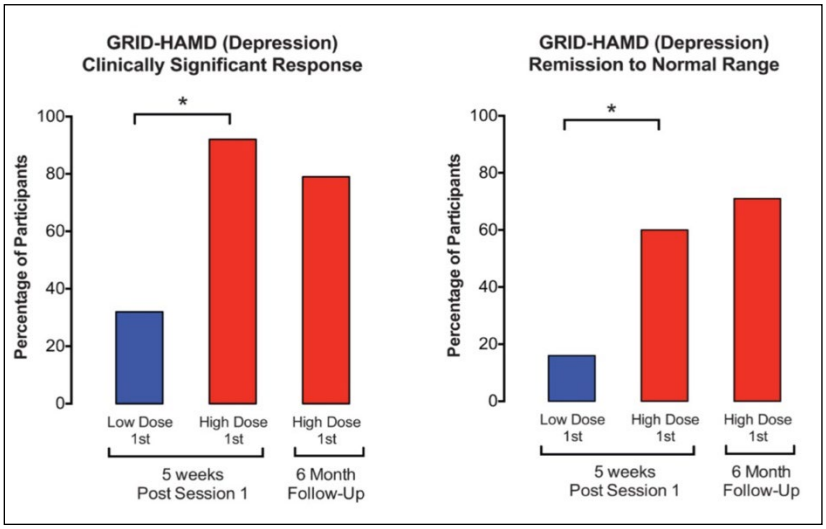
[110] Griffiths et al., 1184.

[111] Griffiths et al., 1184.



Effects of psilocybin on clinically significant response rate and symptom remission rate as assessed with clinician-rated measures of anxiety. Asterisks indicate that the low and high-dose groups differed significantly at five weeks (p>0.001).

Figure 3. Psilocybin Effectiveness on Anxiety.[112]



Effects of psilocybin on clinically significant response rate and symptom remission rate as assessed with clinician-rated measures of depression. Asterisks indicate that the low and high-dose groups differed significantly at five weeks (p>0.001); data at six months show these effects were sustained at follow-up.

Figure 4. Psilocybin Effectiveness on Depression.[113]

[112] Source: Griffiths et al., "Psilocybin in Patients with Cancer,"

[113] Source: Griffiths et al., "Psilocybin in Patients with Cancer,"

Long-term results were more significant for high-dose patients with a "mystical-type" experience than those without a similar experience. The study explains, "A mystical-type experience is characterized by a sense of unity, positive mood, transcendence of time and space, and ineffability."[114] These effects appear to show that even a single psilocybin exposure can produce long-lasting anti-depressant and anti-anxiety effects. Griffiths states, "Such an effect is unprecedented within the field of psychology."[115]

Another study published in 2020 illustrates the efficacy of psilocybin in treating major depressive disorder. The study (n=27) found that 67% of participants showed a significant reduction (>50%) in depression symptoms after one week, with that number rising to 71% at four weeks.[116] According to the primary investigator, Alan Davis, Ph.D., "Compared to traditional anti-depressants on the market, psilocybin's effect was immediate and about four times larger."[117] This is important as most current anti-depression medications take weeks or months to produce any effect.

Until February 2022, the lingering question remaining around the efficacy of psilocybin treatments was its efficacy in the long term. Though fast acting and highly effective in the short term, limited long-term data were available due to the very recent FDA breakthrough treatment approval. A randomized, waiting-list controlled study (n=24) observed participants with moderate to severe depression with two high-dose amounts of psilocybin in conjunction with psychotherapy.[118] Depression scores were taken by a trained clinician using the GRID-HAMD protocol, with follow-up visits out to the 12-month mark.[119]

---

[114] Carhart-Harris et al., "Psilocybin for Treatment Resistant Deprestion," 621.

[115] Griffiths, "Psilocybin and Suffering,"

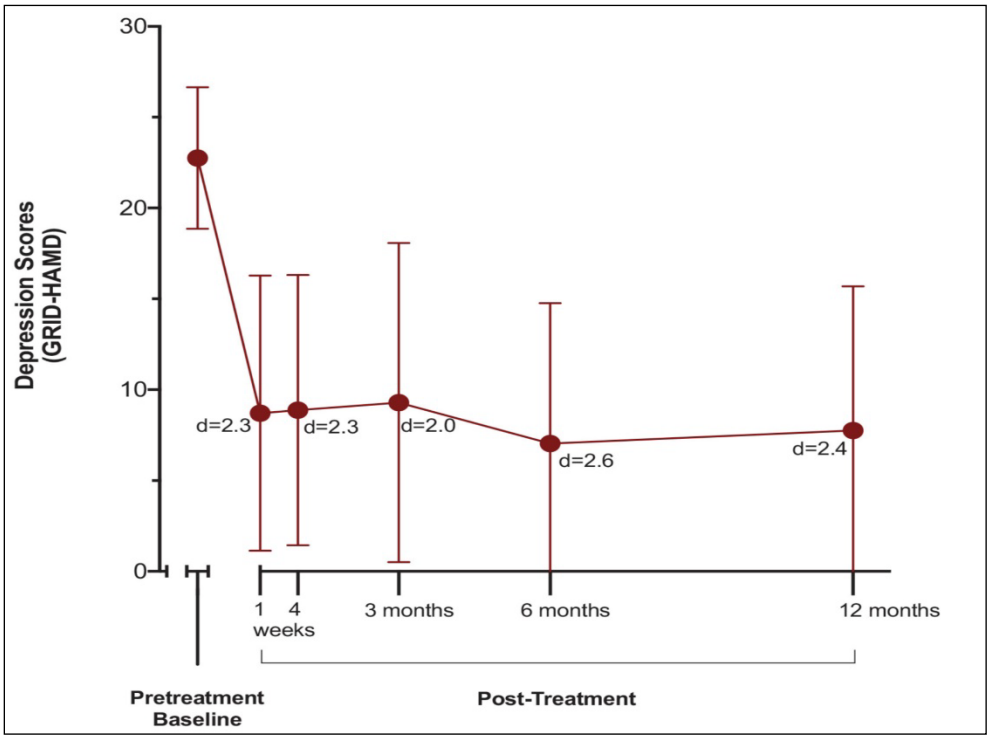
[116] Davis et al., "Effects of Psilocybin-Assisted Therapy on MDD," 481.

[117] Davis et al., "Effects of Psilocybin-Assisted Therapy on MDD," 481.

[118] Gukasyan et al., "Efficacy and Safety of Psilocybin-Assisted Treatment for Major Depressive Disorder: Prospective 12-Month Follow-Up," *Journal of Psychopharmacology* 36, no. 2 (February 1, 2022): 152, https://doi.org/10.1177/02698811211073759.

[119] Gukasyan et al., "Efficacy and Safety of Psilocybin for MDD," 153.

Figure 5 illustrates the decreases from baseline in GRID-HAMD scores. Over 75% of the group had a sustained response to treatment (>50% reduction in GRID-HAMD) at 12 months, and 60% of the participants were in remission.[120] The findings of this study "demonstrate that the substantial anti-depressant effects of psilocybin-assisted therapy may be durable for at least 12 months."[121]



Decrease in GRID-HAMD depression scores over time from baseline through the 12-month follow-up. Mean GRID-HAMD was 22.8 at baseline, 8.7 at one week, 8.9 at four weeks, 9.3 at three months, 7.0 at six months, and 7.7 at 12 months post-treatment.

Figure 5. Long-term Effectiveness of Psilocybin.[122]

[120] Gukasyan et al., 156.

[121] Gukasyan et al., 158.

[122] Source: Gukasyan et al., "Efficacy and Safety of Psilocybin for MDD,"

D. PSYCHEDELIC TREATMENT ROLL-UP

Psychedelic-assisted therapies demonstrate the potential for fast-acting and long-lasting reductions in depression, anxiety, and PTSD symptoms with fewer side effects than SSRIs. The most common side effects of psychedelic use are nausea/vomiting, headaches, transient distress, and temporary visual illusions. These pale in comparison to the severe side effects of SSRIs (changes in heart rate, blood pressure, respiratory rate, withdrawal symptoms, and even increases in depression, anxiety, and suicidality) while demonstrating lower rates of addiction potential. An estimated 40–60% of PTSD patients fail to respond to traditional pharmacological treatments like SSRIs, and dropout rates for first-line psychotherapy treatments remain high.[123] Psychedelics with psychotherapy appear to have faster effects with only a single session that may be sustained for over a year. In contrast, SSRIs often take weeks before any measurable effects are identified.

Prolonged exposure therapy is the gold standard for treating depression, anxiety, and PTSD. Prolonged exposure therapy exposes the patient to traumatic memories to face one's fear and address repressed memories that reinforce the trauma or fear.[124] The issue with that treatment method within SOCOM is that it often requires service members to remove themselves from their team or an upcoming deployment due to high operational tempo. The costs associated with traditional mental health methods are also a consideration.

A 2008 Rand study estimated the two-year post-deployment total cost across the deployed force to be greater than $6 billion.[125] While these active-duty wartime figures highlight significant short-term costs, a recent study captures the broader costs of PTSD across active-duty and veteran populations. The net difference between an adult with or without PTSD—across the military population was $42.7 billion or $25,000 per person.[126]

---

[123] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1025.

[124] American Psychological Association, "Prolonged Exposure (PE)," https://www.apa.org, accessed September 9, 2022, https://www.apa.org/ptsd-guideline/treatments/prolonged-exposure.

[125] Terri L. Tanielian and Lisa Jaycox, Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery (Santa Monica, CA: RAND, 2008), 175–201.

[126] Davis et al., "Economic Burden of PTSD," 40672.

An all-inclusive psychedelic retreat costs $3,000 to $4,500 per person.[127] The substantial short-term and long-term treatment costs underscore the need for improved access to novel treatments to augment existing evidence-based treatments and therapies.

The notably high prevalence rate and the limited efficacy of traditional therapies highlight the pressing need for additional treatment options for both the active-duty and veteran populations. The emerging therapeutic potential of psychedelic-assisted therapies, such as MDMA and psilocybin, represents a potential alternative treatment for those that fail to respond to first-line traditional treatment modalities. Ultimately, both forms of therapy require significant buy-in from the patient through revisiting repressed trauma. However, the shorter duration of psychedelic-assisted treatments likely means less pain and a greater potential for the patient to complete the therapy.

[127] Max Berlinger, "All-Inclusive Magic Mushroom Retreats Are the New Luxury 'Trips,'" *Bloomberg Businessweek*, August 19, 2021, https://www.bloomberg.com/news/articles/2021-08-19/all-inclusive-magic-mushroom-ayahuasca-retreats-are-new-luxury-trips.

VI. THE ARGUMENTS AGAINST PSYCHEDELICS

A. ETHICAL AND SPECIAL OBLIGATION OBJECTIONS

Psychedelic-assisted therapy elicits massive hesitation to subject service members to novel treatments with limited data. Objections to this novel treatment invariably root themselves in the fact that all psychedelic compounds are listed in the Controlled Substances Act of 1970.[128] That list defines psychedelics as "those with no accepted medical use, lack of accepted safety for use under medical supervision, and a high potential for abuse."[129] The recent boom, or "third wave," in psychedelic research began in the early 2000s, but it lacks empirical data representing large, diverse population pools.[130] Even fewer studies have been done focusing on service members who often carry a unique psychological profile. This strengthens the need for additional research before implementation, or even research, within the military is even considered.[131]

The lack of data is rooted in the negative reputation of psychedelics and their association with the "hippie" counterculture. The 1960s and 1970s highlighted the potential for the immoral use of psychoactive substances. Slogans of the era like "turn on, tune in, and drop out" still reverberate with the images of youth convulsing on the ground.[132] Initially, the U.S. Government was, at one point, interested in the effects of psychedelics. The MK-ULTRA program, which ran from 1953 to 1973, tested the potential effects of LSD, resulting in severe and sometimes lethal outcomes.[133] These results provided the U.S. Government with enough empirical evidence and negative public relations backlash to support the argument against psychedelic-assisted therapy.

---

128 "Comprehensive Drug Abuse Prevention and Control Act of 1970," Pub. L. No. H.R. 18583 (1970), https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1236.pdf.

129 "Drug Abuse Prevention Act,"

130 U.S. Department of Justice, Drug Enforcement Administration, "DOJ Scheduling Actions,"

131 Davis et al., "Psychedelic Treatment for Special Operations Forces," 57.

132 Oakley Stern Ray, *Drugs, Society, & Human Behavior*, 3rd ed (St. Louis: Mosby, 1983).

133 "Project MKUltra, the CIA's Program of Research in Behavioral Modification" (Washington, D.C.: United States Senate, August 3, 1977)https://www.intelligence.senate.gov /sites/default/files/ hearings/95mkultra.pdf.

Unlike current treatment methods for PTSD, anxiety, and depression, Psychedelics present the ethical dilemma of suggestibility, that is, "the elevated inclination to accept or act on the suggestions of others, including a psychiatrist."[134] In short, most psychedelics work by down-regulating the default mode network, which serves as one's ego and a sort of conductor, regulating normal thought processes.[135] Simultaneously, while the default mode network is down-regulated, there is an increase in activation in neural network communications that would not "talk" with each other under normal circumstances.[136] The "ego death" effect increases the concern of suggestibility.[137]

Patients in psychedelic-assisted therapy are far more susceptible to a provider's input that may not be in the patient's best interest. Doctors and physicians are required to take the Hippocratic Oath, whereas mental health professionals do not.[138] Though there are procedural and criminal implications for violation of mental health laws, regulations, and ethical codes, the fact remains that a portion of mental health professionals violates boundaries and work outside of their area of expertise.

Aside from those who step outside of their professional lane, there is another concern regarding special obligations and the use of psychedelics. Western medicine has not yet developed procedures, practices, and training for mental health professionals when dealing with patients in highly suggestible states due to psychedelic substances.[139] Without codified practices, using psychedelic-assisted therapy increases the risk to service members' mental well-being and overall wellness, which may exacerbate the problem(s) entirely.

---

[134] Carhart-Harris et al., "LSD Enhances Suggestibility in Healthy Volunteers," *Psychopharmacology* 232, no. 4 (February 2015): 785, https://doi.org/10.1007/s00213-014-3714-z.

[135] Randy L. Buckner, "The Brain's Default Network: Origins and Implications for the Study of Psychosis," *Dialogues in Clinical Neuroscience* 15, no. 3 (September 2013): 351–58.

[136] Pasquini, Palhano-Fontes, and Araujo, "Ayahuasca and the Default Mode Network," 624.

[137] Carhart-Harris et al., "LSD Enhances Suggestibility in Healthy Volunteers," 785.

[138] Chris Theunissen, "It's About Time We Had A Professional Oath in Psychology," *Australian Psychologist* 43, no. 1 (March 1, 2008): 55–60, https://doi.org/10.1080/00050060601100897.

[139] Carhart-Harris and Goodwin, "The Therapeutic Potential of Psychedelic Drugs," 2106.

Considering the lack of empirical data and codified technical and procedural issues surrounding psychedelic-assisted therapy, SOCOM has turned to ketamine and Stellate Ganglion Block. Initial results from these procedures demonstrate the potential to treat service members with mental health disorders without subjecting them to illicit substances.

B. KETAMINE

1. History of Ketamine

The history of ketamine dates back to the 1960s when American chemists first synthesized it in search of a less potent and shorter-acting derivative of phencyclidine, a powerful anesthetic with serious post-treatment side effects.[140] The initial human trial of ketamine, conducted by two University of Michigan medical professors in 1966, noted ketamine's significant analgesic and anesthetic properties and its ability to produce a dissociative state of consciousness in the patient.[141] The FDA subsequently approved ketamine as a method of anesthesia for human use in 1970.[142]

While U.S. congressional legislation banned the increasingly prevalent use and study of psychedelic substances in the 1960s and 1970s, the medical use of ketamine as an anesthetic remained legal and largely uncontrolled.[143] Throughout the 1980s and 1990s, its dissociative effects, which limited ketamine's clinical use, spurred an increase in its illicit consumption.[144]

In response to ketamine abuse, the U.S. government sought to limit access, categorizing ketamine as a Class III controlled substance. As clinical and recreational use

---

[140] Linda Li and Phillip E. Vlisides, "Ketamine: 50 Years of Modulating the Mind," *Frontiers in Human Neuroscience* 10 (November 29, 2016): 15, https://doi.org/10.3389/fnhum.2016.00612.

[141] Edward F. Domino and David S. Warner, "Taming the Ketamine Tiger," *Anesthesiology* 113, no. 3 (September 1, 2010): 679, https://doi.org/10.1097/ALN.0b013e3181ed09a2.

[142] Mathew et al., "Ketamine for Treatment-Resistant Unipolar Depression," *CNS Drugs* 26, no. 3 (March 1, 2012): 3, https://doi.org/10.2165/11599770-000000000-00000.

[143] Emily Witt, "Ketamine Therapy Is Going Mainstream. Are We Ready?," *The New Yorker*, December 29, 2021, https://www.newyorker.com/culture/annals-of-inquiry/ketamine-therapy-is-going-mainstream-are-we-ready.

[144] Georges Mion, "History of Anesthesia: The Ketamine Story – Past, Present and Future," *European Journal of Anaesthesiology | EJA* 34, no. 9 (September 2017): 571–75, https://doi.org/10.1097/EJA.0000000000000638. 575.

of ketamine ebbed and flowed, researchers continued to explore how ketamine affects the brain along with how ketamine could be used off-label to treat both alcohol dependency and treatment-resistant depression. Given the increased urgency for alternative treatments for depression and PTSD, the 50-year history of ketamine is entering a new phase, oriented towards mental health treatments in addition to its storied use as an anesthetic and analgesic agent.

2. What Does Ketamine Do?

In contrast to psychedelic-assisted therapies, ketamine therapy typically focuses on administering the drug without concurrent psychotherapy.[145] Ketamine therapy for depression and PTSD commonly occurs over an initial set of subanesthetic dosing sessions spread across 2–3 weeks, with follow-on maintenance dosing as required. During these sessions, the drug is administered through several options, such as intravenous or intranasal.[146] In subanesthetic doses, the side effects range from nausea or disorientation to more dramatic symptoms such as feelings of disassociation from one's body.[147]

Early studies, beginning in 2000, exploring ketamine as an anti-depressant agent primarily employed single-dose drug administration, noting significant decreases in depression measurements shortly after treatment. As studies continued, researchers discovered that additional treatment sessions typically prolonged the anti-depressant effects of the drug.[148] Feder et al. continued this approach while exploring ketamine's use in ameliorating PTSD-related symptoms—publishing results concerning the efficacy of

[145] Greenway et al., "Integrating Psychotherapy and Psychopharmacology: Psychedelic-Assisted Psychotherapy and Other Combined Treatments," *Expert Review of Clinical Pharmacology* 13, no. 6 (June 2020): 660, https://doi.org/10.1080/17512433.2020.1772054.

