

Living in a Wounded World  
by Adam Gabriele<sup>1</sup>

1. Introduction

*This is the path of the sun's  
journey by night.*

(Turner, "Gilgamesh, in  
Fossil Relief," 22)

Greater cross-disciplinary collaboration between the fields of sustainability and clinical psychology could lead to improved outcomes for both. While the former would be able to more fully conceptualize sustainability challenges, and to better formulate and disseminate solutions-oriented research, the latter would see an expansion of opportunities to involve patients in sustainability-focused activities that could enhance conventional psychotherapeutic and pharmacological treatments. Moreover, mental disorders, themselves, present a pressing issue that requires the attention of sustainability's interdisciplinary, systems-focused, solutions-oriented approach.

To date, sustainability literature has been impoverished by its limited engagement with psychology, with most examples falling under two categories. First, in terms of the often-unconscious cognitive mechanisms that shape our decision-making regarding consumption of material goods or the use of energy, or how we absorb scientific data related to environmental degradation (Cialdini 2003; Clayton 2007). For example, Goldstein, Martin, and Cialdini (2007) describe their experiments showing the power of social proofing - or the tendency of humans to conform to group behavior. Sustainability literature has also given attention to the impact of

ecological crises and climate-caused disaster on the psychological state of those individuals most affected. In this formulation, the mental health of individuals is part of the collateral damage associated with human-driven climate change (Berry 2009; Berry et al. 2010; Bourque and Willox 2014; Clayton 2015). It could be, as some suggest, that sustainability experts simply don't fully understand the breadth of psychological research, and so have not realized the impact it could have on sustainable goals (Koger and Scott 2007). One notable example is sustainability's apparent overreliance on rational actor theories which suppose that individuals will always make the ideal choice if provided with the proper information. In reality, "The experimental facts indicate the need to develop more realistic models of human behavior under uncertainty, acknowledging the complexity of real-world decisions and our species' limited information processing capabilities" (Costanza et al. 2017).

In other fields, the analysis of the psychosocial dimensions of environmental degradation have taken different forms. Religion and Ecology scholars have emphasized the moral dimensions of our impact on the natural world as well as our responsibility to respect and nurture it (Taylor 2010; Grim and Tucker 2014). In Ecopsychology, Theodore Roszak and others have recognized that "we can read our transactions with the natural environment - the way we use or abuse the planet - as projections of unconscious needs and desires" (Roszak et al. 1995). The ecological economist Robert Costanza, whose work strongly influenced the research presented here, has pushed for public policies informed by the ways clinicians treat substance abuse disorders (Costanza et al.

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attends therapy and struggles with intermittent melancholy bordering on depression, but has never been diagnosed with a mental disorder. Neither has he ever served in the military.

2016). Recently, members of the psychology community have expressed a desire to work closely with sustainability scientists and scholars in support of the UN's seventeen Sustainable Development Goals (Koger and Scott 2007; UN 2015; Jaipal 2017). It is essential to the future effectiveness of sustainability to respond to those overtures with openness and enthusiasm.

This paper seeks to do just that by emphasizing the practical aspects of the connection between psychology and sustainability, demonstrating that a particularly grim problem for clinical psychologists – mental disorders resulting from combat-related trauma – is also a dire sustainability challenge. I also shed light on the pragmatic aspects of that connection by suggesting ways cross-disciplinary collaboration between the two fields can lead to more successful outcomes in both.

In the following analysis, I present Post-Traumatic Stress Disorder (PTSD) and Moral Injury (MI) as a sustainability problem using a catalogue of key features put forth in Wiek's framework for Transformational Problem-Solving (2016). Next, I provide a review of studies demonstrating the treatment benefits of agricultural therapy for veterans diagnosed with PTSD or symptoms associated with MI. I then describe my own efforts to investigate the connection between combat-related trauma and sustainability using original survey measurements, interviews and participant observation on-site at Growing Veterans farm in the state of Washington. Despite small sample sizes, the results support two hypotheses: that agricultural therapy is an effective treatment for veterans impacted by combat-related trauma, and that participants who showed a decrease in symptom expression would also exhibit a concurrent increase in sustainable behaviors.

## 1.2 A Note on Terms

The following paper focuses on two forms of psychological disorder common to military veterans: PTSD and MI, which are described in the following section. The former is codified in the American Psychological Association's Diagnostic and Statistical Manual of Mental Disorders, but the latter is not. Therefore, the weight of research and evidence has fallen most heavily on posttraumatic stress disorder. Consequently, the following discussion most often mentions PTSD. I do attempt to distinguish moral injury and highlight the importance of considering it as something distinct. That said, I urge the reader to remember that, to date, MI has been medically diagnosed as PTSD, or not at all. Therefore, much of the evidence on PTSD relates to MI, too, but other important studies (such as those on PTSD prevalence) likely do not include many cases of suffering caused by MI.

### 2.1 Post-traumatic Stress Disorder

Here is the adrenaline rush you  
crave,  
that inexorable flight, that  
insane puncture  
into heat and blood. And I dare  
you to finish  
what you've started. Because  
here, Bullet,  
here is where I complete the  
word you bring.

(Turner, "Here, Bullet," 6-  
10)

Posttraumatic stress disorder was only officially recognized by the American Psychological Association (APA) in 1980, when it was included in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) – referred to by some as the "bible of psychiatry" (van der Kolk, 2015, p.29). However, there is reason to believe, and scholarship to suggest, that PTSD has

afflicted warriors since ancient times.

Jonathan Shay wrote two influential books comparing the plight of psychologically wounded veterans to the actions and descriptions attributed to the characters of Homer's great epic poems, the *Iliad* and the *Odyssey* (Shay 1995; 2001). Likewise, Bryan Doerries's modern translations of later Greek tragedies, themselves written during a century in which Athens waged more than eighty years of war, became the basis for his "Theater of War" program, which has aided veterans and other trauma-impacted individuals through theatrical performance, catharsis, and communalization of grief (Doerries 2015; 2016). Other scholars from various backgrounds have found evidence of PTSD during the ascendancy of the Assyrian and Roman Empires (Cosmopoulos 2007; Abdul-Hamid 2014), the Crusades and the Age of Chivalry (Rubenstein 2008; Cassidy-Welch 2017; Heebøl-Holm and Thomas 2017), the Bible, the poetry of the Renaissance, and the literature of the Victorian period (Shay 1994; Crocq and Crocq 2000).

Combat-related trauma first came to the attention of the professional medical community more than a century before it appeared in the DSM III. During the American Civil War (1865-1871) and the Franco-Prussian War (1870-1871), doctors noted "overstimulation," anxiety, sleeplessness, and depression to be common among the soldiers they treated (Friedman 2017). The massive engagements of the Great War (1914-1918) and World War II (1939-1945) resulted in unprecedented numbers of psychological casualties. Pragmatism during the earlier conflict led to the development of treatments designed not so much to heal as to get soldiers suffering from "shellshock" back on the front lines as quickly as possible. In World War II, a more compassionate interest in "combat neurosis," "combat stress reaction," or "battle fatigue" (as it was variously known) led to

acknowledgment by medical experts that any one could be psychologically injured by war and that psychiatric casualties were to be considered as unavoidable as those resulting from bullets or explosions (Leys 2000; Herman 2015; van der Kolk 2015).

Though medical interest waned in the years following the war, they were revived during the Vietnam era (1965-1975). Judith Herman, author of one of the most significant books on trauma, says that the advancement of understanding of trauma has always required a concurrent political movement. She writes, "The moral legitimacy of the antiwar movement and the national experience of defeat in a discredited war had made it possible to recognize psychological trauma as a lasting and inevitable legacy of war" (Herman 2015, p.27). PTSD was added to the DSM III just five years after the end of the Vietnam War.

Each iteration of the DSM edits or updates its diagnoses in light of new research. Now in its fifth edition, it defines PTSD as a trauma and stressor disorder characterized by five criteria categories - one etiological and four symptomological - that can be summarized as follows:

- Criteria A: Exposure to one or more traumatic events involving the perceived or real threat of physical harm, or actual physical harm, or indirect exposure (i.e. learning about) to such event(s) befalling a close friend or relative.
- Criteria B: Intrusive, recurrent, involuntary memories that cause severe physiological or psychological distress.
- Criteria C: Avoidance, often at great effort, of thoughts, memories, or feelings related to the traumatic event, or of people, places, objects, or situations that trigger such thoughts.

- Criteria D: Negative alterations in cognition or mood, which produce persistent feelings of numbness, fear, anger, guilt, or shame, such that the individual experiencing them loses the ability to feel positive emotions or enjoy activities they used to.
- Criteria E: Heightened arousal or reactivity in the form of increased agitation, irritability, or aggression – even to the point of verbal or physical violence – as well as heightened startle reflex and difficulty concentrating or sleeping.

Veterans diagnosed with PTSD are at an increased risk of suicide and PTSD symptoms can lead to social isolation, dissociative periods of varying length during which the individual may lose touch with reality and experience traumatic events as if they are happening in the present, disturbed sleep or sleeplessness, poor social and family relationships, and absenteeism from work. The diagnosis is associated with lower income, lower educational attainment, and high levels of economic cost resulting from social, occupational, and physical disability and medical care. PTSD-positive individuals are 80% more likely to simultaneously exhibit additional diagnosable disorders – such as substance use (alcohol or drug addiction) or severe depression – as compared to individuals without PTSD (APA 2013).