[146] Walsh et al., "Ketamine for the Treatment of Mental Health and Substance Use Disorders: Comprehensive Systematic Review," *BJPsych Open* 8, no. 1 (January 2022): 1, https://doi.org/10.1192/bjo.2021.1061.

[147] Li and Vlisides, "Ketamine," 4.

[148] Feder et al., "A Randomized Controlled Trial of Repeated Ketamine Administration for Chronic Posttraumatic Stress Disorder," *American Journal of Psychiatry* 178, no. 2 (February 2021): 194, https://doi.org/10.1176/appi.ajp.2020.20050596.

single-dose administration of ketamine in 2014 and repeated-dose administration in 2021.[149]

Like these preliminary studies, current ketamine therapy typically includes a repeat-dosing model, ranging from two to six doses spread across two or three weeks.[150] Each dosing session usually takes approximately 40 minutes, with additional time needed for post-treatment evaluation. The typically administered intravenous dose of ketamine used in depression and PTSD is 0.5mg/kg, a much lower dose than when ketamine is used as an anesthetic agent.[151] Combining short-duration treatment and the limited side effects of sub-anesthetic doses makes ketamine therapy more accessible than other psychedelic-assisted therapies.

In addition to shorter duration sessions, ketamine's potential promise as a treatment for mental health-related symptoms is chiefly due to its fast-acting properties. These rapid effects are often compared to the relatively delayed onset of traditional first-line treatments like pharmacotherapy through SSRIs and psychotherapy.[152] The official VA and DOD guidance for patients at risk for suicide acknowledge the swift effect of ketamine, stating, "There are few interventions that result in such a rapid response with as large an effect size, the benefits of offering this treatment [ketamine infusions] to patients with suicidal ideation make it a potentially important tool for providers to have available."[153]

The rapid relief felt by individuals, often measured in hours or days versus weeks and months, is due principally to how ketamine affects the brain. Traditional anti-

---

149 Feder et al., "RCT of Ketamine for PTSD," 194.

150 Sanacora et al., "A Consensus Statement on the Use of Ketamine in the Treatment of Mood Disorders," *JAMA Psychiatry* 74 (April 2017): 402, https://doi.org/10.1001/jamapsychiatry.2017 .0080.

151 Chittaranjan Andrade, "Ketamine for Depression, 4: In What Dose, at What Rate, by What Route, for How Long, and at What Frequency?," *The Journal of Clinical Psychiatry* 78, no. 7 (August 23, 2017): 852, https://doi.org/10.4088/JCP.17f11738.

152 H. W.W. Hasselmann, "Ketamine as Antidepressant? Current State and Future Perspectives," *Current Neuropharmacology* 12, no. 1 (January 2014): 59, https://doi.org/10.2174/1570159X11311 9990043.

153 Department of Veterans Affairs & Department of Defense, "VA/DOD Clinical Practice Guideline for The Assessment and Management of Patients at Risk for Suicide" (Department of Veterans Affairs & Department of Defense, 2019), https://www.healthquality.va.gov/guidelines/ MH/mdd/ VADoDMDDCPGFinal508.pdf.

depressants such as SSRIs increase serotonin activity by inhibiting reuptake (reabsorption) of serotonin in the body—serotonin is a neurotransmitter related to mood, anxiety, and fear.[154] In contrast, ketamine works through the neurotransmitter glutamate, an entirely different mechanism of action than traditional pharmacological treatments.[155]

Although recent studies debate the exact mechanism of action related to ketamine's anti-depressant effects, many assert that the regulation of glutamate transmission appears to be the principal mechanism for ketamine's anti-depressant effects.[156] Ongoing studies aim to fully elucidate the mechanism of action for ketamine as an anti-depressant and other uses, such as a treatment for PTSD and other related anxiety disorders.

3. Effects of Ketamine on PTSD

The use of ketamine as a pharmacotherapeutic treatment for PTSD is far less researched than ketamine as a treatment method for depression. Albuquerque et al., in a recent systematic review and meta-analysis of the effects of ketamine on PTSD symptoms, underscored the potential efficacy of ketamine as a treatment method for PTSD—the review included 14 comprehensive studies, and approximately 65% were RCTs.[157]

The studies included in the review had participant populations ranging from 12, in a smaller RCT, to 262 in a large randomized controlled trial.[158] Eight of the nine clinical trials assessed in the review noted a marked decrease in the severity of PTSD

---

[154] Andrew Chu and Roopma Wadhwa, "Selective Serotonin Reuptake Inhibitors," in *StatPearls* (Treasure Island (FL): StatPearls Publishing, 2022), 852, http://www.ncbi.nlm.nih.gov/books/NBK554406/.

[155] Holmes et al., "Measuring the Effects of Ketamine on MGluR5 Using [18F]FPEB and PET," *Journal of Cerebral Blood Flow & Metabolism* 40, no. 11 (November 1, 2020): 2255, https://doi.org/10.1177/0271678X19886316.

[156] Marcos Emilio Frizzo, "The Effect of Glutamatergic Modulators on Extracellular Glutamate: How Does This Information Contribute to the Discovery of Novel Antidepressants?," *Current Therapeutic Research* 91 (January 1, 2019): 27, https://doi.org/10.1016/j.curtheres.2019.100566.

[157] Albuquerque et al., "Evidence for the Beneficial Effect of Ketamine in the Treatment of Patients with Post-Traumatic Stress Disorder: A Systematic Review and Meta-Analysis," *Journal of Cerebral Blood Flow & Metabolism*, July 26, 2022, 5, https://doi.org/10.1177/0271678 X221116477.

[158] Abdallah et al., "The Effects of Ketamine on Prefrontal Glutamate Neurotransmission in Healthy and Depressed Subjects," *Neuropsychopharmacology* 43, no. 10 (September 2018): 2155, https://doi.org/10.1038/s41386-018-0136-3.

measurements, with one notable dissenting trial. The included studies also indicated that ketamine infusions are safe and "well-tolerated" for populations with chronic PTSD.[159]

The 2022 Abdallah et al. ketamine study—the largest ketamine RCT for PTSD symptom reduction and the only one with active-duty military personnel—was the only study that failed to show a marked decrease in PTSD symptoms. However, Albuquerque et al. assert that the collective data across the reviewed trials underlines a statistically significant difference between ketamine and control groups in reducing PTSD symptoms.[160] A recent review published in 2022 by Jumaili et al. shares many of the findings in the Abdallah et al. review, noting an overall rapid amelioration of PTSD systems within the first 24 hours of treatment and a high degree of tolerance amongst the study groups.[161]

C. STELLATE GANGLION BLOCK

1. History of Stellate Ganglion Block

The therapeutic potential of the stellate ganglion block (SGB) procedure was first realized by Karnosh et al. in 1947.[162] In the lead-up to their published findings, Karnosh and colleagues treated a series of patients for various neurological and neurovascular disorders utilizing the SGB post-treatment. They identified a substantial change in their patients' moods, including a noted decrease in depression and even increased feelings of euphoria.[163] Further exploration of SGB to address psychiatric disorders drastically decreased after these early published findings, with few published research efforts up until

[159] Albuquerque et al., "Evidence for Beneficial Effect of Ketamine," 11.

[160] Albuquerque et al., 11.

[161] Jumaili et al., "The Safety and Efficacy of Ketamine NMDA Receptor Blocker as a Therapeutic Intervention for PTSD Review of a Randomized Clinical Trial," *Behavioural Brain Research* 424 (April 29, 2022): 113804, https://doi.org/10.1016/j.bbr.2022.113804.

[162] L. J. Karnosh and W. J. Gardner, "The Effects of Bilateral Stellate Ganglion Block on Mental Depression; Report of 3 Cases," *Cleveland Clinic Quarterly* 14, no. 3 (July 1947): 137, https://doi. org/ 10.3949/ccjm.14.3.133.

[163] Mary R. Summers and Remington L. Nevin, "Stellate Ganglion Block in the Treatment of Post-Traumatic Stress Disorder: A Review of Historical and Recent Literature," *Pain Practice: The Official Journal of World Institute of Pain* 17, no. 4 (April 2017): 547, https://doi.org/10.1111/ papr.12503.

the late 2000s. This lull in research began to change as Lipov et al. published the first report of SGB as a targeted therapy specifically for treating PTSD-related symptoms in 2008.[164]

In the period leading up to the first RCT in 2015, most reports covering SGB and PTSD were small-scale case series and case reports focused on active-duty and veteran populations.[165] Expanding upon these earlier case reports, Mulvaney et al. published a notable case series in 2014 that concentrated on combat-related PTSD with 166 total participants, all active-duty service members.[166] This case series indicated a substantially positive response across its patient population, highlighting the procedure's potential to treat an active-duty military population without inhibiting their ability to train and deploy.

Shortly after Mulvaney et al., Hanley et al. published the first RCT of SGB for the treatment of PTSD in 2014; counter to earlier case series and case reports, the 42-person Hanley et al. trial did not find a statistically significant difference between the treatment and sham arms. Following Hanley et al., Olmsted et al. published a larger DOD-funded multi-site RCT 2020. The trial included 113 active-duty military participants from three military treatment facilities in Hawaii, North Carolina, and Germany.[167]

As the largest SGB RCT to date and with statistically significant results in favor of SGB over sham, Olmsted et al. underscored the potential for SGB as an effective treatment compared to traditional PTSD treatments. Going forward, a VA-sponsored 360-person multi-site RCT scheduled to begin in late 2022 may be a decisive milestone in the push for broader implementation of SGB to help address PTSD across the private and public sectors.[168]

---

[164] Summers and Nevin, "Stellate Ganglion Block for PTSD," 549.

[165] Summers and Nevin, 549.

[166] Mulvaney et al., "Stellate Ganglion Block Used to Treat Symptoms Associated With Combat-Related Post-Traumatic Stress Disorder: A Case Series of 166 Patients," *Military Medicine* 179, no. 10 (October 1, 2014): 1136, https://doi.org/10.7205/MILMED-D-14-00151.

[167] Olmsted et al., "Effect of Stellate Ganglion Block Treatment on Posttraumatic Stress Disorder Symptoms: A Randomized Clinical Trial," *JAMA Psychiatry* 77, no. 2 (February 1, 2020): 131, https://doi.org/10.1001/jamapsychiatry.2019.3474.

[168] VA Office of Research and Development, "Efficacy and Safety of Stellate Ganglion Block for Post-Traumatic Stress Disorder in Veterans: NCT05169190," Clinical Trial Registration (clinicaltrials.gov, August 12, 2022), https://clinicaltrials.gov/ct2/show/NCT05169190.

2. What does Stellate Ganglion Block do?

The SGB procedure differs significantly from both traditional forms of treatment for PTSD as well as the emerging treatments mentioned throughout this thesis. While most forms of treatment involve a combination of longer-term pharmacotherapy and psychotherapy, completion of the SGB procedure is measured in minutes, incorporating a real-time physical intervention to rapidly influence a patient's sympathetic nervous system. Specifically, SGB involves injecting a local anesthetic, guided by either ultrasound or x-ray, near a bundle of sympathetic nerves known as the stellate ganglion.

A part of the cervical sympathetic chain, the stellate ganglion, lies just forward of the spine and above the collarbone.[169] The local anesthetic injected near the stellate ganglion temporarily interrupts the cervical sympathetic chain.[170] Generally performed under local anesthesia and in a doctor's office or outpatient setting, the procedure usually takes less than 30 minutes to complete with a short follow-on post-treatment recovery period.[171] Patients typically experience the transient effects of Horner's syndrome (drooping eyelid, asymmetric pupil dilation, alternation in sweating), which is a sign of a successful block. The historical complication rate is meager at 1.9 per 1,000 procedures,[172] with few noted adverse effects across multiple cohort studies and the most recent RCT[173]

3. Effects of Stellate Ganglion Block on PTSD

While the exact mechanism of action for the amelioration of PTSD symptoms through SGB is not precisely understood, most hypotheses point to the procedure's temporary disruption of the connection between the sympathetic nervous system and the

---

169 Mulvaney et al., "SGB for Combat-Related PTSD," 1137.

170 Rae Olmsted et al., "SGB for PTSD Symptoms," 130.

171 Mulvaney et al., "The Successful Use of Left-Sided Stellate Ganglion Block in Patients That Fail to Respond to Right-Sided Stellate Ganglion Block for the Treatment of Post-Traumatic Stress Disorder Symptoms: A Retrospective Analysis of 205 Patients," *Military Medicine* 187, no. 7–8 (July 1, 2022): e826, https://doi.org/10.1093/milmed/usab056.

172 H. Wulf and C. Maier, "Complications and Side Effects of Stellate Ganglion Blockade. Results of a Questionnaire Survey," *Der Anaesthesist* 41, no. 3 (March 1992): 146.

173 Hickey et al., "Stellate Ganglion Block for the Treatment of Posttraumatic Stress Disorder," ed. Elspeth Cameron Ritchie, *Psychiatric Annals* 43, no. 2 (February 2013): 89, https://doi.org/ 10.3928/ 00485713-20130205-08.

parts of the brain irregularly activated in PTSD, such as the amygdala, hippocampus, and prefrontal cortex.[174] As evidenced by advanced neuroimaging, these portions of the brain are often associated with hyperarousal and appear overactive in individuals with PTSD.[175] Enduring over-activation of the sympathetic nervous system begets chronic stress and anxiety, leading to functional impairment and emotional dysregulation.

SGB proponents assert that by temporarily interrupting the cervical sympathetic chain by injecting an anesthetic in proximity to the stellate ganglion, the procedure can effectively "reset the fight-or-flight" response in the patient.[176] Sean Mulvaney, a former Navy SEAL and Army physician, asserts that it is in this reset that patients can achieve the "legroom" necessary to pursue additional treatment modalities.[177] Mulvaney, who now operates as a civilian sports medicine physician and an advocate for the SGB procedure, further underscores that this initial relaxation of the patient's fight-or-flight response enables more significant engagement with mental health professionals.[178] Intuitively, the initial positive observed effects coupled with the potential of increased engagement could lead to a decrease in traditional therapies' high dropout and non-compliance rates.[179]

Like ketamine therapy, SGB's immediate effects could attenuate debilitating PTSD symptoms to the degree that other treatment modalities become more efficacious and accessible, especially to those experiencing treatment-resistant PTSD.[180] The noted rapid onset of these effects represents one of the treatment's most significant advantages. In

---

[174] James H. Lynch, "Stellate Ganglion Block Treats Posttraumatic Stress: An Example of Precision Mental Health," *Brain and Behavior* 10, no. 11 (August 28, 2020): 2, https://doi.org/10.1002/ brb3.1807.

[175] Peterson et al., *Evidence Brief,* 4.

[176] Sean Mulvaney, "PTSD: Treat the Epidemic in Our Ranks," *Proceedings* 145, no. 11 (November 1, 2019), 2, https://www.usni.org/magazines/proceedings/2019/november/ptsd-treat-epidemic-our-ranks.

[177] Mulvaney, "PTSD," 4.

[178] Mulvaney, 7.

[179] Eugene Lipov and Elspeth Ritchie, "A Review of the Use of Stellate Ganglion Block in the Treatment of PTSD," *Current Psychiatry Reports* 17 (August 1, 2015): 599, https://doi.org/10.1007/ s11920-015-0599-4.

[180] Sean W. Mulvaney, James H. Lynch, and Russ S. Kotwal, "Clinical Guidelines for Stellate Ganglion Block to Treat Anxiety Associated With Posttraumatic Stress Disorder," *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 15, no. 2 (2015): 84, https://doi.org/10.55460/EQ05-H5TO.

addition to the observed rapid effects of SGB, the non-pharmacologic biological approach to the SGB procedure centers on a physical intervention, which could decrease the stigma often associated with other mental health disorder treatments.[181] Additionally, the lack of a requirement for daily medications, such as traditional pharmacologic treatments like SSRIs, can increase compliance and decrease traditionally high dropout rates.[182]

A notable and essential aspect of SGB for the active-duty military population is the studied lack of degradation in post-treatment neurocognitive performance. In a 2015 case series involving 11 active-duty combat veterans, Mulvaney et al. noted that SGB did not impair essential qualities like reaction times, memory, and concentration.[183] While rapidly decreasing the detrimental effects of hyperarousal is a noted positive effect of SGB, in the case of active-duty military personnel, it is also critically important for treatments to preserve life-saving performance skills like reaction times and concentration.

D. PSYCHEDELIC RESEARCH DESIGN FLAWS

This section will discuss common shortfalls in psychedelic research trials to date. Psychedelics have experienced a renaissance in research over the last decade. FDA approval for Phase III trials for certain psychedelics holds promise for the long-lasting improvement of one's well-being by reducing depression, anxiety, stress, and addiction and even treating treatment-resistant mental health disorders.[184] Initial findings have resulted in a new wave of enthusiasm and publicity surrounding psychedelics.[185]

---

[181] Navaie et al., "Use of Stellate Ganglion Block for Refractory Post-Traumatic Stress Disorder: A Review of Published Cases," *Journal of Anesthesia and Clinical Research* 5, no. 4 (2014), 7, https://doi.org/10.4172/2155-6148.1000403.

[182] Lipov and Ritchie, "Use of SGB in the Treatment of PTSD," 599.

[183] Mulvaney et al., "Neurocognitive Performance Is Not Degraded After Stellate Ganglion Block Treatment for Post-Traumatic Stress Disorder: A Case Series," *Military Medicine* 180, no. 5 (May 1, 2015): 603, https://doi.org/10.7205/MILMED-D-14-00504.

[184] Romanenko, Pavel and George Fejer, "The Biggest Challenges for Psychedelic Science Today" (ICPR 2020: Interdisciplinary Conference for Psychedelic Research, August 30, 2020), https://icpr-conference.com/the-biggest-challenges-for-psychedelic-science-today/.

[185] Richard Haridy "The Problem at the Heart of Modern Psychedelic Clinical Research," The New Atlas, June 13, 2021, https://newatlas.com/science/placebo-problem-blinding-modern-psychedelic-science/.

While there is growing enthusiasm around the burgeoning collection of widely shared and evaluated research studies on psychedelic therapy, these studies are not without flaws or notable critiques. Those critical of recent findings point to the over-enthusiastic supporters of psychedelics and the inherent methodological difficulties associated with psychedelic trials. The initial wave of western medicine psychedelic studies occurred in the 1950–1960s. Promising research during this period and national-level support from governmental and academic institutions spurred increased interest and expanded studies.[186]

Despite the encouraging claims, critics in the medical field questioned the validity of the studies by pointing to a general lack of controls, blinding measures, and inadequate follow-up assessments.[187] In addition to methodological shortfalls, many factors, such as the conspicuous misuse by high-profile researchers and conservative aversion to the wave of illicit counterculture use, led to the near-complete ban of psychedelics by the 1970s.[188] While those past critiques largely stem from a period of relaxed or ill-defined protocols, modern psychedelic researchers face many of the same methodological hurdles and the continued cultural stigma associated with illicit drug use.

1. RCT Masking

One of the most prominent and reoccurring methodological issues with the initial studies in the 1950s and 1960s and modern psychedelic studies is the omission of treatment masking procedures and post-treatment masking efficacy. Masking (blinding), in the context of clinical trials, refers to the research design's deliberate process of withholding the prospective treatment at various levels, all to limit conscious or unconscious bias.

[186] Rotem Petranker, Thomas Anderson, and Norman Farb, "Psychedelic Research and the Need for Transparency: Polishing Alice's Looking Glass," *Frontiers in Psychology* 11 (2020): 1–2, https://www.frontiersin.org/article/10.3389/fpsyg.2020.01681.

[187] Danielle Giffort, *Acid Revival: The Psychedelic Renaissance and the Quest for Medical Legitimacy* (U of Minnesota Press, 2020), 35.

[188] Petranker, Anderson, and Farb, "Psychedelic Research and the Need for Transparency," 2.

Masking ranges from the subject level to data collectors, investigators, and clinicians assessing outcomes.[189]

While definitions may vary, single-blind typically denotes the withholding of treatment allocation at the subject level. Double-blind refers to withholding treatment information for both the subject and the researcher—the double-blind clinical study ranks as the "gold standard" for validating treatment efficacy.[190] In the case of psychedelic research, blinding is particularly difficult due to the psychoactive nature of various psychedelic substances. The subjective effects of the treatments are often so pronounced to both the subject and evaluators that it makes adequate blinding extremely difficult, decreasing the utility of the comparator and potentially overestimating the effect size of the treatment.[191]

A review of the masking measures in a 2021 MDMA clinical trial highlights the difficulties associated with blinding. The researchers explicitly noted impediments associated with masking during the study stating, "Given the subjective effects of MDMA, the blinding of participants was also challenging and possibly led to expectation effects."[192] In clinical trials involving potentially breakthrough treatments for chronic illnesses or diseases, positive subject expectations can overinflate the treatment's actual effect and negatively impact the subjective measures associated with an undesired treatment arm or placebo.[193] In addition to blinding a subject to their assigned treatment, researchers also assess the post-trial efficacy of the blinding protocols.

---

[189] Anthony J. Viera and Shrikant I. Bangdiwala, "Eliminating Bias in Randomized Controlled Trials: Importance of Allocation Concealment and Masking," *Family Medicine* 39, no. 2 (February 2007): 133.

[190] Sharoon David and Paras B. Khandhar, *Double-Blind Study*, *StatPearls,* (StatPearls Publishing, 2021), https://www.ncbi.nlm.nih.gov/books/NBK546641/.

[191] Suresh D. Muthukumaraswamy, Anna Forsyth, and Thomas Lumley, "Blinding and Expectancy Confounds in Psychedelic Randomized Controlled Trials," *Expert Review of Clinical Pharmacology* 14, no. 9 (September 2021): 1134, https://doi.org/10.1080/17512433.2021. 1933434.

[192] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1030.

[193] Aday et al., "Great Expectations: Recommendations for Improving the Methodological Rigor of Psychedelic Clinical Trials," *Psychopharmacology* 239, no. 6 (June 2022): 1991, https://doi.org/ 10.1007/ s00213-022-06123-7.

In the same 2021 MDMA trial, the research team did not formally evaluate the effectiveness of their blinding protocols, conducting a post-treatment informal assessment as they notified trial participants of their treatment arm. The researchers concluded that many subjects correctly guessed their treatment arm, stating "at least 10% had inaccurately guessed their treatment arm."[194] Post-treatment unblinding statistics from psychedelic trials like the MDMA trial highlight the difficulty of successfully conducting a double-blinded trial of a psychoactive substance. If left unaddressed, a lack of blinding or ineffectual blinding procedures can lead to a heightened degree of expectation bias amongst the subject population, resulting in a considerable predisposition towards a positive or negative response to the suspected treatment arm.[195]

The issue of "breaking blind" is that it causes an expectation bias in the patient, which increases the risk of positively reporting a perceived effect because that is expected.[196] Due to the profound subjective experiences, psychedelic research cannot easily be mimicked with active placebos.[197] New research techniques have attempted to mitigate the placebo problem by using different doses of psychedelic compounds with or without a placebo-controlled group. This will allow researchers to determine the various effects at a given dosage. Outside of dose-controlled groups, other alternatives to identifying the efficacy of psychedelic compounds may be a direct comparison of two or more compounds in the same setting over the same observation timeline while mitigating other patient-specific demographic differences.

[194] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1032.

[195] Mertens et al., "Methodological Challenges in Psychedelic Drug Trials: Efficacy and Safety of Psilocybin in Treatment-Resistant Major Depression (EPIsoDE) – Rationale and Study Design," *Neuroscience Applied* 1 (January 1, 2022): 100104, https://doi.org/10.1016/j.nsa.2022.100104.

[196] Balázs Szigeti et al., "Self-Blinding Citizen Science to Explore Psychedelic Microdosing," *ELife* 10 (March 2, 2021): e62878, https://doi.org/10.7554/eLife.62878.

[197] Griffiths et al., "Psilocybin Can Occasion Mystical-Type Experiences Having Substantial and Sustained Personal Meaning and Spiritual Significance," *Psychopharmacology* 187, no. 3 (August 2006): 269; discussion 284–292, https://doi.org/10.1007/s00213-006-0457-5.

2. Researcher Bias

Many psychedelic researchers are understandably enthusiasts and often biased. The promise of psychedelics has overwhelmingly emphasized positive outcomes while ignoring the potentially adverse consequences. These over-positive tendencies incentivize researchers to publish positive findings while negative results get filed away. This problem is compounded by high investment costs for psychedelic research, which perpetuates the desire for positive results.[198]

Psychedelic research is not exempt from cultural, economic, or systematic biases. In psychology, this problem is known as the bias of the WEIRD (Western, Educated, Industrialized, Rich, and Democratic societies).[199] Psychedelic research appears to be following this trend. It is crucial to diversify a population sample that "members of marginalized cultures or economic statuses or risk inheriting biases that are systemic to society."[200] A widely acknowledged and accepted concept within the field of psychedelics is set and setting. However, studies have yet to test this concept and its underlying mechanisms in a cross-cultural manner.

3. Participant Demographics and Generalizability

In addition to a potential for bias introduced by the robust physiological effects of psychedelics, participant self-selection coupled with high-profile media coverage extolling positive findings associated with psychedelics has the potential to impact expectancy bias and limit the overall generalizability of the study. While investigators typically approach or directly recruit subjects for psychotropic drug trials, a class of medicines that include

198 Muthukumaraswamy, Forsyth, and Lumley, "Blinding and Expectancy Confounds in Psychedelic Randomized Controlled Trials," 1139.

199 Alex Mesoudi, Kesson Magid, and Delwar Hussain, "How Do People Become W.E.I.R.D.? Migration Reveals the Cultural Transmission Mechanisms Underlying Variation in Psychological Processes," ed. Christine A Caldwell, *PLOS ONE* 11, no. 1 (January 13, 2016): 2, https://doi.org/10.1371/journal.pone.0147162.

200 Romanenko, Pavel and Fejer, "Challenges of Psychedelics,"

traditional anti-depressants, trial subjects typically self-register or self-refer for psychedelic trials.[201]

The researchers conducting the 2021 double-blind RCT comparing psilocybin versus escitalopram acknowledge how participant self-selection can limit generalizability, stating, "Most of the recruited volunteers referred themselves [to the study], and many expressed a preference for psilocybin over escitalopram."[202] High rates of self-referrals, set against an environment that has increasingly optimistic views of psychedelics, could result in an increased expectation bias and an overinflection of treatment effects.[203]

In terms of recruitment and clinical trial demographics, a high rate of self-selection and shortfalls in external recruiting may also result in a relatively homogenous clinical trial population. The previously mentioned studies acknowledged diversity and inclusion deficits in their respective trial populations. The researchers of the Carhart-Harris et al. psilocybin trial stated, "The patients in the trial were not from diverse ethnic or socioeconomic backgrounds." The Mitchell et al. MDMA trial researchers said, "The [clinical trial] population is relatively homogeneous and lacks racial and ethnic diversity, which should be addressed in future trials."[204] The limited diversity of their respective trial populations and relatively limited size directly impact the generalizability or external validity of the findings from those studies.

While a diverse subject pool is an essential aspect of the external validity of a trial, in the case of psychedelic trials, past psychedelic use and experience with hallucinogenic substances also contribute to the broader external validity of the study. Those with past experiences with hallucinogenic substances are more attuned to their effects and more likely than those without past experiences to differentiate between the psychedelic

201 Mertens et al., "Methodological Challenges in Psychedelic Drug Trials," 7.

202 Carhart-Harris et al., "Trial of Psilocybin versus Escitalopram for Depression," *New England Journal of Medicine* 384, no. 15 (April 15, 2021): 1410, https://doi.org/10.1056/ NEJMoa2032994.

203 Muthukumaraswamy, Forsyth, and Lumley, "Blinding and Expectancy Confounds in Psychedelic Randomized Controlled Trials," 1136.

204 Carhart-Harris et al., "Trial of Psilocybin," 1411.

treatment arm and its active or inactive comparators.[205] Larger sample sizes would lend to more diverse subject pools, but the stigma surrounding psychedelics prevents greater participation. Conversely, a large portion of participants reports previous psychedelic use. In the Mitchell et al. MDMA study, approximately 40 percent of the MDMA-treatment component reported past MDMA use, and roughly 30 percent of the subjects overall reported previous MDMA use.[206] Past use in the case of psychedelic trials may decrease the efficacy of blinding protocols and limit the external validity of the findings from the trial.

[205] Aday et al., "Great Expectations," 1993.

[206] Mitchell et al., "MDMA-Assisted Therapy for Severe PTSD," 1028.

THIS PAGE INTENTIONALLY LEFT BLANK

VII. THE COUNTERARGUMENTS

A. KETAMINE AND SGB SHORTFALLS

While ketamine has shown potential for a notable decrease in PTSD symptoms across researched trials, there are a series of deficiencies in ketamine studies that are common across many other psychedelic studies. The two most conspicuous faults were small sample sizes and short follow-up periods—except for one large 2022 double-blind RCT. Most trials ranged from 20–30 participants and lacked post-treatment assessment data beyond eight weeks.[207] Beyond information shortfalls linked to study design limitations, there are inherent risks and constraints in ketamine therapy compared to more traditional treatment methods.

First, the very nature of the ketamine infusion experience, such as the potential for dissociative effects, necessitates a specific treatment space and post-treatment monitoring.[208] In addition, while the initial treatments range from 4–6 doses over a few weeks, ketamine therapy typically requires a maintenance regimen to sustain its anti-depressant effects—the scope of long-term maintenance requirements entails further study.[209] Conversely, psilocybin and MDMA have shown significant decreases in PTSD symptoms, depression, and anxiety that last for months, and up to a year, with only a single administration. Lastly, ketamine presents an addiction risk, a significant risk factor when acknowledging the comorbidity of substance abuse with depression and PTSD.[210] Despite the risks associated with ketamine, organizations such as the VA and DOD recognize its

[207] Albuquerque et al., "Evidence for Beneficial Effect of Ketamine," 5–7.

[208] Department of Veterans Affairs & Department of Defense, "VA/DOD Clinical Practice Guideline for The Assessment and Management of Major Depressive Disorder" (Department of Veterans Affairs & Department of Defense, 2022), https://www.healthquality.va.gov/guidelines/ MH/mdd/VADoD MDDCPGFinal508.pdf.

[209] Phillips et al., "Single, Repeated, and Maintenance Ketamine Infusions for Treatment-Resistant Depression: A Randomized Controlled Trial," *American Journal of Psychiatry* 176, no. 5 (May 2019): 407, https://doi.org/10.1176/appi.ajp.2018.18070834.

[210] Department of Veterans Affairs & Department of Defense, "VA/DOD Clinical Practice Guideline for The Assessment and Management of Major Depressive Disorder," 41.

potential to address depression and PTSD positively—a vital component to effectively stemming the tide of active-duty and veteran suicides.

Regarding SGB, though recent trials and past retrospective studies have highlighted the potential efficacy of the SGB procedure in treating PTSD, the main criticisms regarding full SGB adoption center on a generally limited assessment of long-term SGB efficacy and a relatively narrow set of adequately powered trials.[211] Large organizations like the Department of Veterans Affairs have yet to acknowledge SGB as a first-line treatment for PTSD. However, individual facilities within the VA systems are beginning to explore SGB as an adjunct treatment to traditional therapies, especially for those with treatment-resistant cases.

Recent trials like the 2020 Olmsted et al. RCT with 113 participants and the upcoming 2022–24 VA-sponsored RCT with a planned 360 participants represent future datasets that could answer the abovementioned criticisms. Like ketamine treatments, the SGB procedure is a novel, invasive procedure with potential short-term benefits that require multiple follows to sustain its effects. Though it represents a promising alternative to psychedelic-assisted therapy because it is a legal procedure, its effects pale compared to psychedelics.

B. LEGALITY PRECEDENCE

From a legal standpoint, the argument against psychedelic-assisted therapy for SOCOM service members is that those substances are listed as Schedule I drugs on the controlled substances list. The counter-argument is that amphetamines are also a Schedule I controlled substance, but they can be administered under certain circumstances. The military recognizes and upholds the Controlled Substances Act through various UCMJ Articles. Amphetamines, however, are Schedule I drugs that have navigated the lengthy and significantly bureaucratic process of legally using controlled substances. First used by the Allies and Axis forces in World War II, amphetamines were a newly created drug designed to increase the limits of the mind. The German Wehrmacht received 35 million

211 Peterson et al., *Evidence Brief*.

3-milligram tablets of Pervitin for three months to support continual operations at a heightened cognitive state.[212] Dextroamphetamine, created in the 1930s, was a prescription-grade stimulant authorized by the Allied forces across all branches of service, with minimal oversight.[213] What began as biotechnological initiatives designed to gain the upper hand against enemies on the battlefield has evolved to encompass a wide-reaching group of performance-enhancing controlled substances garnering attention from Department of Defense primes like the Defense Advanced Projects Research Agency (DARPA).

In the modern military, aviators are routinely prescribed Dextroamphetamine and Modafinil as approved substances for use during flight to maintain vigilance and alertness when mentally fatigued.[214] Ground forces have even been prescribed amphetamines despite linkages to friendly-fire instances in Afghanistan circa 2002.[215] Furthermore, Propranolol, a proven beta-blocker that alters neurochemicals associated with traumatic memory formation in the brain, has proven promising in military communities despite adverse emotional impacts that raise other ethical concerns around a subject's decision-making capacity under stress.[216] Nevertheless, as Jessica Wolfendale points out, the salient use of controlled substances as performance-enhancing drugs within the military raises ethical concerns about the moral responsibility of military agents to uphold the military's ethical commitment.[217] Especially without compromising an individual's integrity to experience regulating emotions such as remorse and guilt. Amphetamine use has not slowed down within the military. Notwithstanding the significant amount of credible new

212 Nicolas Rasmussen, "Medical Science and the Military: The Allies' Use of Amphetamine during World War II," *The Journal of Interdisciplinary History* 42, no. 2 (2011): 205–33, http://www.jstor.org/stable/41291190.

213 Rasmussen, "Medical Science and the Military," 208.

214 Rasmussen, 205.

215 Eric A Bower and James R Phelan, "Use of Amphetamines in the Military Environment," *The Lancet* 362 (December 2003): s18–19, https://doi.org/10.1016/S0140-6736(03)15060-X.

216 Jonathan D. Moreno, *Mind Wars: Brain Research and National Defense* (New York: Dana Press, 2006).

217 Jessica Wolfendale, "Performance-Enhancing Technologies and Moral Responsibility in the Military," *The American Journal of Bioethics* 8, no. 2 (May 9, 2008): 28–38, https://doi.org/10.1080/15265160802014969.

research in the following two decades since it was published, little advancements have been made within AR 40-7 to overcome the Schedule I hurdle for the use of psychedelic-assisted therapies for members of the armed forces afflicted by PTSD and other mental health issues stemming from the past two decades of armed conflicts in the Middle East.

C. NAVIGATING PSYCHEDELIC RESEARCH PITFALLS

Many of the issues regarding psychedelic research pitfalls can be remedied by applying the principles of open science. This includes "the preregistration of all hypotheses, the study design, data collection methods, and analysis pipelines to increase transparency throughout every step of the scientific process."[218] Should SOCOM or the DOD pursue any means of psychedelic research, it would be wise to start with a review of articles that adhere to the Open Science principles for credibility, accurate understanding, and the potential for reproducibility. A SOCOM CRADA with a reputable institution and a compassionate-use exemption to policy would allow active-duty service members to participate in psychedelic research – giving them a new chance at combating significant trauma while supporting research initiatives. Given the complex history psychedelics' have, it is crucial to conduct this kind of research with care and transparency to maintain a high degree of objectivity.[219] Researchers face conflicting interests and malign incentives, but missteps in the science of psychedelics can be avoided with transparency and moral research practices.[220]

[218] Romanenko, Pavel and Fejer, "Challenges of Psychedelics,"

[219] Rotem Petranker, Thomas Anderson, and Norman Farb, "Psychedelic Research and the Need for Transparency: Polishing Alice's Looking Glass," *Frontiers in Psychology* 11 (2020), https://www.frontiersin.org/article/10.3389/fpsyg.2020.01681.