## 2.2 Moral Injury

It should make you shake and sweat,  
 nightmare you, strand you in a desert  
 of irrevocable desolation, the  
 consequences  
 seared into the vein, no matter  
 what adrenaline

feeds the muscle its courage,  
 no matter  
 what god shines down on you, no  
 matter  
 what crackling pain and anger  
 you carry in your fists, my  
 friend,  
 it should break your heart to  
 kill.

(Turner, "Sadiq")

Unlike PTSD, Moral Injury has no diagnosis in the DSM and, in fact, the main debate surrounding it is whether or not it should be subsumed beneath the current PTSD diagnosis or established as a distinct disorder (Frame 2015). However, increasing numbers of mental health providers, traumatized veterans, and journalists are advocating for its establishment as a unique disorder. "Moral Injury is not officially recognized by the Defense Department," wrote Pulitzer Prize-winning war journalist David Wood in the first of a 3-part series on MI for the Huffington Post (2014). "But it is moral injury, not PTSD, that is increasingly acknowledged as the signature wound of this generation of veterans."

The inclusion of the etiological criteria (Criteria A) is unique to PTSD and widely contested. It is the primary conceptual distinction between PTSD and Moral Injury. It is popularly – if not unanimously – accepted that Criteria E results from overwhelming neurophysiological stress, which would seem to necessitate the physical experience of a traumatic event (Vujanovic and Schnurr 2017). Jonathan Shay, who coined the term "moral injury" in his 1993 book, *Achilles in Vietnam*, and an earlier essay in the *Journal of Traumatic Stress* (Shay 1991), defines MI as a violation of one's sense of "what's right" by someone in a leadership position in a high stakes situation. This violation, he believes, can be coded by the brain as a physical threat, leading to physiological hyperarousal symptoms. However, other characterizations of

MI do not include the etiological (A) or the hyperarousal (E) criteria (Litz et al. 2009).

I believe MI is distinct enough to be considered separately, or at least alongside, PTSD, and not subsumed beneath it. I credit Litz et al. (2009) with the most cogent and scientifically informed definition of Moral Injury to date: "lasting psychological, biological, spiritual, behavioral, and social impact of perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations." Maguen and Litz (2012) acknowledged similarity in the range of symptoms from the intrusion, avoidance, and negative cognition and mood alteration clusters (Criteria B, C, and D), but suggested that shame, guilt, demoralization, self-sabotage, and self-harm were unique to MI (Maguen and Litz 2012). The DSM V, which was published the year after that article (2013) added these facets to the PTSD criteria, but most MI research still suggests at least a notable difference in symptom primacy: whereas PTSD is most often associated with fear and anxiety, those suffering from MI are more consumed by feelings of guilt, shame, or moral disgust (Litz et al., 2009; Drescher et al. 2011; Maguen and Litz 2012; Nash and Litz 2013; Shay, 2014).

Two hypothetical examples may help to clarify the differences between PTSD and MI. Imagine a soldier on patrol comes under fire and, while looking down his scope, he realizes the enemy combatant firing on his position is a child of 13 or 14 years. The soldier perceives a threat to himself and his unit. Deferring to his training and internationally accepted rules of engagement, he fires and kills the youth. Months later he presents symptoms in line with Criteria B, C, and D. He has also started to have great difficulty sleeping. This could be a case of MI (nightmares and depressive rumination, rather than biological hyperarousal symptoms,

could disturb sleep) but because of the firefight (a traumatic event) he would meet diagnostic criteria for PTSD.

Now imagine another soldier who happens to have never been in a combat situation - never to have felt physically threatened or in danger in any way. She did not hear about a close friend being in danger, either. This soldier is assigned to defend a remote village, though, and sees some of the men in that village verbally or physically abusing their wives or hears that they sexually abuse the village youths. The soldier does her duty and eventually goes home, but months later she develops MI with pronounced expressions of guilt and shame, social withdrawal, and trouble sleeping due to nightmares in which, perhaps, it is she, herself, being struck by the village men, meeting all of the PTSD diagnostic criteria except A and E.

PTSD has received substantial attention from the medical and scientific community despite its relatively recent diagnostic recognition. The literature related to MI, on the other hand, leans heavily toward the anecdotal and the personal (Brock and Lettini 2012; Meagher 2014; Frame 2015; Wood 2016; Frame 2017). However, the recent studies cited above and the launch of an international MI-research collaborative by Arizona State University, King's College London, and the University of New South Wales suggest a reversal of that trend.

The differences between MI and PTSD are subtle, but whether or not the reader decides it should be treated as something separate and distinct, there is an important reason to distinguish it here. To date, there has been no diagnostic category for MI. Some, perhaps many, MI-impacted veterans may meet criteria for PTSD, but many do not exhibit Criteria A or E. This affects the evaluation of their symptoms and their disability assessment, which affects their disability entitlement and treatment. Consequently, it affects their lives and the lives of

those around them. More generally, it means that there is a lack of evidence-based treatments designed specifically for MI, despite being every bit as troublesome as PTSD.

### 3. Sustainability Dimensions of Combat-Related Trauma

The ways in which combat-related trauma constitute not only a medical problem but also a sustainability challenge present themselves at multiple impact levels. The individual, the family and community, and the society all share in the burden these disorders represent. Combat-related trauma can impair a veteran's ability to fulfill basic or aspirational life goals across the entire lifespan by impairing social functioning - including in the workspace. In the extreme case, trauma in veterans is strongly associated with a heightened risk of suicide. These types of trauma can create positive feedback loops further exacerbated by the ubiquity and content of modern media as well as ongoing American involvement in Middle Eastern conflict, making the detrimental effects ones that survive and multiply across generations. Furthermore, the treatment of PTSD and moral injury can be complicated by a number of factors and can even produce unintended consequences that can be interpreted as sustainability challenges in their own right. For these reasons, combat-related trauma represents a quintessential example of a "wicked problem": life-threatening urgency, long-term impacts, high complexity, and inability to be solved by simple remedies (Wiek et al. 2012).

Another facet of PTSD prevalence that is relevant to sustainability but not discussed in detail below is that risk of developing PTSD is inequitably distributed. Certain risk factors - particularly, belonging to an ethnic minority or low-income community - give the challenge of trauma a social equity aspect, as well. In general, African

Americans, Latino Americans, and Native Americans have the highest frequency of PTSD, a trend that holds true in populations of service members (Kakzurkin et al. 2016; Asnaani and Hall-Clark 2017). Of note, racial minorities also have more commonly reported negative emotions of guilt, shame, and low self-worth (Carter and Forsyth 2010). Those feelings may be a product of racial discrimination and may also make minority service members disproportionately at risk of developing MI. Female service members also present higher prevalence of PTSD than their male counterparts (NAS 2014).

For the purposes of framing the argument for a Sustainability audience, I will use Wiek's (2016) criteria for identifying sustainability problems, which stipulates that they are 1) significantly harmful over the long term, 2) urgent, 3) characterized by dispersed effects, 4) determined by complex causes, and 5) contested.

I will begin with a focus on the rising scale - that is, the increasing prevalence of PTSD and MI - as an indication of the urgency of the problem. The significant, long-term harm caused by combat-related trauma, particularly in the dimensions of human and social wellbeing, shall be made painfully apparent in the discussion of impairment and suicide. Dispersed effects will be seen across multiple social and temporal scales, with consequences for the individual's capacity to live a fulfilling life, safety for the individual and their family is impacted, the chance at a healthy adulthood, and the economic cost to the wider community. the safety of the individual's family, as well as children's chance at a healthy adulthood, and the economic cost to the wider community. These traumas stem from highly complex and idiomatic causes should already be apparent from the previous discussion of PTSD and MI, but further complexity will be revealed by a look at the ways other factors

can worsen symptom expression even long after the trauma is incurred. The contested nature of PTSD and MI has also been raised in the preceding sections (in the political history of trauma theory and clinical attention, as well as the debate over the distinction of MI from PTSD), but the many uncertainties and barriers surrounding treatment will also be relevant to that aspect of sustainability problems. Treatment complications also reflect another common feature of sustainability problems: oftentimes, attempted solutions create unintended consequences.

### 3.2 Urgency

You will hear the RPG coming  
for you,  
Not so the roadside bomb.

There are bombs under the  
overpasses,  
in trashpiles, in bricks, in  
cars.

There are shopping carts with  
clothes soaked  
in foogas, a sticky gel of  
homemade napalm.

Parachute bombs and artillery  
shells  
sewn into the carcasses of dead  
farm animals.