[220] Petranker, Anderson, and Farb, "Psychedelic Research and the Need for Transparency," 3.

VIII. A WAY FORWARD

A. IMPLEMENTATION

In Greek Mythology, the Titan Prometheus is credited with stealing fire from Hephaestus' forge and delivering it to humanity. In the act of defiance against Zeus, Prometheus not only endowed civilization with fire but with the knowledge of how to use fire to create enduring empires.[221] In addition to fire, Prometheus bestowed the knowledge of science, mathematics, architecture, and navigation, providing humanity dominion over the physical world.[222] Once implemented, Prometheus' gifts created a significant crisis for Zeus and the Gods by enabling humankind to question their power. It also created a crisis on earth due to the ability to project management and authority over one another.

As the myth goes, the discovery or rediscovery of fire began a paradigm shift that forever altered the world. A paradigm shift, or, as Thomas Kuhn explains in *The Structure of Scientific Revolutions*, the "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners," is precisely what Prometheus gifted humanity. However, cultural, societal, political, and bureaucratic change requires much more than identifying novel ideas. They demand action and implementation. Furthermore, actual paradigm shifts need coherent designs capable of ballasting during the externalities inherent in profound change.

This chapter focuses on how providing active-duty military members, specifically members within SOCOM suffering from PTSD, stress, and anxiety, access to psychedelic therapy is a paradigm shift that will undoubtedly affect the mental health crisis within the ranks and what pragmatic design for implementation looks like, how the Department of Defense stands to benefit from psychedelic-assisted therapies to affect the mental health crisis within the United States Military.

---

[221] National Museums Liverpool, "Prometheus: Stealing Fire From the Gods," Liverpool Museums, n.d., https://www.liverpoolmuseums.org.uk/world-museum/greek-myths-and-legends/prometheus-stealing-fire-gods.

[222] National Museums Liverpool, "Prometheus: Stealing Fire From the Gods,"

A. THE PARADIGM SHIFT

A paradigm shift in how the Department of Defense is combatting the effects of more than two decades of declared war in the Middle East is beginning in the United States. Despite the lack of infrastructure to support novel treatments at the scope required domestically within the United States, psychedelic-assisted therapies have continuously gained traction among veteran communities. To such an extent, policymakers are now working to develop legal and funded programs for members of the armed forces suffering from PTSD and TBI. Undoubtedly, these changes will create new challenges and opportunities, but a significant demographic who stand to benefit from programs while continuing to serve the United States military apparatus still exists–the active-duty population.

Three factors must occur to influence the active-duty population in a manner that constitutes a paradigm shift. First, the cultural demand signal must demonstrate the cultural shift of willingness to put forth such a change. Second, a bureaucratic shift should be moving away from traditional treatment methods. Finally, there must be an organizational shift in how the services implement policy change.

B. CULTURAL SHIFT

The increasing demand stemming from mental health disorders and the various societal, political, and legal pressures to remove psychedelics as a Schedule I controlled substance have led to positive change for the masses. Tracking these changes is the Multidisciplinary Association for Psychedelic Studies (MAPS). MAPS is a non-profit founded in 1986 that funds and tracks research initiatives to provide legal and medical knowledge on psychedelics. MAPS asserts that only one adverse reaction occurred among the 1,700 human subjects and countless human trials using psychedelic-assisted therapy for PTSD. Additionally, Psilocybin alpha also tracks the "Psychedelic Renaissance" by providing real-time changes state by state with the decriminalization of psychedelics and the associated approved and pending patents.

Psilocybin alpha currently has over 100 approved or pending patents since 1958.[223] Patents and research initiatives such as those led by Roland Griffiths and Frederick Barrett from Johns Hopkins' Center for Psychedelic and Consciousness Research received $17 million in funding to further the field of psilocybin for controlled relief from anxiety, negative emotion, and other cognitive ailments. Alternatively, the projects of Neuroscientist Michael Silver, the inaugural director of UC Berkley's new Center for the Science of Psychedelics, who leads researchers in clinical studies that complement those conducted by Johns Hopkins and the Imperial College London to increase scientific understanding of psychedelic compounds to treat mental health disorders.[224]

Across the Atlantic, the United Kingdom's Imperial College London's Centre for Psychedelic Research, headed by neuropsychopharmacologists David Nutt and Robin Carhart-Harris, has funded more than €3 million to map the effects of psychedelics. They aim to provide additional clinical evidence to prototype future licensed psychedelic facilities and interventions.[225] In addition to the prestigious research universities assisting in bringing the positive impacts of psychedelics to the betterment of individuals suffering from anxiety, depression, and other transgressive behaviors, private sector corporations and venture capitalists are contributing too.

The list of companies drawing millions of dollars from venture capitalists hoping to capitalize on the promising results from psycho-assisted therapies demonstrates the ecosystem's health. Atai Life Sciences attracted investments from billionaire and co-founder of PayPal and Palantir Technologies, Peter Thiel.[226] Kevin O'Leary, N.B.C.'s well-known investor from Shark Tank, invested in both MindMed and Compass Pathways, citing that the market's scope for treating PTSD and depression demonstrates immense

---

[223] Patrick Lester, "Putting the Politics Back in Implementation," *Social Innovation Research Center* (blog), January 27, 2018, http://www.socialinnovationcenter.org/archives/3012.

[224] Yasmin Anwar, "U.C. Berkeley Launches New Center for Psychedelic Science and Education," *Berkeley News*, September 14, 2020, https://news.berkeley.edu/2020/09/14/uc-berkeley-launches-new-center-for-psychedelic-science-and-education/.

[225] "About Us" (Imperial College London, n.d.), https://www.imperial.ac.uk/psychedelic-research-centre/about-us/.

[226] Keith Speights, "Investing in Psychedelic Stocks," *The Motley Fool*, August 23, 2022, https://www.fool.com/investing/stock-market/market-sectors/healthcare/psychedelic-stocks/.

potential.[227] TOMS founder Blake Mycoskie, New York Times five-time best-selling author Tim Ferris, the Steven and Alexandra Cohen Foundation, and Angel Investor Craig Nerenberg partnered to gift $17 million to Johns Hopkins for research on psychedelic-assisted therapies.[228]

The number of companies turning towards psychedelics to address the growing need centered around addiction, cancer treatment, PTSD, depression, and many other disorders continues to grow. So does the amount of funding and legal support needed to ensure that the advances in psychedelic-assisted therapies endure. If there is any indication that these promising forms of treatment are here to stay, a quick reflection on the effects of the Decriminalize Nature movement associated with the marijuana industry proves a relevant analog to the current state of the psychedelic industry.

After overcoming the stigma associated with Nixon's War on Drugs, the marijuana industry operated at multiple levels of government to chip away at the stigma associated with psychedelics. Physicians, capitalists, journalists, and politicians each had a unique approach to how the effects of cannabis could ameliorate ailments, remedy medical disorders, or provide expansive revenues.[229] The present-day psychedelics industry is reminiscent of the early marijuana movement. Current research demonstrates the legitimate effects psychedelics have on PTSD, anxiety, addiction, and depression. As of December 2021, local governments across twenty-two states have either passed or are working to pass legislation to deprioritize criminal activity penalties with small amounts of psychedelics for personal use.[230]

---

227 Eric Rosenbaum, "Kevin O'Leary: Psychedelic Drugs 'Far Exceed' Cannabis Investment Potential," *CNBC*, May 11, 2022, https://www.cnbc.com/2021/05/11/kevin-oleary-psychedelic-drugs-far-exceed-cannabis-potential.html.

228 "Johns Hopkins Receives $17 Million for Research on Psychedelics," *Philanthropy News Digest*, September 6, 2019, https://philanthropynewsdigest.org/news/johns-hopkins-receives-17-million-for-research-on-pyschedelics.

229 Madison Margolin, "How the Psychedelic Industry Can Learn From the Cannabis Industry's Mistakes," *Double Blind* (blog), February 9, 2022, https://doubleblindmag.com/cannabis-psychedelics-corporatization-compass/.

230 "Psychedelic Legalization & Decriminalization Tracker," *Psychedelic Alpha* (blog), 2022, https://psychedelicalpha.com/data/psychedelic-laws.

The United States Department of Defense has recognized the potential benefits of psychedelic-assisted therapies. In June 2020, DARPA initiated and funded a four-year, $26.9 million cooperative research program with the University of North Carolina.[231] The research agreement, led by Bryan Roth, seeks to identify and create novel psychedelic compounds that have the same positive effects as psychedelics on anxiety and depression without the "hallucinogenic, addictive, and disorienting side effects [that] make their clinical use limited."[232]

C. BUREAUCRATIC SEA CHANGE

For two reasons, politics, legislation, and bureaucracy are essential for implementing evidence-based psychedelic programs to combat PTSD and TBI for active-duty service members. First, politics shape the policy, which drives the strategy for implementation. Politics leads to legislation that addresses the appropriate funding and legal authorities to implement novel evidence-based programs within the Department of Defense.[233] Second, the bureaucratic nature inherent within political institutions transcends political party lines and presidential administrations and persists in the implementation process after legislation has passed.[234]

When describing the importance of paradigms, Kuhn states, "[Paradigms] assist in the determination of the roster of unsolved puzzles and the evaluation of the importance of each."[235] Kuhn argues that searching to solve particular problems or puzzles involves "determination of significant fact, matching of facts with theory, and articulation of

---

[231] Barbara E. Bauer, "U.N.C. to Receive $26.9 Million from DARPA to Develop Psychiatric Medicines," *Psychedelic Science Review* (blog), June 16, 2020, https://psychedelicreview.com/unc-school-of-medicine-receives-26-9-million-from-darpa-to-develop-psychedelic-medicines/.

[232] Mark Derewicz, "Roth Leads $26.9 Million Project to Create Better Psychiatric Medications," *UNC Health Newsroom*, June 15, 2020, https://news.unchealthcare.org/2020/06/roth-leads-26-9-million-project-to-create-better-psychiatric-medications/.

[233] Lester, "Putting the Politics Back in Implementation,"

[234] Lester, "Putting the Politics Back in Implementation,"

[235] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed (Chicago, IL: University of Chicago Press, 1996), 184.

theory…both empirical and theoretical."[236] By that description, The National Defense Authorization Act (NDAA) is essentially the legislative understanding for the Nation's unsolved security puzzles. Furthermore, in true paradigmatic tradition, the collective knowledge of America's elected leaders in the legislative branch identifies and later appropriate funding to influence the most pressing national security puzzles and problems within the paradigm of the national security apparatus.

On July 14th, 2022, the House of Representatives passed H.R. 7900 to authorize the Department of Defense appropriations for FY23.[237] Before the President signs the bill, it must still pass the Senate; however, buried in the 1,230 topics were new bipartisan programs seeking a paradigm change in how the military has addressed the mental health crisis within the active-duty and veteran populations. Of the 1,230 issues voted on, six addressed PTSD.[238] Of those six, three specifically nominate psychedelics and alternative treatment methods like stellate ganglion blocks to address PTSD for veterans and active-duty service members. While the policy takes shape on Capitol Hill, the strategy for implementing change within the units with the most prominent demand signal is lacking.

D. TOP-DOWN DESIGN FOR IMPLEMENTATION

SOCOM's flexibility, agility, and ability to work with non-Federal partners to accomplish mission-oriented goals foster a prime environment for the organizational implementation of novel programs. Using SOCOM's CRADA option as a tool enables the command access to existing infrastructure, knowledge, funding, and resources of non-federal partners.[239] SOCOM should work to establish CRADAs with the leading research institutions on both the East and West coasts to support the various regional sub-unified commands within those perspective regions. Once SOCOM and a reputable university

---

[236] Kuhn, 34.

[237] "National Defense Authorization Act for Fiscal Year 2023 (H.R. 7900)," GovTracks.us, June 28, 2022, https://www.govtrack.us/congress/bills/117/hr7900.

[238] House of Representatives Committee on Rules, "National Defense Authorization Act for Fiscal Year 2023," Pub. L. No. H.R. 7900 (2022), https://rules.house.gove/bil/117/hr-7900.

[239] "SOF AT&L," U.S. Special Operations Command, n.d., https://www.socom.mil/SOF-ATL/pages/crada.aspx.

approve a CRADA, guidance to the sub-unified commands should follow to begin identifying individuals who benefit from evidence-based treatments.

During the initial phases of program identification and implementation, SOCOM should empower the sub-unified commands with the authority and autonomy to create tailored programs for their perspective units within the specific guidelines defined by SOCOM. The power for these initiatives would be derived from updated legislation from Congress on the implementation of psychedelic treatments to combat PTSD and branch-specific regulations, like AR 40-7, which outline the parameters for Schedule I controlled substance use for active-duty service members. Autonomy enables the sub-unified commands to provide service members with access to multiple programs across the continental United States while affording SOCOM the ability to access and observe myriad evidence-based programs.

SOCOM benefits the most from the CRADA model due to the significantly higher prevalence of PTSD and T.B.I. than the rest of the DOD. The CRADA model represents a shift away from the current method of treating mental health through the U.S. Department of Defense's Military Health System, which reportedly failed to consistently "meet outpatient mental health access to care standards for active-duty service members and their families, in accordance with law and applicable DOD policies" according to a 2020 Inspector General report spanning 2018–2020.[240]

E. BOTTOM-UP APPROACH

Viewed at a more granular level, the almost imperceptible shifts of paradigm change in the broader audience become more apparent. Although, before observing niche change, there must first be an understanding of the various pieces to the puzzle to be solved. Kuhn articulated through the word "exemplars" or precisely what a future group of problem-solvers should focus on and how to objectively measure results.[241] Suppose the

[240] Inspector General, Depratment of Defense, "Evaluation of Access to Mental Health Care in the Department of Defense," August 10, 2020, https://media.defense.gov/2020/Aug/12/2002475605/-1/-1/1/DODIG-2020-112_REDACTED.PDF.

[241] Thomas Kuhn, "What Is a Paradigm?," *The Living Philosophy* (blog), February 10, 2022, https://thelivingphilosophy.substack.com/p/what-is-a-paradigm-thomas-kuhn.

target population for the novel treatments is the individuals most likely exposed to conditions causing PTSD and TBI. In that case, the O-6 command level should be the focus.

Novel treatments are only as good as the specific treatments buy-in from the target population. Within U.S. Special Operations Command, the O-6 command level is where the raw data points accumulate within the active-duty population before being reported to higher commands. The O-6 command level directly influences the active-duty service members. They are called upon to deploy to austere conditions to uphold U.S. security interests. Moreover, the echelons of higher command who routinely interact with the Commanders who develop policies derived from The National Security and National Defense Strategy. At this level, commanders can gain unique perspectives about what an organization needs, wants, or will tolerate.

While paradigm change occurs nationally at the cultural, bureaucratic, and organizational levels, similar change can begin at a grassroots level. Awareness campaigns provided by approved mental health experts assigned to Special operations forces can inform the force of the available treatments. Once officially approved by Congress, Commanders at the O-6 level can and should show support for novel therapies and survey the force to identify the need and gauge the level of interest. This model affords real-time feedback to commanders, who are better prepared to care for the service members in the ranks who might benefit from psychedelic-assisted therapies once approved.

IX. CONCLUSION

A. RESULTS

This thesis aimed to identify the potential for psychedelic-assisted therapy to combat suicide amongst SOCOM personnel. The extensive literature review compared the leading treatments (SGB and ketamine) to novel psychedelic treatments (psilocybin and MDMA) for PTSD, depression, and anxiety. The aforementioned mental ailments serve as the leading comorbidities to suicide and suicidal ideations, thus providing researchers with measurable mental health disorders through standardized assessments. Scholarly articles were selected based on the principles Open Science, testing one of the four treatment methods (psilocybin, MDMA, SGB, or Ketamine) against one or more of the comorbidities of suicide, with associated standardized pre- and post-testing assessments.

In comparison to SGB and ketamine, psychedelic-assisted therapy is superior in three distinct ways. Psychedelics provide a rapid and sustained decrease in disorder-related symptoms, exhibit efficacy in treatment-resistant cases, and have minimal adverse events when administered in a controlled environment. Despite the research being limited to existing scholarly articles, the data that is currently available on psychedelic-assisted therapies (psilocybin and MDMA) demonstrates efficacious results in treating PTSD, depression, and anxiety. Psychedelics are more capable of treating these ailments by addressing the root cause of one's PTSD, depression, and/or anxiety.

The root causes may be a result of childhood trauma, exposure to violence like combat or sexual assault, TBI, or even a slow-developing chemical imbalance in the brain. Whatever the root cause is, psychedelics appear to allow one to re-process past traumas without an associated "fight or flight" reaction via neuroplasticity and a reduction of one's ego or "ego death." The empirical data, which continue to grow, show that psychedelic-assisted therapies are more effective in the short-term (<6 weeks) and long-term (>12 months) at reducing PTSD, depression, and anxiety in comparison to SGB and ketamine. Whereas SGB and ketamine require multiple administrations to achieve reduced PTSD,

depression, and anxiety levels, psychedelics often achieve remission of a diagnosis after only one dose.

B. IMPACTS

Like any emerging piece of technology or weaponry intended to provide commanders an advantage on the battlefield, research suggests that psychedelic-assisted therapy may positively assist in addressing mental health within SOCOM's active-duty population. Rapid advancements in technology, specifically social media, continue to bridge gaps between civilian populations and warfighters. Additionally, those same advancements are having significant impacts against political will regarding large-scale combat operations. This creates an increased reliance on SOCOM to execute combat operations and sensitive activities in support of national interests. The events unfolding today in Ukraine exemplify the limited, deterring nature conventional forces will continue to play in Great Power Competition. Conversely, seven years of special operations activities prior to the start of the conflict have provided the structure, regeneration, equipping, and tactical proficiency of the Ukrainian SOF that remain the main effort in that struggle. Without nearly a decade of SOCOM operations and personnel, that fight would be far worse off than it is today.

Losing even a single SOCOM service member to suicide is one too many, and with each loss, the special operations community and our Nation lose years of experience. The same experience gained from years of combat operations in Afghanistan and Iraq, JCETs, and bilateral engagements across the world will be called upon to shape the future battlefield and, ideally, prevent the onset of another conflict.