Graffiti sprayed onto the  
overpasses:  
*I will kill you, American.*

(Turner, "What Every Soldier  
Should Know," 11-20)

The urgency of sustainability problems is characterized by their need to be addressed immediately, even if they have not yet reached the full potential of their danger to society (Wiek 2016). The incidence of traumatization in military veterans has increased rapidly in the past two decades. These escalations seem to be tied to unavoidable realities of modern combat. As of 2013, the total

U.S. veteran population was about 22 million. 2.2 million were veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), but the VA expects that cohort to grow as high as 4 million. Out of those veterans that use VA health care services (only 54% of the total eligible), the percentage diagnosed with PTSD more than doubled from 4.3% to 9.2% from 2003 to 2012. Even more troublingly, the percentage of OEF and OIF veterans diagnosed with PTSD soared from 1.1% to almost 25% of veterans in the same period. From 2004 until 2012, the total estimate of active service members eligible for Military Health Services grew by only 15%, but the frequency of PTSD increased by a factor of thirteen. The National Academies' PTSD treatment assessment, which reported these numbers (NAS 2014), states they are probably underestimated. It is important to reiterate here that, due to diagnostic criteria, many veterans and active service members suffering from MI are not included in these numbers. One could hope that the prevalence of PTSD in the 46% of veterans that do not use VA health services is lower than in the 54% that do on the reasonable grounds that individuals with sound psychological health are less likely to seek care but, as will become apparent, there are reasons to doubt - or at least temper - that expectation.

There are a number of potential reasons for the rising frequency of PTSD in U.S. military veterans. New warfare paradigms may play a significant role. Modern asymmetric warfare - of which ambushes, improvised explosive devices, and an ambiguous enemy blending with the local population are common features - adds further emotional stress to combat operations (Caforio 2014). Weapons in this "iconoclastic" modern age are "dispersive, penetrative, permeating, insidious, invisible, and (largely) indiscriminate" (Kunstler 2011). Weaponized narrative through manipulation of social media, and

military application of technological advances present upheavals of the moral topography that must be traversed by modern soldiers (Allenby 2016; Allenby et al. 2017). "Foundational changes in information volume and velocity have significant implications for both the incidence and the severity of the moral injury inflicted upon individuals and societies," Braden Allenby writes. "The warrior loses identity, meaning, and a narrative that makes order out of conflict, combat, and death" (Allenby et al. 2017, p.54).

Herman (2015) explains that increased frequency and duration intensify PTSD symptoms. It is, in fact, the basis for her advancement of a separate diagnosis for "complex PTSD." Recently, studies have shown that frequency of exposure to traumatic stressors, not necessarily fear-based or physical ones, is even more likely to mediate traumatic stress than duration (Feinstein et al. 2013). At almost two decades, the post-9/11 conflicts are the most prolonged in U.S. history and, since conscription ended in 1973, have been completely reliant upon an all-volunteer force. These two factors have led the military to vigorously encourage reenlistment, meaning a larger percentage of U.S. soldiers are being repeatedly exposed to combat. Nearly half of those deployed to Iraq or Afghanistan as of 2010 had done so multiple times (NAS 2010). Multiple deployments, of course, mean a greater risk of exposure to traumatic events or the stressors that lead to MI. Kline et al. (2010) found that PTSD was three times more likely among soldiers who had been previously deployed. Some, such as members of the Reserve, are less prepared than others for the emotional and physical rigor of protracted conflict (PTSD 2015c). Another factor that might increase prevalence of combat-related trauma is a swift discharge process.

My own impression, based on research and field work, is that the complicated, ambiguous nature of the

military's mission in the Middle East and the feelings that arise when a veteran, years removed from war but still living with the memories of loss, betrayal, or battle, sees that the conflicts have not ended prompts veterans to ask themselves, over and over and with no satisfactory answer, "What the hell were we fighting for?"

### 3.2 Significant Harm

The sound reverberates down  
concertina coils  
the way piano wire thrums when  
given slack.

And it happens like this, on a  
blue day of sun,  
when Private Miller pulls the  
trigger  
to take brass and fire into his  
mouth

(Turner, "Eulogy," 6-10)

"Sustainability problems threaten the viability or integrity of a society" (Wiek 2016, p.43). Trauma does this by weakening an individual's ability to function within and contribute to society. The psychological damage incurred during military service can be as debilitating as any injury to bone or soft tissue. The men and women impacted by these traumas face many challenges, often over the span of their lives, which are difficult – maybe impossible – for even those closest to them to understand. The DSM V reports that impaired functioning resulting from PTSD "is exhibited across social, interpersonal, developmental, educational, physical health, and occupational domains." (APA 2013). The National Academies found that PTSD could lead to substandard work performance and adverse effects in social relationships (NAS 2014, p.34) and the National Center for PTSD warns that PTSD can cause problems with trust, closeness, communication, concentration, and problem-solving (PTSD 2015c). Evidence suggests that greater severity of shared core symptoms of

PTSD and MI - particularly recurrent memories and avoidance - are most strongly related to unemployment (Anderson 2014) and in one major sample of nearly 1000 homeless Iraq and Afghanistan veterans, two thirds had PTSD (Tsai 2013).

Numbing and avoidance symptoms can lead to less interest in social activities, including sex, or the tendency to push away loved ones and friends. Many of the hyperarousal symptoms cause irregular sleep patterns and chronic stress (Shay 1994; APA 2013; van der Kolk, 2015). In order to cope with the pain of such symptoms, trauma-impacted veterans may take to self-medicating, which can lead to further problems with alcohol or drugs (PTSD 2015c). Those suffering from moral injury might pursue self-handicapping behaviors, such as self-sabotaging relationships or inflicting parasuicidal harm on oneself (Maguen and Litz 2012, Maguen and Litz 2013). Briere and Eadie theorize that exposure to trauma and comorbidity (additional diagnosable disorder) with depression can lead to dissociative symptoms (which cause the individual, to varying extent, to regard his or herself as Other) and a wide range of self-injurious behaviors, including cutting, burning, or hitting as an avoidance strategy to regulate unpleasant states of hyperarousal or overwhelming feelings of alienation from oneself (Briere and Eadie 2016, p.623).

In 2016, the VA reported that, on average, 20 veterans kill themselves every day. After adjusting for age, suicide risk for male veterans was 19% higher compared with U.S. civilian adult men and 2.5 times higher comparing female veterans to female civilians. Veterans accounted for just 8.5% of the U.S. adult population, but 18% of deaths by suicide. Nearly three-quarters of the U.S.'s veteran population, according to 2016 VA statistics, are over the age of 50. Not surprisingly, most of the self-inflicted deaths were among veterans in this age range

- testament to the fact that the risk should not be expected to fade with time - but the highest frequency of suicide was to be found among the younger generation of veterans aged 18 to 29, which accounts for only about 5% of the overall veteran population (VA 2016). This suggests that the younger generation is more at risk from suicide or that modern forms of warfare are more likely to lead to suicide. Either way, it points to a worrying trend: suicide rates among veteran Health Administration (VHA) patients diagnosed with PTSD have risen steadily since 2005 (VA 2016).

Heightened risk of suicide among veterans has been associated with PTSD and that risk increases in direct relationship to the severity of PTSD symptoms presented. Some common features of the disorder, such as comorbid depression and feelings of guilt, significantly amplify the connection (Bryan et al. 2013; Bryan et al. 2016). Moreover, as previously noted, guilt is more strongly associated with MI than PTSD and, so, may actually be even more likely to drive a veteran to suicide (Litz 2009; Maguen 2013). Adding to that, a meta-analytic review determined that subclinical or subthreshold PTSD (a state which closely resembles but ultimately fails to meet diagnosable criteria for PTSD), which affects over 20% of veterans of both sexes, is also associated with increased suicide risk, as well as impairment and comorbid conditions (Brancu et al., 2016).

There are known protective factors and proven therapies that decrease suicide risk. While "personal resources" such as social support can mitigate PTSD severity (Herman 2015; Zang 2017) and thus, suicide risk, it is important to remember that many of the symptoms common to PTSD and Moral Injury lead veterans to withdraw from social activity. Research shows that trauma-focused therapy reduces suicide risk, but mental health providers may be reluctant to use them to treat patients who are

already reporting suicidal rumination or have a history of suicide attempts. Over 80% of licensed psychologists believe trauma-focused therapy in the presence of such factors could actually lead to suicide, rather than prevent it (Bryan et al. 2016). As will be shown, other variables problematize clinical treatment, such as stigmas common to military culture and patient dropout. In addition, it should be noted that more than a quarter of veteran suicides were recent users of VHA health services (VA 2016).

### 3.3 Dispersed Effects

*You carry the pearls of war  
within you, bombs  
swallowed whole and saved for  
later.  
Give them to your children.  
Give them to your love.*

(Turner, "Dreams from the  
Malaria Pills (Barefoot),"  
10-12)

The harmful effects of sustainability problems are dispersed spatially and temporally, often making them difficult to pinpoint. The need to contain these cascading effects, Wiek has suggested (2016), is a principle characteristic of sustainability challenges. The tragic consequences of PTSD and MI fall most heavily upon the men and women directly impacted by those traumas, but they do not fall on them alone. Sadly, while suicide is an end for the veteran who takes his or her own life, it can mark the beginning of loved ones' descent into similar depths of despair. Nash and Litz (2013), prompted by mounting evidence of PTSD symptoms presented by spouses and children of military service members, theorized that the cumulative burdens of a husband or parent's trauma could lead to mental health problems for the spouse or child. Furthermore, they suggested that this "secondary traumatization"

could exacerbate the primary instance and worsen the symptoms of the military service member, which in turn could exacerbate the secondary traumatization and so on. Suicide, in particular, could represent a betrayal of trust in the veteran's family, leading to moral injuries "transmitted and retransmitted between family members like waves generated by the fall of a rock in a small pond" (Nash 2013, p. 371). Another study showed that exposure to suicide increased suicide risk for those exposed, with greater closeness to the deceased correlating to higher risk (Hom et al. 2017).