C. IMPLEMENTATION AND FUTURE RESEARCH

The story of Prometheus serves as a reminder that there is always an individual, or with the veteran population, a group of individuals who suffer significantly for human progress.[242] The selfless actions and toll on the veteran population, especially the special

[242] "Prometheus: The Creator of Mankind," Psychological Minds, June 27, 2018, https://psy-minds.com/prometheus-creator-mandkind/.

operators fighting in the Global War on Terror, ignite the paradigm shift for approved psychedelic treatments to combat PTSD and TBI within the DOD. Successful implementation depends on continued legislation, fiscal appropriations, and sound organizational strategies with follow-through. As Kuhn states, "to be more successful is not, however, to be either completely successful with a single problem or notably successful with any large number."[243] It takes an amalgamation of capabilities and factors to prevail throughout campaigning, crisis, and conflict. Psychedelic therapies are not a panacea for the mental health crisis within the military, but they carry emended potential to be another tool for treatment and recovery.

It is recommended that SOCOM identify avenues to gain additional information about the susceptibility and willingness of its personnel in relation to psychedelic treatment methods. A widespread survey of the force will illuminate the existing knowledge base of the potential of psychedelic-assisted therapy and provide leaders with a litmus test of their service members' appetite for novel treatments. Additionally, SOCOM should pursue a CRADA with the leading research institutes to reproduce the results of previous studies. To date, very few studies have focused on the application of psychedelic-assisted therapy for veterans, and none, due to legalities, have incorporated active-duty special operations personnel. The uniqueness of SOCOM personnel's experiences will provide researchers with a new diverse population pool to reproduce prior results while affording SOCOM another avenue to help those in its ranks who are suffering from various forms of treatment-resistant depression, anxiety, and PTSD.

243 Kuhn, *The Structure of Scientific Revolutions*.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Abdallah, Chadi G., Henk M. De Feyter, Lynnette A. Averill, Lihong Jiang, Christopher L. Averill, Golam M. I. Chowdhury, Prerana Purohit et al. "The Effects of Ketamine on Prefrontal Glutamate Neurotransmission in Healthy and Depressed Subjects." *Neuropsychopharmacology* 43, no. 10 (September 2018): 2154–60. https://doi.org/10.1038/s41386-018-0136-3.

Absher, Jim. "The Uniform Code of Military Justice (UCMJ)." Military.com, July 30, 2021. https://www.military.com/join-armed-forces/the-uniform-code-of-military-justice-ucmj.html.

Aday, Jacob S., Boris D. Heifets, Steven D. Pratscher, Ellen Bradley, Raymond Rosen, and Joshua D. Woolley. "Great Expectations: Recommendations for Improving the Methodological Rigor of Psychedelic Clinical Trials." *Psychopharmacology* 239, no. 6 (June 2022): 1989–2010. https://doi.org/10.1007/s00213-022-06123-7.

Akiki, Teddy J., Christopher L. Averill, and Chadi G. Abdallah. "A Network-Based Neurobiological Model of PTSD: Evidence from Structural and Functional Neuroimaging Studies." *Current Psychiatry Reports* 19, no. 11 (September 19, 2017): 81. https://doi.org/10.1007/s11920-017-0840-4.

Albuquerque, Thaís Rodrigues de, Luis Fernando Reis Macedo, Gyllyandeson de Araújo Delmondes, Modesto Leite Rolim Neto, Thales Marcon Almeida, Ricardo Riyoiti Uchida, Quirino Cordeiro, Kenya Waléria de Siqueira Coelho Lisboa, and Irwin Rose Alencar de Menezes. "Evidence for the Beneficial Effect of Ketamine in the Treatment of Patients with Post-Traumatic Stress Disorder: A Systematic Review and Meta-Analysis." *Journal of Cerebral Blood Flow & Metabolism*, July 26, 2022, 0271678X221116477. https://doi.org/10.1177/0271678X221116477.

Alexandra Kredlow, M., Robert J. Fenster, Emma S. Laurent, Kerry J. Ressler, and Elizabeth A. Phelps. "Prefrontal Cortex, Amygdala, and Threat Processing: Implications for PTSD." *Neuropsychopharmacology* 47, no. 1 (January 2022): 247–59. https://doi.org/10.1038/s41386-021-01155-7.

American Psychological Association. *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. 5th ed. Washington: American Psychiatric Association, 2013.

———. "What Is Posttraumatic Stress Disorder (PTSD)?" Accessed October 3, 2022. https://psychiatry.org/patients-families/ptsd/what-is-ptsd.

———. "Stress Effects on the Body." American Psychological Association, November 1, 2018. https://www.apa.org/topics/stress/body.

America's Health Rankings. "Analysis of CDC WONDER: Suicide, Multiple Cause of Death Report," 2019. https://www.americashealthrankings.org/explore/annual/measure/Suicide/state/ALL.

Andrade, Chittaranjan. "Ketamine for Depression, 4: In What Dose, at What Rate, by What Route, for How Long, and at What Frequency?" *The Journal of Clinical Psychiatry* 78, no. 7 (August 23, 2017): 10106. https://doi.org/10.4088/JCP.17f11738.

Anwar, Yasmin. "U.C. Berkeley Launches New Center for Psychedelic Science and Education." *Berkeley News*, September 14, 2020. https://news.berkeley.edu/2020/09/14/uc-berkeley-launches-new-center-for-psychedelic-science-and-education/.

Apfel, Brigitte A., Jessica Ross, Jennifer Hlavin, Dieter J. Meyerhoff, Thomas J. Metzler, Charles R. Marmar, Michael W. Weiner, Norbert Schuff, and Thomas C. Neylan. "Hippocampal Volume Differences in Gulf War Veterans with Current versus Lifetime Posttraumatic Stress Disorder Symptoms." *Biological Psychiatry* 69, no. 6 (March 15, 2011): 541–48. https://doi.org/10.1016/j.biopsych.2010.09.044.

Armed Forces Health Surveillance Branch. "Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, Active Component, U.S. Armed Forces, 2020." Military Health System, May 1, 2021. https://health.mil/News/Articles/2021/05/01/AC-burden-May-2021.

———. "Update: Mental Health Disorders and Mental Health Problems, Active Component, U.S. Armed Forces, 2016–2020." *Medical Surveillance Monthly Report* 28, no. 8 (August 2021): 2–9.

Army Publishing Directorate. "Publishing Guidance," n.d. https://armypubs.army.mil.

Bachynski, Kathleen E, Michelle Canham-Chervak, Sandra A Black, Esther O Dada, Amy M Millikan, and Bruce H Jones. "Mental Health Risk Factors for Suicides in the U.S. Army, 2007–8." *Injury Prevention* 18, no. 6 (December 2012): 405–12. https://doi.org/10.1136/injuryprev-2011-040112.

Banks, Duncan. "What Is Brain Plasticity and Why Is It So Important?" *The Converstation*, April 4, 2016. https://theconversation.com/what-is-brain-plasticity-and-why-is-it-so-important-55967.

Bartone, Paul T., Robert R. Roland, James J. Picano, and Thomas J. Williams. "Psychological Hardiness Predicts Success in U.S. Army Special Forces Candidates." *International Journal of Selection and Assessment* 16, no. 1 (March 2008): 78–81. https://doi.org/10.1111/j.1468-2389.2008.00412.x.

Bauer, Barbara E. "U.N.C. to Receive $26.9 Million from DARPA to Develop Psychiatric Medicines." *Psychedelic Science Review* (blog), June 16, 2020. https://psychedelicreview.com/unc-school-of-medicine-receives-26-9-million-from-darpa-to-develop-psychedelic-medicines/.

Behold Retreats. "Psilocybin Therapy: The Complete Guide (Updated 2022)." Behold Retreats, June 23, 2021. https://behold-retreats.com/blog/psilocybin-therapy.

Berlinger, Max. "All-Inclusive Magic Mushroom Retreats Are the New Luxury 'Trips.'" *Bloomberg Businessweek*, August 19, 2021. https://www.bloomberg.com/news/articles/2021-08-19/all-inclusive-magic-mushroom-ayahuasca-retreats-are-new-luxury-trips.

Bernschneider-Reif, S., F. Oxler, and R. W. Freudenmann. "The Origin of MDMA ('ecstasy')--Separating the Facts from the Myth." *Die Pharmazie* 61, no. 11 (November 2006): 966–72.

Bestha, Durga, Layla Soliman, Kelly Blankenship, and James Rachal. "The Walking Wounded: Emerging Treatments for PTSD." *Current Psychiatry Reports* 20, no. 10 (September 14, 2018): 94. https://doi.org/10.1007/s11920-018-0941-8.

Bird, Catherine I. V., Nadav L. Modlin, and James J. H. Rucker. "Psilocybin and MDMA for the Treatment of Trauma-Related Psychopathology." *International Review of Psychiatry* 33, no. 3 (April 3, 2021): 229–49. https://doi.org/10.1080/09540261.2021.1919062.

Black, Sandra A., M. Shayne Gallaway, Michael R. Bell, and Elspeth C. Ritchie. "Prevalence and Risk Factors Associated with Suicides of Army Soldiers 2001–2009." *Military Psychology* 23, no. 4 (2011): 433–51. https://doi.org/10.1037/h0094766.

Bossis, Anthony P. "Psilocybin, Spirituality, and Palliative Care: Research and Implications." *Alternative and Complementary Therapies* 27, no. 1 (February 1, 2021): 14–17. https://doi.org/10.1089/act.2020.29309.apb.

Bower, Eric A, and James R Phelan. "Use of Amphetamines in the Military Environment." *The Lancet* 362 (December 2003): s18–19. https://doi.org/10.1016/S0140-6736(03)15060-X.

Bratsos, Sosipatros, and Sohag N. Saleh. "Clinical Efficacy of Ketamine for Treatment-Resistant Depression." *Cureus* 11, no. 7 (July 22, 2019): e5189. https://doi.org/10.7759/cureus.5189.

Bromis, Konstantinos, Maria Calem, Antje A.T.S. Reinders, Steven C.R. Williams, and Matthew J. Kempton. "Meta-Analysis of 89 Structural MRI Studies in Posttraumatic Stress Disorder and Comparison With Major Depressive Disorder." *American Journal of Psychiatry* 175, no. 10 (October 2018): 989–98. https://doi.org/10.1176/appi.ajp.2018.17111199.

Brooks, Megan. "FDA Grants Psilocybin Second Breakthrough Therapy Designation for Resistant Depression." *MedScape*, November 25, 2019. https://www.medscape.com/viewarticle/921789.

Brose, Christian. *The Kill Chain: Defending America in the Future of High-Tech Warfare*. First edition. New York: Hachette Books, 2020.

Bryant, Richard A. "Post-Traumatic Stress Disorder: A State-of-the-Art Review of Evidence and Challenges." *World Psychiatry* 18, no. 3 (2019): 259–69. https://doi.org/10.1002/wps.20656.

Buckner, Randy L. "The Brain's Default Network: Origins and Implications for the Study of Psychosis." *Dialogues in Clinical Neuroscience* 15, no. 3 (September 2013): 351–58.

Byock, Ira. "Taking Psychedelics Seriously." *Journal of Palliative Medicine* 21, no. 4 (April 2018): 417–21. https://doi.org/10.1089/jpm.2017.0684.

Carey, Benedict. "Studies Link Mental Issues and the Rigor of the Military." *The New York Times*, October 23, 2014, sec. Health. https://www.nytimes.com/2014/10/24/health/studies-link-mental-issues-and-the-rigor-of-the-military.html.

Carhart-Harris, R. L., M. Kaelen, M. G. Whalley, M. Bolstridge, A. Feilding, and D. J. Nutt. "LSD Enhances Suggestibility in Healthy Volunteers." *Psychopharmacology* 232, no. 4 (February 2015): 785–94. https://doi.org/10.1007/s00213-014-3714-z.

Carhart-Harris, Robin, Bruna Giribaldi, Rosalind Watts, Michelle Baker-Jones, Ashleigh Murphy-Beiner, Roberta Murphy, Jonny Martell, Allan Blemings, David Erritzoe, and David J. Nutt. "Trial of Psilocybin versus Escitalopram for Depression." *New England Journal of Medicine* 384, no. 15 (April 15, 2021): 1402–11. https://doi.org/10.1056/NEJMoa2032994.

Carhart-Harris, Robin L, Mark Bolstridge, James Rucker, Camilla M J Day, David Erritzoe, Mendel Kaelen, Michael Bloomfield et al. "Psilocybin with Psychological Support for Treatment-Resistant Depression: An Open-Label Feasibility Study." *The Lancet Psychiatry* 3, no. 7 (July 2016): 619–27. https://doi.org/10.1016/S2215-0366(16)30065-7.

Carhart-Harris, Robin L., David Erritzoe, Tim Williams, James M. Stone, Laurence J. Reed, Alessandro Colasanti, Robin J. Tyacke et al. "Neural Correlates of the Psychedelic State as Determined by FMRI Studies with Psilocybin." *Proceedings of the National Academy of Sciences* 109, no. 6 (February 7, 2012): 2138–43. https://doi.org/10.1073/pnas.1119598109.

Carhart-Harris, Robin L., and Guy M. Goodwin. "The Therapeutic Potential of Psychedelic Drugs: Past, Present, and Future." *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology* 42, no. 11 (October 2017): 2105–13. https://doi.org/10.1038/npp.2017.84.

Carhart-Harris, Robin L., Suresh Muthukumaraswamy, Leor Roseman, Mendel Kaelen, Wouter Droog, Kevin Murphy, Enzo Tagliazucchi et al. "Neural Correlates of the LSD Experience Revealed by Multimodal Neuroimaging." *Proceedings of the National Academy of Sciences* 113, no. 17 (April 26, 2016): 4853–58. https://doi.org/10.1073/pnas.1518377113.

Carhart-Harris, Robin L, Leor Roseman, Eline Haijen, David Erritzoe, Rosalind Watts, Igor Branchi, and Mendel Kaelen. "Psychedelics and the Essential Importance of Context." *Journal of Psychopharmacology* 32, no. 7 (July 1, 2018): 725–31. https://doi.org/10.1177/0269881118754710.

Carhart-Harris, Robin, Robert Leech, Peter Hellyer, Murray Shanahan, Amanda Feilding, Enzo Tagliazucchi, Dante Chialvo, and David Nutt. "The Entropic Brain: A Theory of Conscious States Informed by Neuroimaging Research with Psychedelic Drugs." *Frontiers in Human Neuroscience* 8 (2014). https://www.frontiersin.org/articles/10.3389/fnhum.2014.00020.

Carod-Artal, F.J. "Alucinógenos en las culturas precolombinas mesoamericanas." *Neurología* 30, no. 1 (January 2015): 42–49. https://doi.org/10.1016/j.nrl.2011.07.003.

Chen, Xinyuan, Mackenzie Bullard, Christy Duan, Jamilah R. George, Terence Ching, Stephanie Kilpatrick, Jordan Sloshower, and Monnica Williams. "The Cost of Exclusion in Psychedelic Research." Bill of Health, November 6, 2020. https://blog.petrieflom.law.harvard.edu/2020/11/06/exclusion-psychedelic-research-diversity/.

Chu, Andrew, and Roopma Wadhwa. "Selective Serotonin Reuptake Inhibitors." In *StatPearls*. Treasure Island (FL): StatPearls Publishing, 2022. http://www.ncbi.nlm.nih.gov/books/NBK554406/.

Comprehensive Drug Abuse Prevention and Control Act of 1970, Pub. L. No. H.R. 18583 (1970). https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1236.pdf.

Crisp and Associates Military Law. "UCMJ Article 112A – Wrongful Use, Possession of Controlled Substances," 2022. https://mymilitarylawyers.com/practice-areas/ucmj-articles/ucmj-article-112a-wrongful-use-possession-controlled-substance/.

Dattani, Saloni, Hanna Ritchie, and Max Roser. "Mental Health." Our World In Data, August 2021. https://ourworldindata.org/mental-health#citation.

David, Sharoon, and Paras B. Khandhar. *Double-Blind Study*. *StatPearls [Internet]*. StatPearls Publishing, 2021. https://www.ncbi.nlm.nih.gov/books/NBK546641/.

Davis, Alan K., Lynnette A. Averill, Nathan D. Sepeda, Joseph P. Barsuglia, and Timothy Amoroso. "Psychedelic Treatment for Trauma-Related Psychological and Cognitive Impairment Among U.S. Special Operations Forces Veterans." *Chronic Stress* 4 (January 2020): 247054702093956. https://doi.org/10.1177/2470547020939564.

Davis, Alan K., Frederick S. Barrett, Darrick G. May, Mary P. Cosimano, Nathan D. Sepeda, Matthew W. Johnson, Patrick H. Finan, and Roland R. Griffiths. "Effects of Psilocybin-Assisted Therapy on Major Depressive Disorder: A Randomized Clinical Trial." *JAMA Psychiatry* 78, no. 5 (May 1, 2021): 481. https://doi.org/10.1001/jamapsychiatry.2020.3285.

Davis, L L, A Suris, M T Lambert, C Heimberg, and F Petty. "Post-Traumatic Stress Disorder and Serotonin: New Directions for Research and Treatment." *Journal of Psychiatry and Neuroscience* 22, no. 5 (November 1997): 318–26.

Davis, L L., Jeff Schein, Martin Cloutier, Patrick Gagnon-Sanschagrin, Jessica Maitland, Annette Urganus, Annie Guerin, Patrick Lefebvre, and Christy R. Houle. "The Economic Burden of Posttraumatic Stress Disorder in the United States From a Societal Perspective." *The Journal of Clinical Psychiatry* 83, no. 3 (April 25, 2022). https://doi.org/10.4088/JCP.21m14116.

Daws, Richard E., Timmermann, Christopher, Giribaldi, Bruna, Sexton, James D., Wall, Matthew B., Erritzoe, David, Roseman, Leor, Nutt, David, and Carhart-Harris, Robin. "Increased Global Integration in the Brain After Psilocybin Therapy for Depression." *Nature Medicine* 28 (April 11, 2022): 844–51. https://doi.org/10.1038/s41591-022-01744-z.

Department of the Army. "Army Regulation 40-7: Use of U.S. Food and Drug Administration-Regulated Investigational Products in Humans Inlcuding Schedule I Controlled Substances," October 19, 2009. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/r40_7.pdf.