Death is far from the only way a veteran's PTSD or MI could adversely affect their families. Another unfortunate side effect of combat-related trauma is an increased tendency toward violent or aggressive behavior. To people reliving some kind of trauma "mind and body are constantly aroused, as if they are in imminent danger," wrote van der Kolk (2015, p. 95). "They either react to stress by becoming 'spaced out' or with excessive anger" (p. 99). Jonathan Shay places great emphasis on this aspect of trauma, devoting an entire chapter of *Achilles in Vietnam* to "berserk" rage and its attendant physiological state likened to "flaming ice," comparing Vietnam soldiers who gave up all sense of preservation in reckless battle displays to the famous rage of the Iliad's hero (Shay, 1995).

But rivaling Achilles's millennia-old tragic tale are the unwritten stories of many modern day veteran families. PTSD-positive, male, combat-exposed veterans are strongly associated with being psychologically or physically aggressive toward spouses and children. Severity of numbing, hyperarousal, and avoidance symptoms, as well as comorbidity with addiction or depression have been correlated with increased violence. Other aspects of PTSD and MI, particularly *alexithymia*, or the

inability to identify or communicate one's emotions, can worsen inter-relational conflict by increasing frustration and avoidance (Monson et al. 2009; van der Kolk, 2015).

It follows that there may be a link from PTSD to perpetration of violent crime and, in fact, some studies have supported this. Elbogen et al. (2012) found arrests to be significantly associated with PTSD featuring high anger or irritability. Barrett, Teesson, and Mills (2014) arrived at the same conclusion in research with veterans in Australia. Shay attributes the correlation he observed between veterans and criminal activity to not just anger, but a thrill-seeking impulse, which could be another expression of hyperarousal or a coping strategy for numbness. He even suggests, without imputing veterans with any kind of inherent moral depravity, that the necessities of war and combat, at least in the Vietnam era, perfectly prepared soldiers for lives of crime (Shay 2002).

The effects of this aggression can be felt for years, even generations. Another significant correlation noticed by Elbogen et al. (2012) was between arrests and "having witnessed family violence." The National Center for PTSD lists "living in a home with domestic (family) violence" as a risk factor for exposure to PTSD-inducing events (PTSD 2015). Furthermore, experience of inter-parental violence as a child can lead to higher levels of psychological stress and lower capacity for intimacy (Dinshtein et al. 2011), perpetration of dating violence (Narayan et al. 2014), and major negative health outcomes including depression, suicide attempts, alcohol abuse, and intrafamilial conflict (Roustit et al. 2009). In a survey of over 9,500 U.S. adults, researchers observed a strong, graded dose-response relationship between adverse childhood exposure, including abuse or violence perpetrated against the mother and adult diseases of the

heart, lung, and liver, cancer, severe obesity, alcoholism, drug abuse, depression, and suicide risk (Felitti et al. 1998). In other words, as the number and variety of adverse childhood exposures increased, so did the severity of health problems.

It bears noting that the other adverse childhood exposures observed in the survey included living with individuals who were mentally ill, suicidal, substance abusers, or imprisoned at some point - all characteristics disproportionately common among veterans suffering from PTSD and MI. Compounding the suffering of the children is the guilt experienced by the PTSD-afflicted parent. "I worried that I was passing down my combat experience like a mother passes down half of her DNA makeup," Brooke King, a mother and a veteran, wrote in the Atlantic (2017), "My children are different than they would have been if I, their caregiver, nurturer, and life giver, had not served in the Iraq War."

The possibility that a veteran's increased tendency toward aggression may lead them or their children to crime is clearly a cost to not only the family, but also the wider community - one that is impossible to sum. It is nearly as difficult to quantify the economic burden incurred by society. Kessler et al. (2008) estimated, based on 2002 data, that mental disorders in general cost the U.S. at least \$193 billion in lost earnings. A report issued by the RAND Corporation in 2008 predicted that "two-year post-deployment costs to society resulting from PTSD and major depression for 1.64 million deployed service members (as of October 2007) could range from \$4.0 to \$6.2 billion (in 2007 dollars), depending on how we account for the costs of lives lost to suicide." But even that cold accounting did not take into consideration "costs associated with homelessness, domestic violence, family strain, and substance abuse" (Tanelian 2009, p.9). Apparently assigning value to these was even more difficult than

putting a price tag on suicide. The vast majority of the cost, in their estimation, was attributed to productivity loss - only 4% to treatment. Average annual costs for VHA treatment (i.e. taxpayer-funded treatment) of veterans with PTSD were almost 3.5 times higher than veterans without PTSD in the period from 2004-2009 (CBO 2012).

### 3.4 Complexity

Rockets often fall  
in the night sky of the  
skull, down long avenues  
of the brain's myelin  
sheathing, over synapses  
and the rough structures of  
thought, they fall  
into the hippocampus, into  
the seat of memory -  
where lovers and strangers  
and old friends  
entertain themselves, unaware  
of the dangers  
headed their way

(Turner, "Katyusha Rockets,"  
15-22)

Sustainability problems are characterized by their complex causes. They are multiple, cutting across many domains, and are part of long chains of cause and effect relationships, which create undesirable and unforeseen outcomes (Wiek 2016). PTSD and MI are both incredibly complex in these regards. Not only is there no sure way of knowing when an event or moral affront will result in a pathological response, there is also no guaranteed path to recovery. Sometimes, the path taken leads to even more undesirable outcomes, creating more problems for the individual, his or her family, and the community. Simultaneous diagnoses with other medical or mental disorders, multiple prescription medications, individuals' social resources or unique personality traits, and other variables, the full range of which will likely never be understood,

ensure that there are no simple solutions for combat-related trauma.

PTSD has high rates of comorbidity with a number of other damaging psychological and neurophysiological conditions, the most common among veterans being *dysthymia* (persistent depressive disorder), anxiety disorder, major depressive disorder, alcohol or drug use disorders, and bipolar disorders (NAS 2014). Recent research has found major depressive disorder co-occurring with PTSD at rates as high as 52% (Rytwinski et al. 2013). Another study found that subthreshold PTSD was correlated with depression 43.9% of the time in research involving OEF and OIF veterans (Kornfield et al. 2012). Norman et al. (2012) reviewed research that revealed disturbingly high rates of alcohol use disorder comorbid with PTSD (28% in women and 52% in men), PTSD comorbid with alcohol use disorder (30-59%), and substance use disorder comorbid with PTSD (34%) in a sample of over 10,000 men and women. Back et al. (2014) interviewed veterans of the Iraq and Afghanistan eras with comorbid AUD and PTSD and found that over 94% of those interviewed perceived a relationship between the disorders. Most, 85% believed that spikes in the severity of their PTSD symptoms led to increases in substance abuse, not the other way around. Also, more severe depression in individuals with PTSD has been related to higher rates of unemployment (Cohen et al, 2013) and PTSD-impacted individuals with comorbid SUD have less positive treatment outcomes (Berenz and Coffey 2012; Back et al. 2014).

Traumatic brain injury (TBI) or mild TBI is another injury common to military personnel - a physical one incurred through concussive trauma to the brain, such as blunt force impact or, more commonly, the shockwave of a nearby detonation - which incurs somatic, cognitive, and emotional challenges similar in kind to those stemming from PTSD and MI (PTSD 2015c). In an epidemiological study, Howlett and Stein (2016) found a strong association between TBI and

PTSD. Their review revealed multiple research studies in which 28-37% of veterans with TBI presented clinically significant PTSD symptoms. The prevalence of comorbidity between TBI or mild TBI and PTSD is well documented - to the extent that, together, they have come to be known as the "signature wounds" of the post-9/11 era and clinicians refer to PTSD, TBI, and chronic pain as the "polytrauma clinical triad" (Hammer and Sauvé 2014; Pugh et al. 2014). TBI worsens PTSD symptoms, thoughts of suicide, familial and social functioning, and abnormal stress response across the lifetime (Lindemer et al. 2013; Wisco et al. 2014; Pugh et al. 2016).

Even PTSD-positive veterans who make it home without any problematic secondary conditions find that there are still many ways for their symptoms to worsen. A number of studies since 9/11 have shown that hearing about and witnessing traumatic events through the media, whether on TV or through the Internet, is correlated with stress symptoms (Teddy, 2016; Feinstein, 2013; PTSD 2015b). Furthermore, the constant stream of such news and images through social media can simulate the re-experiencing typical of PTSD, possibly contributing to the development or worsening of symptoms. "Unlike direct exposure to a collective trauma, which can end when the acute phase of the event is over, media exposure keeps the acute stressor active and alive in one's mind" (Holman et al. 2013, p. 93).

The interplay of symptoms that take place in the case of comorbidities may also prompt prescription of competing medications, which can have detrimental effects when used together. "The potential of such medications to work at cross purposes with each other makes it all the more important that healthcare providers become experts in the psychopharmacology involved in both PTSD and mild TBI" (Hammer and Sauvé 2014). However, pharmacotherapy of PTSD is exceedingly complex. The VA's

National Formulary, a catalog which contains all the commonly prescribed drugs VHA doctors approve, contains well over one thousand items (VA 2018), yet it is not exhaustive. Systematic reviews reveal a lack of empirical evidence to support psychopharmacological treatments, limited efficacy of existing drugs, lack of sufficient research to develop new ones, a lack of specificity - as some commonly prescribed medications were tested in the context of other disorders, and - despite the exhortation to become expert - insufficient understanding of the effects of combined medications (Bernardy and Friedman, 2017; Krystal et al., 2017).

Many pharmacological treatments have known side-effects or have been shown to have only moderate effectiveness, including the selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs) recommended by the VA and the DOD. SSRIs and SNRIs are also suspected to increase suicidal ideation in some cases (Schneeweiss et al. 2010; Miller et al. 2013). One drug, the beta-blocker Propanolol, is ethically disputed on the grounds that it may result in collateral attenuation of other memories essential to sense of self. Benzodiazepines continue to be prescribed to treat PTSD symptoms of anxiety and sleep disorder, despite their use being specifically warned against by the VHA because of accompanying risk of heightened AUD and problematic withdrawal (Bastien 2010; Tawa and Murphy 2013; Bernardy and Friedman 2017).

Regrettably, seeking and staying in treatment is not tantamount to recovery. PTSD and MI treatment is incredibly complex. Part of this is because, as consensus holds, PTSD and MI are what is known as a "dimensional disorder." The severity of dimensional disorders is judged by the degree of symptom expression, not just whether or not they are expressed. PTSD and MI, then, are as

highly idiomatic as the means by which they are acquired, and that can have important bearing on determining what type of treatment is appropriate for the individual (Maguen and Litz 2012; Bryan et al. 2013; Harpaz-Rotem et al. 2013; Kramer et al. 2016; Graham et al. 2016; Zang et al. 2017). A good example of this is the emphasis Judith Herman placed (2015) on the significance of "safety" before treatment, warning that trauma-focused therapy at too early a stage could worsen addictive behaviors.

### 3.5 Contested

The ghosts of American  
soldiers  
wander the streets of Balad by  
night,

unsure of their way home,  
exhausted

(Turner, "Ashbah," 1-3)

Sustainability problems are typified by the disagreement surrounding causation, effects, and solution strategies. One such debate over the separation of PTSD and MI into two distinct phenomena was introduced earlier in this paper, as were some of the many different treatments, each of which has its adherents and its defamers. Another example, perhaps the most tragic, is the sad fact that many see mental disorder resulting from combat-related trauma as the result of some defect, some weakness, in the impacted individual - a stigma which probably discourages many who need help from seeking it. As stated above, only 54% of veterans eligible for VHA treatment receive it. A final example of a divisive issue in veteran mental health services is the quality of care provided by the VHA, which has been praised by some and called into question by others.

One of the most commonly cited impediments is a cultural one - one not specific to the U.S. military but particularly evident within it.

There is an unfortunate perception - or misperception - that seeking mental health treatment is a sign of weakness or cowardice, causing some veterans to have negative views toward it. A connected concern is that attachment of such stigma to oneself could or would negatively impact one's prospects for promotion or post-service employment (Yarvis 2011; Kitchliner et al. 2012; Tawa and Murphy 2013; Garcia et al. 2014; Wachen et al. 2016). Those impacted by mental health disorders are probably acutely aware of this, as research has shown they are twice as likely to be worried about being stigmatized as those who did not meet criteria for such a disorder (Yarvis 2011). Wachen et al. (2016) believe that stigma is even more pronounced among active duty service members versus veterans, which is to be expected given the fear of negative career impacts.

Research suggests that treatment delivered in a timely fashion, as near in time to the stressor as possible, can improve treatment outcomes (Kitchliner et al. 2012; Wachen et al. 2016). This was a key realization that led to the reduction of psychiatric casualties during the Great War (Herman 2015). Therefore, even if a veteran seeks treatment after service, his or her decision not to on the grounds of stigma while still active may extend or complicate recovery. Stigma is also a strong component of veteran patient attrition, or dropout. Goetter et al. (2015) reviewed treatment studies involving post-9/11 veterans and found that dropout was a "critical aspect" of underutilization of health services. One study they analyzed showed a discouraging average dropout rate of 23%, (Steenkamp and Litz 2013) but two others reported much higher rates of 68% and 78% (Garcia et al. 2011; DeViva 2014).

The VA is the largest provider of mental health care services in the United States. To date, it has had some success disseminating and training in Cognitive Processing

Therapy and Prolonged Exposure, but its resources are increasingly strained (Sloan et al. 2011). Cognitive Processing Therapy focuses on how the individual mentally interprets and copes with their trauma. Prolonged Exposure involves engaging with traumatic events or re-experiencing triggers until the individual becomes better able to control the related symptoms. A recent review found that the VA faces challenges in regards to inadequate funding, delays funding new program development, difficulties recruiting quality care providers, and slow implementation of specialized programs. Moreover, the VA's effectiveness is handicapped by a reactive approach to treatment and poor tracking practices to measure effectiveness. In 39 reviewed VA programs specialized for PTSD reviewed wherein outcomes were properly reported, only modest outcomes were found (Lake 2015). For example, a recent randomized clinical trial (the "gold standard" in therapeutic research) found that Cognitive Processing Therapy was effective, but even that trial reported lingering "clinically significant" symptoms in more than half of the participants (Resick et al. 2017). Reviews also determined that many PTSD studies have suffered from "less than optimal" methodological quality (Kitchliner, 2012; Lake 2015).

### 3.6 Inherent Unsustainability

Tomorrow is made of shrapnel  
and blood.

(Turner, "A Lullaby for  
Bullets," 1-2)

PTSD and Moral Injury are not challenges for the medical field alone. These men and women are back in society - where they belong, and where their condition also has an effect on the entire community and their treatment costs taxpayer dollars. It also happens that sustainability has the potential be

a powerful tool to improve PTSD and MI treatment outcomes, and, for many, that alone should justify its attention from sustainability scientists and scholars. The ways sustainability and trauma care intersect will become clearer in subsequent sections. Before moving on, I draw attention to one more way in which PTSD, MI, and probably other forms of mental disorder, as well, are fundamental sustainability challenges.

Up to this point, I have done my best to consider only empirical, scientific findings, but now I would step back from the data and look once more at the problem. Trauma isolates individuals from their community. It locks them in continuous loops of terror or shame. It makes it difficult to concentrate on challenging problems, commit to sustained activities, or manage frustration in interpersonal conflict. It causes one to perpetuate behaviors that are self-damaging, even destructive, while pushing away or ignoring positive people. Trauma feeds on the individual and hungrily draws others into its bleak reality. Most profoundly, PTSD, and even more so MI, impart upon those it consumes a "sense of a foreshortened future" (APA 2013). As Ratcliffe, Ruddell, and Smith (2014) explained, drawing on the work of the philosopher Edmund Husserl, this means more than simply anticipating an early or generally negative end for oneself. It can fundamentally reshape one's relationship to reality by inoculating an outlook dominated by a consuming nihilism. As one comes to believe the trauma-fueled lie that the meaningful events of their life are in the past, a false certainty grows that all the events between now and one's inevitable end are, consequently, meaningless. Thus every instant lived is lived in negative anticipation of the next.

I argue that it is impossible for such a person to adopt or adhere to sustainable principles and values. Without hope, how can one envision a better future? Without patience and

positive expectation, how can one wage the long, demoralizing struggle that many of the most important sustainability challenges promise? Without love and protective feelings for oneself, how could one ever truly live in service to others? Trauma disorders, I propose, are an inherently unsustainable state with symptoms that are perfectly antithetical to sustainability values. But there is good news.

Tsai et al. (2015) advance the possibility of a "positive legacy" of trauma in their first-ever nationally representative study of post-traumatic growth, which Zoellner and Maercker (2006) described as a "a significant beneficial change in cognitive and emotional life that may be the 'antithesis' of posttraumatic stress disorder." Such changes can include increased appreciation of life, setting new life priorities, a sense of increased personal strength, identification of new possibilities, improved closeness of intimate relationships, or positive spiritual change. Tsai et al. (2015) found that 72% of veterans with PTSD reported at least moderate PTG, expressed most commonly as greater appreciation of life and personal strength. The researchers suggest that interventions designed to promote greater social support, purpose in life, and intrinsic religiosity could help foster post-traumatic growth from trauma among veterans. MI scholars have made similar claims (Meagher 2014; Allenby et al. 2017).

I believe that Sustainability, especially in its focus on environment, has potent similarities to many religions – its normative dimensions, its dependence on consistent and diligent observance of particular behaviors, and the goodwill at its heart. As Thomas Dunlap put it in his book *Faith in Nature* (2009), environmentalism "gives moral weight to the apparently trivial decisions of daily life" while "holding some areas and species in awe and finding in wilderness the opening to ultimate reality" (p. 4).