Department of Veterans Affairs & Department of Defense. "VA/DOD Clinical Practice Guideline for The Assessment and Management of Patients at Risk for Suicide." Department of Veterans Affairs & Department of Defense, 2019. https://www.healthquality.va.gov/guidelines/MH/mdd/VADoDMDDCPGFinal508.pdf.

———. "VA/DOD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder." Department of Veterans Affairs & Department of Defense, 2017.

Department of Veterans Affairs & Department of Defense (last). "VA/DOD Clinical Practice Guideline for The Assessment and Management of Major Depressive Disorder." Department of Veterans Affairs & Department of Defense, 2022. https://www.healthquality.va.gov/guidelines/MH/mdd/VADoDMDDCPGFinal508.pdf.

Derewicz, Mark. "Roth Leads $26.9 Million Project to Create Better Psychiatric Medications." *UNC Health Newsroom*, June 15, 2020. https://news.unchealthcare.org/2020/06/roth-leads-26-9-million-project-to-create-better-psychiatric-medications/.

"Diagnosing PTSD or Posttraumatic Stress Disorder Diagnosis." Informational, 2022. http://www.ptsdalliance.org/diagnosis/.

Dobie, Dorcas J., Daniel R. Kivlahan, Charles Maynard, Kristen R. Bush, Tania M. Davis, and Katharine A. Bradley. "Posttraumatic Stress Disorder in Female Veterans: Association with Self-Reported Health Problems and Functional Impairment." *Archives of Internal Medicine* 164, no. 4 (February 23, 2004): 394–400. https://doi.org/10.1001/archinte.164.4.394.

Domino, Edward F., and David S. Warner. "Taming the Ketamine Tiger." *Anesthesiology* 113, no. 3 (September 1, 2010): 678–84. https://doi.org/10.1097/ALN.0b013e3181ed09a2.

Dong, T. T., J. Mellin-Olsen, and A. W. Gelb. "Ketamine: A Growing Global Health-Care Need." *BJA: British Journal of Anaesthesia* 115, no. 4 (October 1, 2015): 491–93. https://doi.org/10.1093/bja/aev215.

Doss, Manoj K., Michal Považan, Monica D. Rosenberg, Nathan D. Sepeda, Alan K. Davis, Patrick H. Finan, Gwenn S. Smith et al. "Psilocybin Therapy Increases Cognitive and Neural Flexibility in Patients with Major Depressive Disorder." *Translational Psychiatry* 11, no. 1 (November 8, 2021): 1–10. https://doi.org/10.1038/s41398-021-01706-y.

MAPS. "FDA Grants Breakthrough Therapy Designation for MDMA-Assisted Therapy for PTSD, Agrees on Special Protocol Assessment for Phase 3 Trials," August 26, 2017. https://maps.org/news/media/press-release-fda-grants-breakthrough-therapy-designation-for-mdma-assisted-psychotherapy-for-ptsd-agrees-on-special-protocol-assessment-for-phase-3-trials/.

Feder, Adriana, Sara Costi, Sarah B. Rutter, Abigail B. Collins, Usha Govindarajulu, Manish K. Jha, Sarah R. Horn et al. "A Randomized Controlled Trial of Repeated Ketamine Administration for Chronic Posttraumatic Stress Disorder." *American Journal of Psychiatry* 178, no. 2 (February 2021): 193–202. https://doi.org/10.1176/appi.ajp.2020.20050596.

Feduccia, Allison A., Lisa Jerome, Berra Yazar-Klosinski, Amy Emerson, Michael C. Mithoefer, and Rick Doblin. "Breakthrough for Trauma Treatment: Safety and Efficacy of MDMA-Assisted Psychotherapy Compared to Paroxetine and Sertraline." *Frontiers in Psychiatry* 10 (2019). https://www.frontiersin.org/article/10.3389/fpsyt.2019.00650.

Feduccia, Allison A., and Michael C. Mithoefer. "MDMA-Assisted Psychotherapy for PTSD: Are Memory Reconsolidation and Fear Extinction Underlying Mechanisms?" *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 84 (June 2018): 221–28. https://doi.org/10.1016/j.pnpbp.2018.03.003.

Flory, Janine D., and Rachel Yehuda. "Comorbidity between Post-Traumatic Stress Disorder and Major Depressive Disorder: Alternative Explanations and Treatment Considerations." *Dialogues in Clinical Neuroscience* 17, no. 2 (June 2015): 141–50.

Frankenhuis, Willem E., and Daniel Nettle. "Open Science Is Liberating and Can Foster Creativity." *Perspectives on Psychological Science* 13, no. 4 (July 2018): 439–47. https://doi.org/10.1177/1745691618767878.

Freudenmann, Roland W., Florian Öxler, and Sabine Bernschneider-Reif. "The Origin of MDMA (Ecstasy) Revisited: The True Story Reconstructed from the Original Documents." *Addiction* 101, no. 9 (September 2006): 1241–45. https://doi.org/10.1111/j.1360-0443.2006.01511.x.

Frizzo, Marcos Emilio. "The Effect of Glutamatergic Modulators on Extracellular Glutamate: How Does This Information Contribute to the Discovery of Novel Antidepressants?" *Current Therapeutic Research* 91 (January 1, 2019): 25–32. https://doi.org/10.1016/j.curtheres.2019.100566.

Froese, Tom, Gastón Guzmán, and Laura Guzmán-Dávalos. "On the Origin of the Genus Psilocybe and Its Potential Ritual Use in Ancient Africa and Europe1." *Economic Botany* 70, no. 2 (June 2016): 103–14. https://doi.org/10.1007/s12231-016-9342-2.

Galatzer-Levy, Isaac R., and Richard A. Bryant. "636,120 Ways to Have Posttraumatic Stress Disorder." *Perspectives on Psychological Science* 8, no. 6 (November 1, 2013): 651–62. https://doi.org/10.1177/1745691613504115.

Gamma, A. "3,4-Methylenedioxymethamphetamine (MDMA) Modulates Cortical and Limbic Brain Activity as Measured by [H215O]-PET in Healthy Humans." *Neuropsychopharmacology* 23, no. 4 (October 2000): 388–95. https://doi.org/10.1016/S0893-133X(00)00130-5.

Gao, Mei, Damoon Rejaei, and Hong Liu. "Ketamine Use in Current Clinical Practice." *Acta Pharmacologica Sinica* 37, no. 7 (July 2016): 865–72. https://doi.org/10.1038/aps.2016.5.

Giffort, Danielle. *Acid Revival: The Psychedelic Renaissance and the Quest for Medical Legitimacy*. U of Minnesota Press, 2020.

Ginzburg, Karni, Tsachi Ein-Dor, and Zahava Solomon. "Comorbidity of Posttraumatic Stress Disorder, Anxiety and Depression: A 20-Year Longitudinal Study of War Veterans." *Journal of Affective Disorders* 123, no. 1–3 (June 2010): 249–57. https://doi.org/10.1016/j.jad.2009.08.006.

Gradus, J. L., P. Qin, A. K. Lincoln, M. Miller, E. Lawler, H. T. Sorensen, and T. L. Lash. "Posttraumatic Stress Disorder and Completed Suicide." *American Journal of Epidemiology* 171, no. 6 (March 15, 2010): 721–27. https://doi.org/10.1093/aje/kwp456.

Gradus, J. L., Sussie Antonsen, Elisabeth Svensson, Timothy L. Lash, Patricia A. Resick, and Jens Georg Hansen. "Trauma, Comorbidity, and Mortality Following Diagnoses of Severe Stress and Adjustment Disorders: A Nationwide Cohort Study." *American Journal of Epidemiology* 182, no. 5 (September 1, 2015): 451–58. https://doi.org/10.1093/aje/kwv066.

Gradus, J. L., DSc, MPH. "PTSD and Death from Suicide." *PTSD Research Quarterly* 28, no. 4 (2017). https://www.ptsd.va.gov/publications/rq_docs/V28N4.pdf.

Greenway, Kyle T., Nicolas Garel, Lisa Jerome, and Allison A. Feduccia. "Integrating Psychotherapy and Psychopharmacology: Psychedelic-Assisted Psychotherapy and Other Combined Treatments." *Expert Review of Clinical Pharmacology* 13, no. 6 (June 2020): 655–70. https://doi.org/10.1080/17512433.2020.1772054.

Griffiths, Chris, Kate Walker, Isabel Reid, Ksenija Maravic da Silva, and Alex O'Neill-Kerr. "A Qualitative Study of Patients' Experience of Ketamine Treatment for Depression: The 'Ketamine and Me' Project." *Journal of Affective Disorders Reports* 4 (April 1, 2021): 100079. https://doi.org/10.1016/j.jadr.2021.100079.

Griffiths, R. R., W. A. Richards, U. McCann, and R. Jesse. "Psilocybin Can Occasion Mystical-Type Experiences Having Substantial and Sustained Personal Meaning and Spiritual Significance." *Psychopharmacology* 187, no. 3 (August 2006): 268–83; discussion 284–292. https://doi.org/10.1007/s00213-006-0457-5.

Griffiths, Roland. "The Science of Psilocybin and Its Use to Relieve Suffering." TEDMED Conferences, 2015. https://www.tedmed.com/talks/show?id=526825.

Grinspoon, Lester, and James B. Bakalar. "Can Drugs Be Used to Enhance the Psychotherapeutic Process?" *American Journal of Psychotherapy* 40, no. 3 (July 1986): 393–404. https://doi.org/10.1176/appi.psychotherapy.1986.40.3.393.

Gukasyan, Natalie, Alan K Davis, Frederick S Barrett, Mary P Cosimano, Nathan D Sepeda, Matthew W Johnson, and Roland R Griffiths. "Efficacy and Safety of Psilocybin-Assisted Treatment for Major Depressive Disorder: Prospective 12-Month Follow-Up." *Journal of Psychopharmacology* 36, no. 2 (February 1, 2022): 151–58. https://doi.org/10.1177/02698811211073759.

Hagenbach, Dieter A., and Lucius Werthmüller. *Mystic Chemist: The Life of Albert Hofmann and His Discovery of LSD*. Santa Fe, NM: Synergetic Press, 2013.

Hamilton, J. Paul, Madison Farmer, Phoebe Fogelman, and Ian H. Gotlib. "Depressive Rumination, the Default-Mode Network, and the Dark Matter of Clinical Neuroscience." *Biological Psychiatry* 78, no. 4 (August 15, 2015): 224–30. https://doi.org/10.1016/j.biopsych.2015.02.020.

Hamilton, J. Paul, and Ian H. Gotlib. "Neural Substrates of Increased Memory Sensitivity for Negative Stimuli in Major Depression." *Biological Psychiatry* 63, no. 12 (June 15, 2008): 1155–62. https://doi.org/10.1016/j.biopsych.2007.12.015.

Hamilton, J. Paul, Matthias Siemer, and Ian H. Gotlib. "Amygdala Volume in Major Depressive Disorder: A Meta-Analysis of Magnetic Resonance Imaging Studies." *Molecular Psychiatry* 13, no. 11 (November 2008): 993–1000. https://doi.org/10.1038/mp.2008.57.

Hanling, Steven R., Anita Hickey, Ivan Lesnik, Robert Jeremy Hackworth, Eric Stedje-Larsen, Carol Anne Drastal, and Robert N. McLay. "Stellate Ganglion Block for the Treatment of Posttraumatic Stress Disorder: A Randomized, Double-Blind, Controlled Trial." *Regional Anesthesia & Pain Medicine* 41, no. 4 (July 1, 2016): 494–500. https://doi.org/10.1097/AAP.0000000000000402.

Hanwella, Raveen, and Varuni de Silva. "Mental Health of Special Forces Personnel Deployed in Battle." *Social Psychiatry and Psychiatric Epidemiology* 47, no. 8 (August 2012): 1343–51. https://doi.org/10.1007/s00127-011-0442-0.

Haridy, Richard. "The Problem at the Heart of Modern Psychedelic Clinical Research." The New Atlas, June 13, 2021. https://newatlas.com/science/placebo-problem-blinding-modern-psychedelic-science/.

Hasselmann, H. W.W. "Ketamine as Antidepressant? Current State and Future Perspectives." *Current Neuropharmacology* 12, no. 1 (January 2014): 57–70. https://doi.org/10.2174/1570159X113119990043.

Hickey, Anita H., Maryam Navaie, Eric T. Stedje-Larsen, Eugene G. Lipov, and Robert N. McLay. "Stellate Ganglion Block for the Treatment of Posttraumatic Stress Disorder." Edited by Elspeth Cameron Ritchie. *Psychiatric Annals* 43, no. 2 (February 2013): 87–92. https://doi.org/10.3928/00485713-20130205-08.

Hing, Matthew, Jorge Cabrera, Craig Barstow, and Robert Forsten. "Special Operations Forces and Incidence of Post-Traumatic Stress Disorder Symptoms." *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 12, no. 3 (2012): 23–35.

Holmes, Sophie E, Jean-Dominique Gallezot, Margaret T Davis, Nicole DellaGioia, David Matuskey, Nabeel Nabulsi, John H Krystal et al. "Measuring the Effects of Ketamine on MGluR5 Using [18F]FPEB and PET." *Journal of Cerebral Blood Flow & Metabolism* 40, no. 11 (November 1, 2020): 2254–64. https://doi.org/10.1177/0271678X19886316.

House of Representatives Committee on Rules. National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. H.R. 7900 (2022). https://rules.house.gove/bil/117/hr-7900.

Hysek, Cédric M., Yasmin Schmid, Linda D. Simmler, Gregor Domes, Markus Heinrichs, Christoph Eisenegger, Katrin H. Preller, Boris B. Quednow, and Matthias E. Liechti. "MDMA Enhances Emotional Empathy and Prosocial Behavior." *Social Cognitive and Affective Neuroscience* 9, no. 11 (November 2014): 1645–52. https://doi.org/10.1093/scan/nst161.

Inoue, Catarina, Evan Shawler, Christopher H. Jordan, and Christopher A. Jackson. "Veteran and Military Mental Health Issues." In *StatPearls*. Treasure Island (FL): StatPearls Publishing, 2022. http://www.ncbi.nlm.nih.gov/books/NBK572092/.

Inspector General, Depratment of Defense. "Evaluation of Access to Mental Health Care in the Department of Defense," August 10, 2020. https://media.defense.gov/2020/Aug/12/2002475605/-1/-1/1/DODIG-2020-112_REDACTED.PDF.

Jahangir, Asma, Carlos Fuentes, Cesar Gaviria, Ernesto Zedillo, Fernando Cardoso, George Papandreou, George Shultz et al. "War on Drugs." The Global Commission on Drug Policy, June 2011. https://www.globalcommissionondrugs.org/reports/the-war-on-drugs.

Philanthropy News Digest. "Johns Hopkins Receives $17 Million for Research on Psychedelics," September 6, 2019. https://philanthropynewsdigest.org/news/johns-hopkins-receives-17-million-for-research-on-pyschedelics.

Johnson, Matthew W., and Roland R. Griffiths. "Potential Therapeutic Effects of Psilocybin." *Neurotherapeutics* 14, no. 3 (July 2017): 734–40. https://doi.org/10.1007/s13311-017-0542-y.

Johnson, Matthew W., Peter S. Hendricks, Frederick S. Barrett, and Roland R. Griffiths. "Classic Psychedelics: An Integrative Review of Epidemiology, Therapeutics, Mystical Experience, and Brain Network Function." *Pharmacology & Therapeutics* 197 (May 2019): 83–102. https://doi.org/10.1016/j.pharmthera.2018.11.010.

Judkins, Jason L., Brian A. Moore, Tyler L. Collette, Willie J. Hale, Alan L. Peterson, and Sandra B. Morissette. "Incidence Rates of Posttraumatic Stress Disorder Over a 17-Year Period in Active Duty Military Service Members." *Journal of Traumatic Stress* 33, no. 6 (2020): 994–1006. https://doi.org/10.1002/jts.22558.

Jumaili, Wisam Al, Chintan Trivedi, Timothy Chao, Aaron Kubosumi, and Shailesh Jain. "The Safety and Efficacy of Ketamine NMDA Receptor Blocker as a Therapeutic Intervention for PTSD Review of a Randomized Clinical Trial." *Behavioural Brain Research* 424 (April 29, 2022): 113804. https://doi.org/10.1016/j.bbr.2022.113804.

Kabil, Ahmed. "The History of Psychedelics and Psychotherapy." Timeline, January 13, 2016. https://timeline.com/the-history-of-psychedelics-and-psychotherapy-fe70f72557aa.

Karnosh, L. J., and W. J. Gardner. "The Effects of Bilateral Stellate Ganglion Block on Mental Depression; Report of 3 Cases." *Cleveland Clinic Quarterly* 14, no. 3 (July 1947): 133–38. https://doi.org/10.3949/ccjm.14.3.133.

Kerr, N. L. "HARKing: Hypothesizing after the Results Are Known." *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc* 2, no. 3 (1998): 196–217. https://doi.org/10.1207/s15327957pspr0203_4.

Kerzner, Jaimie, Helen Liu, Ilya Demchenko, David Sussman, Duminda N. Wijeysundera, Sidney H. Kennedy, Karim S. Ladha, and Venkat Bhat. "Stellate Ganglion Block for Psychiatric Disorders: A Systematic Review of the Clinical Research Landscape." *Chronic Stress* 5 (January 1, 2021): 24705470211055176. https://doi.org/10.1177/24705470211055176.

Kessler, Ronald C. "Posttraumatic Stress Disorder in the National Comorbidity Survey." *Archives of General Psychiatry* 52, no. 12 (December 1, 1995). https://doi.org/10.1001/archpsyc.1995. 03950240066012.

Kilpatrick, Dean G., Heidi S. Resnick, Melissa E. Milanak, Mark W. Miller, Katherine M. Keyes, and Matthew J. Friedman. "National Estimates of Exposure to Traumatic Events and PTSD Prevalence Using DSM-IV and DSM-5 Criteria." *Journal of Traumatic Stress* 26, no. 5 (October 2013): 537–47. https://doi.org/10.1002/jts.21848.

King's College London, Research & Innovation. "Psychedelic Trials." Accessed December 5, 2021. https://www.kcl.ac.uk/research/psilocybin-trials.