Likewise, social support and a sense of purpose in life, the same aspects of religiosity that are of benefit to those recovering from PTSD and MI, figure centrally in the application of sustainable agriculture as an alternative trauma therapy, which I introduce in the next section.

One implication of this could have immediate positive impact on sustainability efforts toward transformation: when designing strategies for cities, neighborhoods, regions, etc., psychologists could be asked to generate a probabilistic psychological profile of the region based on a range of sociodemographic and historical data. Sustainability advocates could then use that data to formulate the messaging they will use to gain local support for the transformation strategy.

#### 4. Agricultural Therapy

... I follow the footpath  
leading to silence.

It is a type of medicine by  
landscape,  
This forgetting of my life

(Turner, "The One Square Inch  
Project," 2-6)

Psychotherapy and psychopharmacology are not the only viable means of treatment for veterans impacted with PTSD and MI. Complementary and alternative medicine approaches to PTSD treatment used in the VA/DOD healthcare system – including, but not limited to: meditation, yoga, theater, and virtual reality exposure –revealed that complementary and alternative medicine can be effective in reducing severity of PTSD and endorsed an integrative approach to management of combat-related disorders (Lake 2015; Doerries 2015; Maples-Keller et al. 2016). Integrative treatment, combining alternative approaches with conventional medicine, has been advanced as a means to improve outcomes (Kazdin and Blasé 2011;

Kitchliner et al. 2012) and is preferred by veterans undergoing treatment for combat-related trauma (Back et al. 2014; Schumm 2015). Agricultural therapy (AT), also referred to as therapeutic gardening or horticultural therapy, a type of nature-assisted or "green" therapy, is one effective alternative treatment enhancement that can be considered a sustainable activity, as well.

AT provides both cognitive and emotional benefits while also granting participants increased feelings of personal meaning and connection to nature or the community. Research also revealed ancillary benefits to the participant in the form of improved physical health through nutrition and physical activity, and increased opportunity for employment, as well as community benefits of decreased crime, atmospheric carbon sequestration, and improved community organization (Okvat and Zautra 2011; Parkinson et al. 2011; Ingram et al. 2016; Soga et al. 2017). Veterans have benefited from AT through exercise, sense stimulation, positive reminiscence, stabilization of sleep cycles, decreased stress, reduction of pain, reduction of agitation, reduced reliance on medication, restoration of memory and attention, increased sense of responsibility, increased social interaction, increased feelings of calm and relaxation, identity construction/reconstruction, and significant improvement in self-esteem with few or zero side effects (Clayton 2007; Detweiler et al. 2012; Poulsen et al. 2015; Lehman et al. 2018).

At least three general theories exist to account for the therapeutic benefits of AT for veterans. Attention Restoration Theory (ART), holds that therapeutic gardening activities allow the individual to focus "voluntary attention" and filter out external stimuli, alleviating some degree of the expressions of hyperarousal symptoms

experienced by veterans with PTSD as well as the depressive ruminating that may come with PTSD and MI (Kaplan and Kaplan 1989; Gonzalez et al. 2010; Okvat and Zautra 2011; Detweiler et al. 2012; Ingram et al. 2016). The Psychophysiological Stress Recovery Theory (PSRT) suggests that exposure to green space, even briefly, as well as viewing of aesthetically pleasing natural vistas can regulate physiological processes, such as blood pressure or muscle tension, that are typically dysregulated in PTSD-positive or MI-expressive veterans (Ulrich 1999; Ulrich 2002, Brilingsmark et al. 2009; Ingram et al. 2016). Finally, the biophilia hypothesis posits a more fundamental connection between humans and nature, to the point that removal of any natural element in the environment can affect human psychology and even culture (Ingram et al. 2016). The presence in soil and plant tissue of *mycobacterium vaccae*, a type of bacteria found to increase feelings of calm and improved cognition through activation of serotonergic neurons, lends scientific weight to this theory (Lowry et al. 2007; Reber et al. 2016, Siebler et al. 2017).

#### 4.2 Veteran-Focused Agricultural Therapy

And I keep telling myself that  
if I walk far enough  
or long enough someday I'll  
come out the other side.

(Turner, "Wading Out," 22-23)

My own research has been inspired and, to some extent, modeled by two VA-supported studies led or co-led by Dr. Karen Besterman, a medical anthropologist at the Center of Innovation on Disability and Rehabilitation Research at the James A. Haley VA Medical Center in Tampa, Florida. Citing evidence of the historically challenging nature of community reintegration for veterans, a process made more

difficult - even fatally so - by PTSD and the social isolation that is the all too common result of its salient features, Besterman-Dahan's studies sought to verify the value of community agriculture initiatives as viable strategies for improving outcomes.

The first study (Brown et al. 2016) set out to identify the barriers and facilitators associated with participating in a community agriculture initiative for transitioning rural veterans and to describe both the experiences and satisfaction of veteran and non-Veteran participants in a veteran-run peer support and community agriculture program in western Washington state. Qualitative and quantitative research, consisting of semi-structured interviews, participant observation, and multiple validated survey measurements, showed convincingly that participation in the community agriculture initiative resulted in improvements in mental, physical, and emotional health. The veterans reported or exhibited improved interpersonal communication and vocational capacity, as well as increased connection to the surrounding community. Benefits accrued primarily from the senses of satisfaction, belonging, and camaraderie that participation in the community agriculture initiative imparted.

The second study aimed to broaden the sample and extend the investigation to the national level. Besterman-Dahan and her colleagues partnered with the Farmer-Veteran Coalition (FVC - farmvetco.org), a non-profit initiated in 2007 by Michael O'Gorman and other California-based organic farmers with the mission of creating jobs in agriculture for returning U.S. military veterans. The FVC recognizes not only the needs, both social and psychological, of its more than 4,500 veteran members, but also the needs of American agriculture, which is facing a looming demographic crisis (FVC 2018). Consistent with a

30-year trend, the 2012 Census of Agriculture showed an increase in the average age of farmers. 61% were between the ages of 35 and 64 years old and 33% were over the age of 65. Meanwhile, the overall number of farmers fell since the last census in 2007 (USDA 2014). The FVC believes that returning veterans have the skills - and the incentive - to fill the boots of the thousands of older farmers who are within a few years of retirement.

The goals and objectives of the second study were much like the first: To enhance and improve policy programs and resources for veteran farmers by identifying barriers, facilitators, and motivators related to participation in community agriculture, and to describe the impact on veterans' quality of life and health, both social and physical. They used a combination of surveys administered online and semi-structured phone interviews with select survey respondents, Besterman-Dahan and her team collected data, presented at the FVC's 2016 conference in Michigan, from over 700 surveys and 18 interviews that supported the findings of the earlier study (Besterman-Dahan et al. 2016). Participation in community agriculture reduced pain, anxiety, and depression while improving physical health (through exercise and inspiring a better diet), social functioning, community involvement, economic opportunity and capacity for employment. Improvement in psychological health was observed in terms of increased sense of purpose, meaning, accomplishment, and calm, as well as formation of future goals.

## 5 Case Study Analysis

I wanted to know how strong the transformational power of recovery with Agriculture Therapy (or "dirt therapy" as the veterans I worked with called it) really was. As thorough as Besterman-Dahan et al.'s research was, in neither study did they specifically target

veterans diagnosed with PTSD or symptomatic of MI. My goal was to return to Growing Veterans farm, the site of the first of the two studies mentioned above, to see if that subgroup of participants reported similar transformation. At the same time, I wondered - based on the inherently *unsustainable* nature of trauma symptomology - if I might find evidence that healing is an inherently *sustainable* transformation. Therefore, I set out to answer, first, what were the therapeutic benefits obtained by PTSD or MI-impacted veterans participating in AT and, second, did those participants whose symptoms improved also display a concurrent increase in sustainable behaviors or outlook in their daily life.

This research began with in-depth literature reviews of trauma and trauma treatment, PTSD, MI, and agricultural therapy, including the Diagnostic Statistical Manual of Mental Disorders 5<sup>th</sup> Edition (APA 2013) epidemiological evidence from World Health Organization's Mental Health report, as well as phenomenological accounts from veterans, embedded journalists, and members of the care community.

My mixed-methods approach included participant observation, online surveys, and semi-structured interviews with veteran participants, employees, and managers of Growing Veterans. Materials and research design were approved through Arizona State University's (ASU's) Internal Review Board (IRB) after submitting recruitment scripts, consent forms, survey, and interview questions.

I was aware that veterans are often subjected to numerous tests and that my own status as a student unaffiliated with the VA or the military might not carry enough weight to motivate participation. Therefore, I chose to develop my own survey in order to minimize the number of measurements the subjects would need to complete. During the literature review phase, I identified six psychological

constructs relevant to both sustainability and trauma recovery and designed my questionnaire to target those concepts. Mental health professionals, including several employed by the VA, reviewed the survey to confirm its validity, and I edited the measurement according to their suggestions.