Krystal, John H., Lori L. Davis, Thomas C. Neylan, Murray A. Raskind, Paula P. Schnurr, Murray B. Stein, Jennifer Vessicchio, Brian Shiner, Theresa D. Gleason, and Grant D. Huang. "It Is Time to Address the Crisis in the Pharmacotherapy of Posttraumatic Stress Disorder: A Consensus Statement of the PTSD Psychopharmacology Working Group." *Biological Psychiatry* 82, no. 7 (October 2017): e51–59. https://doi.org/10.1016/j.biopsych.2017.03.007.

Kuhn, Thomas. "What Is a Paradigm?" *The Living Philosophy* (blog), February 10, 2022. https://thelivingphilosophy.substack.com/p/what-is-a-paradigm-thomas-kuhn.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*. 3rd ed. Chicago, IL: University of Chicago Press, 1996.

Kunimatsu, Akira, Koichiro Yasaka, Hiroyuki Akai, Natsuko Kunimatsu, and Osamu Abe. "MRI Findings in Posttraumatic Stress Disorder." *Journal of Magnetic Resonance Imaging: JMRI* 52, no. 2 (August 2020): 380–96. https://doi.org/10.1002/jmri.26929.

Lanius, Ruth A., Paul A. Frewen, Mischa Tursich, Rakesh Jetly, and Margaret C. McKinnon. "Restoring Large-Scale Brain Networks in PTSD and Related Disorders: A Proposal for Neuroscientifically-Informed Treatment Interventions." *European Journal of Psychotraumatology* 6, no. 1 (December 1, 2015): 27313. https://doi.org/10.3402/ejpt.v6.27313.

Lee, Daniel J., Carla W. Schnitzlein, Jonathan P. Wolf, Meena Vythilingam, Ann M. Rasmusson, and Charles W. Hoge. "Psychotherapy Versus Pharmacotherapy for Posttraumatic Stress Disorder: Systemic Review and Meta-Analyses to Determine First-Line Treatments." *Depression and Anxiety* 33, no. 9 (2016): 792–806. https://doi.org/10.1002/da.22511.

Lehavot, Keren, Simon B. Goldberg, Jessica A. Chen, Jodie G. Katon, Joseph E. Glass, John C. Fortney, Tracy L. Simpson, and Paula P. Schnurr. "Do Trauma Type, Stressful Life Events, and Social Support Explain Women Veterans' High Prevalence of PTSD?" *Social Psychiatry and Psychiatric Epidemiology* 53, no. 9 (September 2018): 943–53. https://doi.org/10.1007/s00127-018-1550-x.

Leslie, Eric, Eric Pittman, Brendon Drew, and Benjamin Walrath. "Ketamine Use in Operation Enduring Freedom." *Military Medicine* 186, no. 7–8 (July 1, 2021): e720–25. https://doi.org/10.1093/milmed/usab117.

Lester, Patrick. "Putting the Politics Back in Implementation." *Social Innovation Research Center* (blog), January 27, 2018. http://www.socialinnovationcenter.org/archives/3012.

Li, Linda, and Phillip E. Vlisides. "Ketamine: 50 Years of Modulating the Mind." *Frontiers in Human Neuroscience* 10 (November 29, 2016): 15. https://doi.org/10.3389/fnhum.2016.00612.

Liechti, M. "Acute Psychological Effects of 3,4-Methylenedioxymethamphetamine (MDMA, 'Ecstasy') Are Attenuated by the Serotonin Uptake Inhibitor Citalopram." *Neuropsychopharmacology* 22, no. 5 (May 2000): 513–21. https://doi.org/10.1016/S0893-133X(99)00148-7.

Lipov, Eugene. "A Randomized, Double-Blind, Placebo-Controlled Trial of Stellate Ganglion Block in the Treatment of Post-Traumatic Stress Disorder: Scientific Poster." *Journal of Trauma & Treatment* s4 (2015). https://doi.org/10.4172/2167-1222.S4-022.

Lipov, Eugene G, Ryan Jacobs, Shauna Springer, Kenneth D Candido, and Nebojsa Nick Knezevic. "Utility of Cervical Sympathetic Block in Treating Post-Traumatic Stress Disorder in Multiple Cohorts: A Retrospective Analysis." *Pain Physician*, 2022, 10.

Lipov, Eugene, and Elspeth Ritchie. "A Review of the Use of Stellate Ganglion Block in the Treatment of PTSD." *Current Psychiatry Reports* 17 (August 1, 2015): 599. https://doi.org/10.1007/s11920-015-0599-4.

Liriano, Felix, Candace Hatten, and Thomas L Schwartz. "Ketamine as Treatment for Post-Traumatic Stress Disorder: A Review." *Drugs in Context* 8 (April 8, 2019): 212305. https://doi.org/10.7573/dic.212305.

Lopez, Nicole. "An Exploration of Linguistic Relativity Theory for Consideration of Terence McKenna's 'Stoned Ape Theory' on the Origins of Consciousness and Language: Implications for Language Pedagogy." *Journal of Conscious Evolution* 16, no. 6 (November 7, 2020): 14.

Love, Shayla. "Inside the Dispute Over a High-Profile Psychedelic Study." *Vice* (blog), May 16, 2022. https://www.vice.com/en/article/4awj3n/inside-the-dispute-over-a-high-profile-psychedelic-study.

Lowe, Henry, Ngeh Toyang, Blair Steele, Henkel Valentine, Justin Grant, Amza Ali, Wilfred Ngwa, and Lorenzo Gordon. "The Therapeutic Potential of Psilocybin." *Molecules* 26, no. 10 (May 15, 2021): 2948. https://doi.org/10.3390/molecules26102948.

Lundgren, Christina, and Victoria Howell. "Comprehensive Review of Laryngospasm." *Update in Anaesthesia: Journal of Anesthesia & Critical Care 35* 35 (February 2020): 15–18.

Lynch, James H. "Stellate Ganglion Block Treats Posttraumatic Stress: An Example of Precision Mental Health." *Brain and Behavior* 10, no. 11 (2020): e01807. https://doi.org/10.1002/brb3.1807.

Lynch, James H., Peter D. Muench, John C. Okiishi, Gary E. Means, and Sean W. Mulvaney. "Behavioral Health Clinicians Endorse Stellate Ganglion Block as a Valuable Intervention in the Treatment of Trauma-Related Disorders." *Journal of Investigative Medicine* 69, no. 5 (June 2021): 989. https://doi.org/10.1136/jim-2020-001693.

Madsen, Martin K., Patrick M. Fisher, Daniel Burmester, Agnete Dyssegaard, Dea S. Stenbæk, Sara Kristiansen, Sys S. Johansen et al. "Psychedelic Effects of Psilocybin Correlate with Serotonin 2A Receptor Occupancy and Plasma Psilocin Levels." *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology* 44, no. 7 (June 2019): 1328–34. https://doi.org/10.1038/s41386-019-0324-9.

Maeng, Lisa Y, and Mohammed R Milad. "Post-Traumatic Stress Disorder: The Relationship Between the Fear Response and Chronic Stress." *Chronic Stress* 1 (February 1, 2017): 2470547017713297. https://doi.org/10.1177/2470547017713297.

Magruder, Kathryn M., B. Christopher Frueh, Rebecca G. Knapp, Lori Davis, Mark B. Hamner, Renée Hebert Martin, Paul B. Gold, and George W. Arana. "Prevalence of Posttraumatic Stress Disorder in Veterans Affairs Primary Care Clinics." *General Hospital Psychiatry* 27, no. 3 (June 2005): 169–79. https://doi.org/10.1016/j.genhosppsych.2004.11.001.

Mah, Linda, Claudia Szabuniewicz, and Alexandra J. Fiocco. "Can Anxiety Damage the Brain?:" *Current Opinion in Psychiatry* 29, no. 1 (January 2016): 56–63. https://doi.org/10.1097/YCO.0000000000000223.

Majić, Tomislav, Timo T Schmidt, and Jürgen Gallinat. "Peak Experiences and the Afterglow Phenomenon: When and How Do Therapeutic Effects of Hallucinogens Depend on Psychedelic Experiences?" *Journal of Psychopharmacology* 29, no. 3 (March 1, 2015): 241–53. https://doi.org/10.1177/0269881114568040.

Mann, Sukhmanjeet Kaur, and Raman Marwaha. "Posttraumatic Stress Disorder." In *StatPearls*. Treasure Island (FL): StatPearls Publishing, 2022. http://www.ncbi.nlm.nih.gov/books/NBK559129/.

Margolin, Madison. "How the Psychedelic Industry Can Learn From the Cannabis Industry's Mistakes." *Double Blind* (blog), February 9, 2022. https://doubleblindmag.com/cannabis-psychedelics-corporatization-compass/.

Martinez, Marisol. "Psilocybin Treatment for Major Depression Effective for Up to a Year for Most Patients, Study Shows." Johns Hopkins Medicine Newsroom, February 15, 2022. https://www.hopkinsmedicine.org/news/newsroom/news-releases/psilocybin-treatment-for-major-depression-effective-for-up-to-a-year-for-most-patients-study-shows.

———. "Psychedelic Treatment with Psilocybin Relieves Major Depression, Study Shows." Johns Hopkins Medicine Newsroom, November 4, 2020. https://www.hopkinsmedicine.org/news/newsroom/news-releases/psychedelic-treatment-with-psilocybin-relieves-major-depression-study-shows.

Mason, N. L., K. P. C. Kuypers, J. T. Reckweg, F. Müller, D. H. Y. Tse, B. Da Rios, S. W. Toennes, P. Stiers, A. Feilding, and J. G. Ramaekers. "Spontaneous and Deliberate Creative Cognition during and after Psilocybin Exposure." *Translational Psychiatry* 11, no. 1 (June 2021): 209. https://doi.org/10.1038/s41398-021-01335-5.

Mason, Natasha L., Elisabeth Mischler, Malin V. Uthaug, and Kim P. C. Kuypers. "Sub-Acute Effects of Psilocybin on Empathy, Creative Thinking, and Subjective Well-Being." *Journal of Psychoactive Drugs* 51, no. 2 (March 15, 2019): 123–34. https://doi.org/10.1080/02791072.2019.1580804.

Mathew, Sanjay J., Asim Shah, Kyle Lapidus, Crystal Clark, Noor Jarun, Britta Ostermeyer, and James W. Murrough. "Ketamine for Treatment-Resistant Unipolar Depression." *CNS Drugs* 26, no. 3 (March 1, 2012): 189–204. https://doi.org/10.2165/11599770-000000000-00000.

Mertens, Lea J., Michael Koslowski, Felix Betzler, Ricarda Evens, Maria Gilles, Andrea Jungaberle, Henrik Jungaberle et al. "Methodological Challenges in Psychedelic Drug Trials: Efficacy and Safety of Psilocybin in Treatment-Resistant Major Depression (EPIsoDE) – Rationale and Study Design." *Neuroscience Applied* 1 (January 1, 2022): 100104. https://doi.org/10.1016/j.nsa.2022.100104.

Mesoudi, Alex, Kesson Magid, and Delwar Hussain. "How Do People Become W.E.I.R.D.? Migration Reveals the Cultural Transmission Mechanisms Underlying Variation in Psychological Processes." Edited by Christine A Caldwell. *PLOS ONE* 11, no. 1 (January 13, 2016): e0147162. https://doi.org/10.1371/journal.pone.0147162.

Michael Torrice. “Ketamine Is Revolutionizing Antidepressant Research, but We Still Don’t Know How It Works.” Chemical & Engineering News, January 15, 2020. https://cen.acs.org/biological-chemistry/neuroscience/Ketamine-revolutionizing-antidepressant-research-still/98/i3.

Mion, Georges. “History of Anesthesia: The Ketamine Story – Past, Present and Future.” *European Journal of Anaesthesiology | EJA* 34, no. 9 (September 2017): 571–75. https://doi.org/10.1097/EJA.0000000000000638.

Mitchell, Jennifer, Allison Coker, and Berra Yazar-Klosinski. “Reply to: Caution at Psychiatry’s Psychedelic Frontier and Challenges with Benchmarking of MDMA-Assisted Psychotherapy.” *Nature Medicine* 27, no. 10 (October 2021): 1691–92. https://doi.org/10.1038/s41591-021-01526-z.

Mithoefer, Michael C, Ann T Mithoefer, Allison A Feduccia, Lisa Jerome, Mark Wagner, Joy Wymer, Julie Holland et al. “3,4-Methylenedioxymethamphetamine (MDMA)-Assisted Psychotherapy for Post-Traumatic Stress Disorder in Military Veterans, Firefighters, and Police Officers: A Randomised, Double-Blind, Dose-Response, Phase 2 Clinical Trial.” *The Lancet Psychiatry* 5, no. 6 (June 2018): 486–97. https://doi.org/10.1016/S2215-0366(18)30135-4.

Mollaahmetoglu, O. Merve, Johanna Keeler, Katherine J. Ashbullby, Eirini Ketzitzidou-Argyri, Meryem Grabski, and Celia J. A. Morgan. “‘This Is Something That Changed My Life’: A Qualitative Study of Patients’ Experiences in a Clinical Trial of Ketamine Treatment for Alcohol Use Disorders.” *Frontiers in Psychiatry* 12 (2021). https://www.frontiersin.org/article/10.3389/fpsyt.2021.695335.

Moreno, Jonathan D. *Mind Wars: Brain Research and National Defense*. New York: Dana Press, 2006.

Mulvaney, Sean. “PTSD: Treat the Epidemic in Our Ranks.” *Proceedings* 145, no. 11 (November 1, 2019). https://www.usni.org/magazines/proceedings/2019/november/ptsd-treat-epidemic-our-ranks.

Mulvaney, Sean W, James H Lynch, Kamisha E Curtis, and Tamara S Ibrahim. “The Successful Use of Left-Sided Stellate Ganglion Block in Patients That Fail to Respond to Right-Sided Stellate Ganglion Block for the Treatment of Post-Traumatic Stress Disorder Symptoms: A Retrospective Analysis of 205 Patients.” *Military Medicine* 187, no. 7–8 (July 1, 2022): e826–29. https://doi.org/10.1093/milmed/usab056.

Mulvaney, Sean W., James H. Lynch, Matthew J. Hickey, Tabassum Rahman-Rawlins, Matthew Schroeder, Shawn Kane, and Eugene Lipov. “Stellate Ganglion Block Used to Treat Symptoms Associated With Combat-Related Post-Traumatic Stress Disorder: A Case Series of 166 Patients.” *Military Medicine* 179, no. 10 (October 1, 2014): 1133–40. https://doi.org/10.7205/MILMED-D-14-00151.

Mulvaney, Sean W., James H. Lynch, and Russ S. Kotwal. "Clinical Guidelines for Stellate Ganglion Block to Treat Anxiety Associated With Posttraumatic Stress Disorder." *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 15, no. 2 (2015): 79–85. https://doi.org/10.55460/EQ05-H5TO.

Mulvaney, Sean W., James H. Lynch, Jason de Leeuw, Matthew Schroeder, and Shawn Kane. "Neurocognitive Performance Is Not Degraded After Stellate Ganglion Block Treatment for Post-Traumatic Stress Disorder: A Case Series." *Military Medicine* 180, no. 5 (May 1, 2015): e601-4. https://doi.org/10.7205/MILMED-D-14-00504.

Mustafa, Nor Suliana, and Nasir Mohamad. "MDMA and the Brain: A Short Review on the Role of Neurotransmitters in the Cause of Neurotoxicity." *Basic and Clinical Neuroscience Journal*, November 30, 2019. https://doi.org/10.32598/bcn.9.10.485.

Muthukumaraswamy, Suresh D., Anna Forsyth, and Thomas Lumley. "Blinding and Expectancy Confounds in Psychedelic Randomized Controlled Trials." *Expert Review of Clinical Pharmacology* 14, no. 9 (September 2021): 1133–52. https://doi.org/10.1080/17512433.2021.1933434.

National Center for PTSD. "Moral Injury." General Information. Accessed November 30, 2021. https://www.ptsd.va.gov/professional/treat/cooccurring/moral_injury.asp.

National Institute of Mental Health (NIMH). "Post-Traumatic Stress Disorder." Accessed September 8, 2022. https://www.nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd.

GovTracks.us. "National Defense Authorization Act for Fiscal Year 2023 (H.R. 7900)," June 28, 2022. https://www.govtrack.us/congress/bills/117/hr7900.

National Museums Liverpool. "Prometheus: Stealing Fire From the Gods." Liverpool Museums, n.d. https://www.liverpoolmuseums.org.uk/world-museum/greek-myths-and-legends/prometheus-stealing-fire-gods.

Navaie, Maryam, Morgan S. Keefe, Anita H. Hickey, Robert N. Mclay, Elspeth Cameron Ritchie, and Salahadin Abdi. "Use of Stellate Ganglion Block for Refractory Post-Traumatic Stress Disorder: A Review of Published Cases." *Journal of Anesthesia and Clinical Research* 5, no. 4 (2014). https://doi.org/10.4172/2155-6148.1000403.

New Atlas. "The Problem at the Heart of Modern Psychedelic Clinical Research," June 14, 2021. https://newatlas.com/science/placebo-problem-blinding-modern-psychedelic-science/.

Nichols, David E. "Psilocybin: From Ancient Magic to Modern Medicine." *The Journal of Antibiotics* 73, no. 10 (October 2020): 679–86. https://doi.org/10.1038/s41429-020-0311-8.

Norbury, Agnes, Sarah Rutter, Abigail Collins, Sara Costi, Manish Jha, Sarah Horn, Marin Kautz et al. *Neuroimaging Correlates and Predictors of Response to Repeated-Dose Intravenous Ketamine in PTSD*, 2021. https://doi.org/10.1101/2021.04.10.21255127.

Norman, Sonya B., PhD, and Shira Maguen PhD. "Moral Injury." U.S. Department of Veterans Affairs, 2022. https://www.ptsd.va.gov/professional/treat/cooccurring/moral_injury.asp.

Nour, Matthew M., Lisa Evans, David Nutt, and Robin L. Carhart-Harris. "Ego-Dissolution and Psychedelics: Validation of the Ego-Dissolution Inventory (EDI)." *Frontiers in Human Neuroscience* 10 (June 14, 2016). https://doi.org/10.3389/fnhum.2016.00269.

O'Hare, Ryan. "Magic Mushroom Compound Performs as Well as Anti-Depressant in Small Study." *Imperial College London*, April 14, 2021, sec. health. https://www.imperial.ac.uk/news/219413/magic-mushroom-compound-performs-well-antidepressant/.

Ot'alora G, Marcela, Jim Grigsby, Bruce Poulter, Joseph W. Van Derveer, Sara Gael Giron, Lisa Jerome, Allison A. Feduccia et al. "3,4-Methylenedioxymethamphetamine-Assisted Psychotherapy for Treatment of Chronic Posttraumatic Stress Disorder: A Randomized Phase 2 Controlled Trial." *Journal of Psychopharmacology (Oxford, England)* 32, no. 12 (December 2018): 1295–1307. https://doi.org/10.1177/0269881118806297.

Palhano-Fontes, Fernanda, Dayanna Barreto, Heloisa Onias, Katia C. Andrade, Morgana M. Novaes, Jessica A. Pessoa, Sergio A. Mota-Rolim et al. "Rapid Antidepressant Effects of the Psychedelic Ayahuasca in Treatment-Resistant Depression: A Randomized Placebo-Controlled Trial." *Psychological Medicine* 49, no. 4 (March 2019): 655–63. https://doi.org/10.1017/S0033291718001356.

Pandya, Mayur, Murat Altinay, Donald A. Malone, and Amit Anand. "Where in the Brain Is Depression?" *Current Psychiatry Reports* 14, no. 6 (December 2012): 634–42. https://doi.org/10.1007/s11920-012-0322-7.

Pasquini, Lorenzo, Fernanda Palhano-Fontes, and Draulio B Araujo. "Subacute Effects of the Psychedelic Ayahuasca on the Salience and Default Mode Networks." *Journal of Psychopharmacology* 34, no. 6 (June 2020): 623–35. https://doi.org/10.1177/0269881120909409.

Pelicki, Brian, Luoma, Jason B., Bathje, Geoff J., Rhea, Joseph, and Narloch, Vilmarie F. "Ethical and Legal Issues in Psychedelic Harm Reduction and Integration Therapy." *Harm Reduction Journal* 18, no. 40 (April 7, 2021). https://doi.org/10.1186/s12954-021-00489-1.

Peterson, Kim, Donald Bourne, Johanna Anderson, Katherine Mackey, and Mark Helfand. *Evidence Brief: Effectiveness of Stellate Ganglion Block for Treatment of Posttraumatic Stress Disorder (PTSD)*. Department of Veterans Affairs (US), 2017. https://www.ncbi.nlm.nih.gov/books/NBK442253/.

Petranker, Rotem, Thomas Anderson, and Norman Farb. "Psychedelic Research and the Need for Transparency: Polishing Alice's Looking Glass." *Frontiers in Psychology* 11 (2020). https://www.frontiersin.org/article/10.3389/fpsyg.2020.01681.

Phillips, Jennifer L., Sandhaya Norris, Jeanne Talbot, Meagan Birmingham, Taylor Hatchard, Abigail Ortiz, Olabisi Owoeye, Lisa A. Batten, and Pierre Blier. "Single, Repeated, and Maintenance Ketamine Infusions for Treatment-Resistant Depression: A Randomized Controlled Trial." *American Journal of Psychiatry* 176, no. 5 (May 2019): 401–9. https://doi.org/10.1176/appi.ajp.2018.18070834.

Pitman, Roger K., Ann M. Rasmusson, Karestan C. Koenen, Lisa M. Shin, Scott P. Orr, Mark W. Gilbertson, Mohammed R. Milad, and Israel Liberzon. "Biological Studies of Posttraumatic Stress Disorder." *Nature Reviews. Neuroscience* 13, no. 11 (November 2012): 769–87. https://doi.org/10.1038/nrn3339.

Pittaway, David A. "'To Learn Healing Knowledge': Philosophy, Psychedelic Studies and Transformation." *South African Journal of Philosophy* 37, no. 4 (October 2, 2018): 438–51. https://doi.org/10.1080/02580136.2018.1532186.

Psych Scene Hub. "Post Traumatic Stress Disorder (PTSD) – Neurobiology and Management." Accessed October 7, 2022. https://psychscenehub.com/psychinsights/post-traumatic-stress-disorder/.

The PTSD Alliance. "Diagnosing Posttraumatic Stress Disorder," January 2022. http://www.ptsdalliance.org/diagnosis/.

"Project MKUltra, the CIA's Program of Research in Behavioral Modification." Washington, D.C.: United States Senate, August 3, 1977. https://www.intelligence.senate.gov/sites/default/files/hearings/95mkultra.pdf.

Psychological Minds. "Prometheus: The Creator of Mankind," June 27, 2018. https://psy-minds.com/prometheus-creator-mandkind/.

Psychedelic Alpha. "Psychedelic Legalization & Decriminalization Tracker," 2022. https://psychedelicalpha.com/data/psychedelic-laws.

Rae Olmsted, Kristine L., Michael Bartoszek, Sean Mulvaney, Brian McLean, Ali Turabi, Ryan Young, Eugene Kim et al. "Effect of Stellate Ganglion Block Treatment on Posttraumatic Stress Disorder Symptoms: A Randomized Clinical Trial." *JAMA Psychiatry* 77, no. 2 (February 1, 2020): 130–38. https://doi.org/10.1001/jamapsychiatry.2019.3474.

Rasmussen, Nicolas. "Medical Science and the Military: The Allies' Use of Amphetamine during World War II." *The Journal of Interdisciplinary History* 42, no. 2 (2011): 205–33. https://doi.org/10.1162/jinh_a_00212.

Ray, Oakley Stern. *Drugs, Society, & Human Behavior*. 3rd ed. St. Louis: Mosby, 1983.

Reiff, M.D., Collin, Elon Richman, M.D., Charles Nemeroff, M.D., Ph.D., Linda Carpenter, M.D., Ph.D., Alik Widge, M.D., Ph.D., Carolyn Rodriguez, M.D., Ph.D., Ned Kalin, M.D., and William McDonald, M.D. "Psychedelics and Psychedelic-Assisted Psychotherapy." *The American Journal of Psychiatry* 177, no. 5 (May 2020): 391–410.

Reuveni, Inbal, Omer Bonne, Ruti Giesser, Tamir Shragai, Gilad Lazarovits, Moshe Isserles, Shaul Schreiber, Atira S. Bick, and Netta Levin. "Anatomical and Functional Connectivity in the Default Mode Network of Post-Traumatic Stress Disorder Patients after Civilian and Military-Related Trauma: Anatomical and Functional Connectivity in PTSD." *Human Brain Mapping* 37, no. 2 (February 2016): 589–99. https://doi.org/10.1002/hbm.23051.

Riley, Sarah, James Thompson, and Christine Griffin. "Turn on, Tune in, but Don't Drop out: The Impact of Neo-Liberalism on Magic Mushroom Users' (in)Ability to Imagine Collectivist Social Worlds." *International Journal of Drug Policy* 21, no. 6 (November 2010): 445–51. https://doi.org/10.1016/j.drugpo.2010.07.001.

Rocklein Kemplin, Kate, Olimpia Paun, Dan C. Godbee, and Jonathan W. Brandon. "Resilience and Suicide in Special Operations Forces: State of the Science via Integrative Review." *Journal of Special Operations Medicine: A Peer Reviewed Journal for SOF Medical Professionals* 19, no. 2 (2019): 57–66.

Romanenko, Pavel, and George Fejer. "The Biggest Challenges for Psychedelic Science Today." ICPR 2020: Interdisciplinary Conference for Psychedelic Research, August 30, 2020. https://icpr-conference.com/the-biggest-challenges-for-psychedelic-science-today/.

Rosenbaum, Eric. "Kevin O'Leary: Psychedelic Drugs 'Far Exceed' Cannabis Investment Potential." *CNBC*, May 11, 2022. https://www.cnbc.com/2021/05/11/kevin-oleary-psychedelic-drugs-far-exceed-cannabis-potential.html.

Ross, Cassie, Rakesh Jain, Carl Bonnett, and Philip Wolfson. "High-Dose Ketamine Infusion for the Treatment of Posttraumatic Stress Disorder in Combat Veterans." *Annals of Clinical Psychiatry : Official Journal of the American Academy of Clinical Psychiatrists* 31 (November 1, 2019): 271–79.

Ross, Marisa C., and Josh M. Cisler. "Altered Large-Scale Functional Brain Organization in Posttraumatic Stress Disorder: A Comprehensive Review of Univariate and Network-Level Neurocircuitry Models of PTSD." *NeuroImage: Clinical* 27 (January 1, 2020): 102319. https://doi.org/10.1016/j.nicl.2020.102319.

Ruffell, Simon, PhD. Psychedlics and the Default Mode Network. Interview by Jasmine Virdi, February 4, 2020. https://psychedelicstoday.com/2020/02/04/psychedelics-and-the-default-mode-network/.

Russell, Patricia D., Jason L. Judkins, Alexis Blessing, Brian Moore, and Sandra B. Morissette. "Incidences of Anxiety Disorders among Active Duty Service Members between 1999 and 2018." *Journal of Anxiety Disorders* 91 (October 1, 2022): 102608. https://doi.org/10.1016/j.janxdis.2022.102608.

Sanacora, G., M. Frye, W. McDonald, S. Mathew, Mason S. Turner, A. Schatzberg, P. Summergrad, and C. Nemeroff. "A Consensus Statement on the Use of Ketamine in the Treatment of Mood Disorders." *JAMA Psychiatry* 74 (April 2017): 399–404. https://doi.org/10.1001/jamapsychiatry.2017.0080.

Sareen, Jitender. "Posttraumatic Stress Disorder in Adults: Impact, Comorbidity, Risk Factors, and Treatment." *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie* 59, no. 9 (September 2014): 460–67.

Schultes, Richard E. "Plantae Mexicanae II." *Botanical Museum Leaflets, Harvard University* 7, no. no.3 (1939): 37–56.

Shay, Jonathan. *Achilles in Vietnam: Combat Trauma and the Undoing of Character*. 1. Scribner trade paperback ed. New York: Scribner, 2003.

Shrout, Patrick E., and Joseph L. Rodgers. "Psychology, Science, and Knowledge Construction: Broadening Perspectives from the Replication Crisis." *Annual Review of Psychology* 69, no. 1 (January 4, 2018): 487–510. https://doi.org/10.1146/annurev-psych-122216-011845.

Speights, Keith. "Investing in Psychedelic Stocks." *The Motley Fool*, August 23, 2022. https://www.fool.com/investing/stock-market/market-sectors/healthcare/psychedelic-stocks/.

Spoont, Michele R., David B. Nelson, Maureen Murdoch, Thomas Rector, Nina A. Sayer, Sean Nugent, and Joseph Westermeyer. "Impact of Treatment Beliefs and Social Network Encouragement on Initiation of Care by VA Service Users With PTSD." *Psychiatric Services* 65, no. 5 (May 2014): 654–62. https://doi.org/10.1176/appi.ps.201200324.

Steenkamp, Maria, Brett Litz, Charles Hoge, and Charles Marmar. "Psychotherapy for Military-Related PTSD A Review of Randomized Clinical Trials." *JAMA The Journal of the American Medical Association* 314 (August 4, 2015): 489–500. https://doi.org/10.1001/jama.2015.8370.

Stoker, Alexander D, David M Rosenfeld, Matthew R Buras, Jeremy M Alvord, and Andrew W Gorlin. "Evaluation of Clinical Factors Associated with Adverse Drug Events in Patients Receiving Sub-Anesthetic Ketamine Infusions." *Journal of Pain Research* 12 (December 23, 2019): 3413–21. https://doi.org/10.2147/JPR.S217005.

Suitt, III, Thomas Howard. "High Suicide Rates among United States Service Members and Veterans of the Post- 9/11 Wars." The Cost of War Project, Brown University, 2021. https://watson.brown.edu/costsofwar/files/cow/imce/papers/2021/Suitt_Suicides_Costs%20of%20War_June%2021%202021.pdf.

Summers, Mary R., and Remington L. Nevin. "Stellate Ganglion Block in the Treatment of Post-Traumatic Stress Disorder: A Review of Historical and Recent Literature." *Pain Practice: The Official Journal of World Institute of Pain* 17, no. 4 (April 2017): 546–53. https://doi.org/10.1111/papr.12503.

Szigeti, Balázs, Laura Kartner, Allan Blemings, Fernando Rosas, Amanda Feilding, David J Nutt, Robin L Carhart-Harris, and David Erritzoe. "Self-Blinding Citizen Science to Explore Psychedelic Microdosing." *ELife* 10 (March 2, 2021): e62878. https://doi.org/10.7554/eLife.62878.

Thériault, François L, William Gardner, Franco Momoli, Bryan G Garber, Mila Kingsbury, Zahra Clayborne, Daniel Y Cousineau-Short, Hugues Sampasa-Kanyinga, Hannah Landry, and Ian Colman. "Mental Health Service Use in Depressed Military Personnel: A Systematic Review." *Military Medicine* 185, no. 7–8 (August 14, 2020): e1255–62. https://doi.org/10.1093/milmed/usaa015.

Theunissen, Chris. "It's About Time We Had A Professional Oath in Psychology." *Australian Psychologist* 43, no. 1 (March 1, 2008): 55–60. https://doi.org/10.1080/00050060601100897.

Thomas, Eileen, and Joan Kathy Magilvy. "Qualitative Rigor or Research Validity in Qualitative Research: Scientific Inquiry." *Journal for Specialists in Pediatric Nursing* 16, no. 2 (April 2011): 151–55. https://doi.org/10.1111/j.1744-6155.2011.00283.x.

Tylš, Filip, Tomáš Páleníček, and Jiří Horáček. "Psilocybin – Summary of Knowledge and New Perspectives." *European Neuropsychopharmacology* 24, no. 3 (March 2014): 342–56. https://doi.org/10.1016/j.euroneuro.2013.12.006.

U.S. Army Special Operations Command. "AY21-22 Priority Research Topics," January 12, 2021.

U.S. Special Operations Command. "Psychological Autopsy Study of Suicides Among U.S. Special Operations Forces," December 15, 2020. https://www.socom.mil/FOIA/Documents/Psychological%20Autopsy%20Study%20of%20Suicides%20among%20United%20States%20Special%20Operations%20Forces.pdf.

U.S. Department of Defense. "U.S. Military Casualties – Operation Freedom's Sentinel (OFS) and Operation Enduring Freedom (OEF) Casualty Summary by Month and Service," February 1, 2022. https://dcas.dmdc.osd.mil/dcas/pages/report_sum_comp.xhtml.

U.S. Department of Justice, Drug Enforcement Administration. "List of Scheduling Actions, Controlled Substances, and Regulated Chemicals," November 2015. https://www.deadiversion.usdoj.gov/schedules/orangebook/orangebook.pdf.

U.S. Government Accountability Office. "Report to the Committee on Armed Services, House of Representatives. Special Operations Forces: Additional Actions Needed to Effectively Manage the Preservation of the Force and Family (POTFF) Program," December 2021. https://www.gao.gov/assets/gao-22-104486.pdf.

U.S. Special Operations Command. "SOF AT&L," n.d. https://www.socom.mil/SOF-ATL/pages/crada.aspx.

U.S. Drug Enforcement Agency. "Drug Scheduling." Accessed May 18, 2022. https://www.dea.gov/drug-information/drug-scheduling.

VA Office of Research and Development. "Efficacy and Safety of Stellate Ganglion Block for Post-Traumatic Stress Disorder in Veterans: NCT05169190." Clinical Trial Registration. clinicaltrials.gov, August 12, 2022. https://clinicaltrials.gov/ct2/show/NCT05169190.

Viera, Anthony J., and Shrikant I. Bangdiwala. "Eliminating Bias in Randomized Controlled Trials: Importance of Allocation Concealment and Masking." *Family Medicine* 39, no. 2 (February 2007): 132–37.

Vollenweider, F. "Positron Emission Tomography and Fluorodeoxyglucose Studies of Metabolic Hyperfrontality and Psychopathology in the Psilocybin Model of Psychosis." *Neuropsychopharmacology* 16, no. 5 (May 1997): 357–72. https://doi.org/10.1016/S0893-133X(96)00246-1.

Vollenweider, Franz X, Alex Gamma, Matthias Liechti, and Theo Huber. "Psychological and Cardiovascular Effects and Short-Term Sequelae of MDMA ('Ecstasy') in MDMA-Naïve Healthy Volunteers." *Neuropsychopharmacology* 19, no. 4 (October 1998): 241–51. https://doi.org/10.1038/sj.npp.1395197.

Walsh, Zach, Ozden Merve Mollaahmetoglu, Joseph Rootman, Shannon Golsof, Johanna Keeler, Beth Marsh, David J. Nutt, and Celia J. A. Morgan. "Ketamine for the Treatment of Mental Health and Substance Use Disorders: Comprehensive Systematic Review." *BJPsych Open* 8, no. 1 (January 2022). https://doi.org/10.1192/bjo.2021.1061.

"What Is Moral Injury?" Syracuse University, 2014. https://moralinjuryproject.syr.edu/about-moral-injury/.

Whitfield-Gabrieli, Susan, and Judith M. Ford. "Default Mode Network Activity and Connectivity in Psychopathology." *Annual Review of Clinical Psychology* 8, no. 1 (2012): 49–76. https://doi.org/10.1146/annurev-clinpsy-032511-143049.

"Why PTSD Is Under-Recognized, Part I: The Upside Down | Psychology Today." Accessed October 17, 2022. https://www.psychologytoday.com/us/blog/stress-relief/201802/why-ptsd-is-under-recognized-part-i-the-upside-down.

Witt, Emily. "Ketamine Therapy Is Going Mainstream. Are We Ready?" *The New Yorker*, December 29, 2021. https://www.newyorker.com/culture/annals-of-inquiry/ketamine-therapy-is-going-mainstream-are-we-ready.

Wnuk, Alexis. "The Changing Face of Post-Traumatic Stress Disorder." Accessed October 19, 2022. https://www.brainfacts.org:443/diseases-and-disorders/mental-health/2019/the-changing-face-of-posttraumatic-stress-disorder-062019.

Wolfendale, Jessica. "Performance-Enhancing Technologies and Moral Responsibility in the Military." *The American Journal of Bioethics* 8, no. 2 (May 9, 2008): 28–38. https://doi.org/10.1080/15265160802014969.

Wulf, H., and C. Maier. "Complications and side effects of stellate ganglion blockade. Results of a questionnaire survey." *Der Anaesthesist* 41, no. 3 (March 1992): 146–51.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California