Contact with Growing Veterans was initiated in person at the Farmer-Veteran Coalition conference at Michigan State University in December of 2016. Later, contact was resumed via email and then phone. The farm manager agreed to identify eligible candidates for the study from among their organization's staff and participants and to help distribute the survey through GV's email system and social media. The farm manager also agreed to allow me to visit the farm, during which time I would work as a volunteer while gathering data. That visit took place in late October 2017.

Individual survey items were evaluated based on favorable or unfavorable change relative to the hypotheses. Favorable base states (B or C options) were not taken into account during calculation. Items were assigned numeric values (1-5) based on percent of responses consistent with a positive transformation (5=80-90%, 4=60-79%, 3=40-59, 2=20-39%, 1=0-19%). Items were totaled for each construct to be assigned an endorsement score of None (5-10), Moderate (11-15), Strong (16-20), or Significant (21-25).

Interviews were each coded twice: once according to the six constructs evaluated in the surveys and once using an *in vivo* approach, which revealed five more noteworthy constructs: "Strength of In-group Dynamics" and "Counterpoint" were contraindicators relative to the hypothesis and three more - "Distrust in Institutions," "Triggers," and "What was the Point" - related to possible expression of symptoms PTSD and MI that were still apparent.

## 5.2 Results

All six of the survey constructs were positively endorsed. In most (4/6), the endorsement was significant and strong in the remaining two. In descending order, the most positive responses - meaning those that most strongly supported the hypotheses - were found in constructs pertaining to: "Health and Well-being," "Positive Future Outlook," "Pro-Sociality," "Environmental Sensitivity," "Identity and Self-worth," and, finally, "Positive Worldview."

Most of the 30 individual item responses showed very positive endorsement with ratings of 4 or 5. Four were in the middle range with ratings of 3. Only three were rated lower. One item rated a 1, but actually showed a slight (30%) unfavorable transformation relative to the hypothesis.

Most of the constructs were strongly supported. Analysis of the interview transcripts showed a relatively even distribution of responses related to the target constructs across interviews with the exception of "Positive Future Outlook," which was only moderately expressed.

### 5.3 Limitations

While the data collected in the study was emotionally powerful and argues strongly in favor of continued research along these lines, it was limited in some major and minor ways, including:

1. Small sample size: In the interval between phone contact and visitation Growing veterans, experiencing economic difficulties and leadership changes, had decided to close down operations at their farm in Mount Vernon, WA to move to a smaller property in Bellevue, WA. Most of this process was already complete at the time of my arrival. Roughly half of the staff had been laid off and very few veteran volunteers visited the farm while I was there. It is likely that this was because a) veteran volunteers were

upset or otherwise disappointed that Growing veterans was moving and were keeping their distance, b) veteran volunteers saw little point in working on a farm that would not be there in a few days time, or c) the move being nearly complete and the growing season nearly over, there was little to do.

Another factor in the small sample size for surveys and interviews was the specificity of the selection criteria. A convenience sample, appropriate for Brown et al. (2016) and Besterman-Dahan et al. (2018), would not work in this instance. The study required respondents and interviewees who were veterans with diagnosed PTSD or symptoms matching popular theories of MI whom had participated in AT. After my visit to Growing Veterans, I attempted to increase the number of survey responses by contacting other veteran-focused AT programs, as well as the FVC, itself, but without success.

2. Self-selection bias: Those veterans that I did meet during my visit were either staff or long-term volunteers who were still there out of particular loyalty to or gratitude toward the program. It is possible that they reflected only the most favorable end of the spectrum among veteran participants.

3. Contextual ambiguity: The nature of the activity, sustainable agriculture/agricultural therapy, is likely to produce ancillary sustainable behaviors (buying local, choosing organic foods, greater appreciation for nature) without necessarily leading to similar increases across other domains of Sustainability. While sustainable choices related to food and nature are some of the most impactful a person can make, they only get at some aspects of Sustainability. Therefore, it is difficult to make general claims regarding the extent to which a sustainable transformation has taken place.

While results were insufficient to prove that recovery from trauma

via agricultural therapy led to sustainable transformations among veterans impacted by PTSD and MI, neither did they disprove my hypotheses that agricultural therapy is an effective alternative treatment or treatment enhancement for veterans impacted by combat-related trauma and that participants in the AT program would report a rise in sustainable behavior and thinking as their symptoms decreased in severity. In fact, the small amount of data collected strongly supported the hypotheses and did so with very high precision among responses. Considering this, further research is warranted, incorporating the following strategic changes to address the shortfalls of the current study:

1. Engage in a more formal partnership with the VA, FVC, the Department of Defense, or other military or military-adjacent organization to enhance perception of validity and effectiveness of outreach.

2. Expand the research to incorporate a greater diversity of agricultural therapy programs and arrange data collection for earlier in the year. Make at least near-term solvency of the program part of the selection criteria.

3. Widen study to incorporate other recovery methods, including CAM treatments (yoga, mindfulness, art therapy, etc.) and more mainstream methods (psychotherapy, medication). If the second hypothesis - that there would be a co-occurring rise in sustainable behavior as trauma symptoms decreased in severity - is correct, the form of treatment should not matter, only the extent of recovery.

#### 5.4 Discussion

Despite these shortcomings, some salient points did emerge. First, both survey and interview respondents subjective experience very much in line with those reported in the studies conducted by

Besterman-Dahan and her colleagues. Specifically, AT granted a new sense of purpose and of being part of a community. These experiences led to recovery of an individual identity connected to a greater community. Notably, expressions of a reclaimed identity included a note of reconciliation with past deeds, rather than avoidance. And the recoveries were striking. One participant who had had a gun at his temple the day before starting at Growing veterans credited the program with saving his life, not to mention introducing him to his fiancée and inspiring a new career. Another reported that he'd been using two prescription drugs to regulate his symptoms and heavily abusing alcohol when he entered the program. He no longer uses the drugs or the alcohol. Other members indicated that the program helped them to realize that their history as soldiers is an integral part of their lives that they could feel comfortable sharing.

Another important observation was that some triggers remained problematic. Some were clearly linked to the physiological startle reflex or agitation of the hyperarousal cluster, such as reactivity to sudden loud noises or traffic. However, the complaint that came up most consistently was frustration with or distrust of authority figures - in this case, the board of the non-profit that managed the program. This is most consistent with causal theories of MI, and it sheds light on the difficulties traumatized vets have with reintegration. Even the most common relationships - an employee with his boss - can become an avenue toward resurgent symptoms.

Lastly, all of the respondents indicated some form of sustainable behavior or outlook change since participating in the program. Most common were the decision to eat foods produced locally and organically, improvements in personal health through nutrition and physical activity. But other changes were not

so closely related to the agricultural activity itself. For instance, one participant had partitioned her home with curtains to heat it more efficiently and had purposefully started wearing the same clothes for multiple days to avoid frequent washes. Others had registered to vote, joined community organizations, or formulated long-term plans with an optimistic view of future. Perhaps most notable, were the comments that revealed a change in thinking toward people who were different. For example, one of the participants, speaking of a derogatory term he had used commonly during his time in the military, said, "Then I realized it *is* bad ... It's hurtful. If I was homosexual, I wouldn't want to be called a 'faggot.'"

These comments reflect understanding of tradeoffs, willingness to sacrifice convenience for environmental reasons, democratic participation, long-term thinking, and empathetic interpersonal relating - capacities essential to sustainable transformations and reflective of the values, futures, strategic, and systems thinking that characterize sustainable transformation (Keeler et al.).

Personal assets such as social bonds are protective factors against the development of trauma-related mental disorder (Charuvastra and Cloitre 2009; Zang et al. 2017). Disturbingly, current trends are leading away from such connections. As the psychologist and social theorist John Schumaker argues in his book *The Age of Insanity* (2001), modern consumerism erodes the very factors that could increase psychological resilience: "Contemporary economic strategies sever attachments to self, community, and earth, with fragmentation and alienation as predictable consequences" (p. 41). The comments of a thirteen year old girl featured in *iGen*, Jean Twenge's ethnography of the titular generation born between 1993 and

1998, the first to spend their entire adolescence in "the age of the smartphone," likewise foretell the degradation of positive socialization: "I would rather be on my phone in my room watching Netflix than spending time with my family. That's what I've been doing most of the summer. I've been on my phone more than I've been with actual people" (Twenge 2017, p.2). Twenge notes an increase in incidence of mental illness, delayed emotional development, and a lack of interest in in-person social activity among iGen's principal characteristics.

Meanwhile, the threats to psychological health are multiplying. Climate change will displace entire communities given rising sea levels and intensified weather phenomena, endangering mental health in ways sustainability scholars have already begun to consider. But what about the traumas this paper has focused on? The circumstances leading to veteran PTSD and Moral Injury are, of course, more intense than anything commonly experienced by people in the general population, but are they truly different in kind? If Moral Injury arises when a sense of right is violated, especially when the violation is perpetrated by someone in a position of authority, what is the effect on the average American who wakes up nearly every day to the news that celebrities, captains of industry, and political leaders have been exposed or accused as cheats, rapists, and possibly even traitors? What is the effect on minority-ethnic communities when they see men marching with torches in their fists and racism-fueled rage in their hearts? What is the effect on African-Americans when members of their community fall victim to unprovoked acts of police brutality, and their murderers go unpunished? Even those insulated from these moral insults are prey to the twenty-four hour news cycle and ubiquitous social media, which stream the many guises of human vice and brutality whenever we have the courage to look. And,

recently, an old horror- the looming, existential fear of nuclear war – has seemingly been summoned from the depths of national memory. Joanna Rogers Macy, an activist and Buddhist scholar, wrote during the Cold War, “These developments are facts of life in our present world. They shape the wider context of our lives. Whatever policies we may advocate in response to them, they are part of the story we are living now together. To be aware of them at any level is to feel pain for our world and our collective future” (Macy 1983, p. 2). A quarter century later, as North Korean’s dictator and America’s president compare buttons, her words resonate.

### 6.1 A Proposal for veteran-focused Urban Agricultural Therapy

Sometimes looking for a solution isn’t the best way to find one. Sometimes it is better to look for compatible deficiencies – to see vulnerabilities as opportunities and apply elegant solutions to wicked problems. The FVC and its member organizations observed that American agriculture is in need of labor and that veterans are a labor force in need of a particular vocation. Like matched pieces of a puzzle, they merely fit them together, and in the process created something new and holistic. Intrinsic to this type of problem solving is a bi-directional dynamic that, I believe, generates a more durable solution. Furthermore, there are other opportunities for veteran healing in urban agriculture, and, at least on the sustainability side, even greater need.

Urban agriculture is growing. Over 800 million people around the world practice agriculture within and around cities, with a yield potentially fifteen times more productive than rural areas (FAO 2018). This growth is in line with the rapid increase in urbanization of the global population. As of 2014, 54% of the world’s people lived in urban settlements (UN 2014). The U.S. is well ahead of the curve with an

urban population topping 80% (USDC 2012).

Cities change the local temperature and produce what is called an “urban heat island” effect, which can expose residents to further dangerous health risks and can even detrimentally affect one’s well-being (Mohajerani et al. 2016). Research has shown that increasing green space inside the urban area correlates with a reduction in local temperature and that the use of green roofs, i.e. rooftop gardens, can reduce blackouts, improve storm water management, air quality, and increase urban biodiversity (Susca et al. 2011). Urban farms and gardens may even be better than large parks for reducing UHI, as not only the amount, but also the shape and distribution of green space matters: “Multiple smaller interventions that take advantage of wind patterns tend to have a greater cooling effect across a large canopy” (Gunawarden et al. 2017).

Another major but somewhat controversial urban challenge are “food deserts,” defined by the USDA as “urban neighborhoods ... without ready access to fresh, healthy, and affordable food.” Wright et al. (2016) found that, while “food deserts” are highly correlated with low-income and minority ethnic communities, several factors (such as the large number of produce stands and small-chain grocers present in these same communities, suggest that unhealthy eating is more likely a choice determined by cost, education, and culture. Urban farms often double as community outreach and education centers and could serve as an axis of cultural change toward healthy eating in urban communities defined as food deserts (de Zeeuw et al. 2010)

Many urban farms, like their rural counterparts, struggle to monetize, and inability to meet operating costs often leads to closure (McMillan 2016). But here one can see, like the directors of the FVC did, how compatible deficiencies can be

brought together to achieve an elegant solution.

If small cooperative associations of PTSD and MI-affected veterans came together to establish urban farms operating on a community-supported agriculture (CSA) model - in which community members buy "shares" of a farm's produce, delivered or picked up at regular intervals throughout the growing season - their activity could enhance their own recovery while contributing to the remediation of the urban heat island effect and greenhouse gas emissions. Meanwhile, leveraging training imbued with the "hearts and minds" ethos embraced by the military since the Vietnam War, urban veteran farmers could provide educational outreach to facilitate healthy culture change in "food deserts" while simultaneously satisfying the veterans' own needs for fulfilling, mission-oriented work, sense of purpose, and positive reconnection with the civilian community.

Hypothetically, the financial precariousness of running an urban farm could be offset by the combined benefits of the veterans running it. The VA pays each veteran, on average, about \$13,000 per year for ages up to 54 (VA 2016). However, supplementary governmental investment in such programs would improve success rates, while being more than offset by decreased health and welfare costs associated with PTSD, MI, addiction, food deserts, and urban heat islands and increased effectiveness of initiatives aimed at improvement in those contexts.

The transition from state-sponsored warrior to state-sponsored farmer would not be without precedent: Velleius, in his *Compendium of Roman History*, describes how Roman consul Gaius Marius ceded land grants to retired legionnaires during the first century B.C.E. The U.S. government has promoted such programs since the beginning of our nation. Veterans were granted bounty-land warrants for military service during all conflicts from the Revolutionary War

until the mid-nineteenth century numbering more than 550,000 and allotting more than sixty million acres. Additions made to the Homestead Act in 1872 favored veterans, and farm re-settlement programs were extended to veterans of both World Wars (Headle 1922; Black and Hyson 1944). More recently, the 2014 Farm Bill grants preference to veteran farmers and ranchers (2014). As for urban agriculture, the USDA established a microloans program designed for such projects in 2013. In 2016, it funded twelve urban farms, the most in its history at that time, and published an Urban Agriculture Toolkit (Business Insider 2016).

Sustainability initiatives involving servicemen and women need not be limited to agriculture. There seem to be plenty of veterans who retain the desire to serve their wider community, even at personal risk. Team Rubicon (teamrubicon.org) is an organization which dispatches veterans with special skills to disaster zones, and the self-organization of hundreds of veterans who went to defend the rights of Dakota Access Pipeline protesters, are inspiring examples (Healy 2016).

### 7.1 Conclusion

Let me lie here and dream of a  
better life.  
Let what beauty there is be  
lifted up  
And given to the greater world

(Turner, "Mihrab," 7-9)

In this paper, I have highlighted the ways combat-related trauma poses a problem suited to sustainability's strengths and how attention to it could yield improvements in outcomes for both sustainability and psychology. Using the key features of sustainability problems from Wiek's Transformational Problem-Solving Framework (2016), I have demonstrated that PTSD and Moral Injury are urgent and significantly harmful, yet contested problems

characterized by complex causes and dispersed effects. I have described the ways that simplistic, reductive approaches to solving this problem can, besides having mixed effectiveness, potentially compound the problem by making it more complex. Finally, I theorized that the symptoms of trauma are antithetical to sustainability in general and thus undermine sustainability projects that rely on the diligent and passionate commitment of the general public.

Following a thorough review of scientific and theoretical literature relevant to agricultural therapy, I focused on a particular pair of studies which showed how sustainable organic agriculture can enhance treatment outcomes for veterans diagnosed with PTSD or exhibiting symptoms associated with MI. I described my own attempts to build upon those findings in a sustainability context via the development and application of novel survey measurements, interviews and participant observation techniques at the Growing Veterans farm in Washington. While conclusions drawn from that research are limited by small sample sizes, the results support prior studies and my own hypotheses: that agricultural therapy would still be effective when the research sample was narrowed to the veterans impacted by combat-related trauma and that participants who showed a decrease in symptom expression would also exhibit a concurrent increase in sustainable behaviors. I believe the findings justify the need for future research in this area.

In the final section, I proposed a model for an urban community agriculture initiative that would combine veteran-focused AT with community outreach to enhance treatment outcomes while simultaneously furthering sustainability goals by counteracting effects related to "food deserts" and urban heat islands.

Besides bringing attention to an unrecognized sustainability problem, this research has contributed to the field of sustainability in two ways. First, it has shown the power of an approach to solution-formulation that links problems according to compatible needs. Rather than trying to wrestle with sustainability problems head-on, this approach, in essence, brings problems together so that they can solve each other. Second, by emphasizing those aspects of sustainability efforts that offer a sense of purpose or self-efficacy, an opportunity for feeling part of a community united around a common mission, and a redemptive path toward a better future, sustainability might inspire more diligent adherence to sustainable values than by simply offering the vision of that future. It may be that a better alternative to the status quo isn't enough; individuals may also need to feel "worthy" of that better alternative or that they might become so in working toward it.

Aldo Leopold, the inspirational environmental philosopher and conservationist, said, "one of the penalties of an ecological education is that one lives alone in a world of wounds," meaning that ecologists more than most people clearly see the many ways economic development in the modern world has damaged biological systems (Leopold 1991, p. 165). The same dynamic applies today to sustainability scholars and practitioners who are trained to understand and address both ecological and social wounds in our shared world. It is our responsibility to heal those wounds in an integrated fashion, attentive to the many complex connections between nature and culture, causes and consequences, past, present, and future. By focusing on those aspects of sustainable change that provide the sense of purpose, strengthening of identity as an individual part of a community, and a redemptive path that prove so motivating for those whose lives have been radically transformed by trauma,

sustainability scientists can be more than bearers of bad news – we can be messengers of hope, of healing, as we move toward a better tomorrow.

And to the veterans at the center of this study and the attendant research, we must thank them for their service, not, in this case, as our society's shield, but as its mirror, reflecting and magnifying the ways in which we all are vulnerable – reflecting and magnifying the humanity that we all share.

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