Equine Assisted Therapy for PTSD: Clinical and Neuroimaging Evidence HETI 2021

Yuval Neria PhD

Columbia University Medical Center, NY

ny126@cumc.columbia.edu

Funding

NIMH NIH/NHLBI

Foundations: Bob Woodruff Foundation, Stand for the Troops, Mack

Foundation, NARSAD

New York Presbyterian

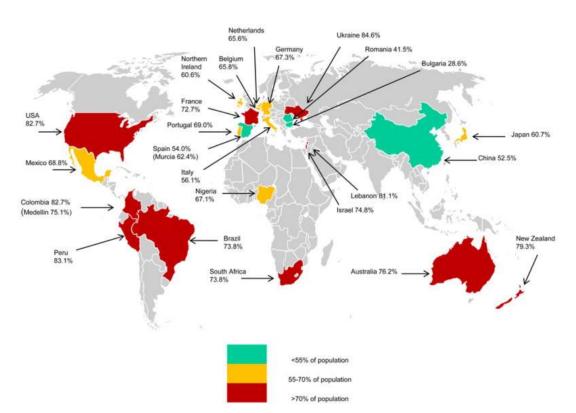
Cambridge University Press

Springer Books





Trauma is Everywhere



 World Health Organization (Benjet et al., 2016)



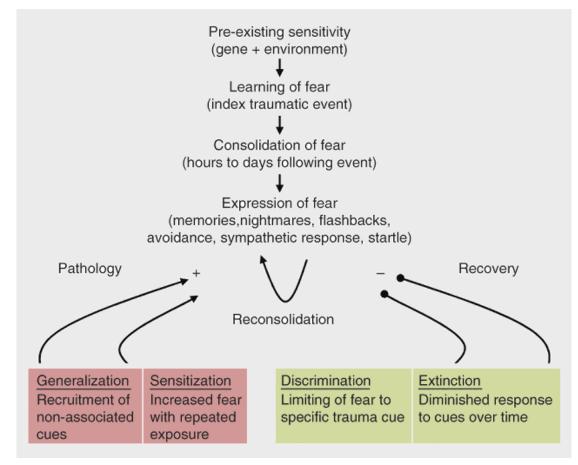




Psychiatric Wounds of War

- Soldiers' Heart Civil War
- Shell Shock World War I
- Battle Fatigue World War II
- Combat Neurosis Korean War
- Post Traumatic Stress Disorder (PTSD) –
 Vietnam

Trauma=Fear









PTSD in Israeli Prisoners of the 1973 War



An Eighteen-Year Follow-up Study of Israeli Prisoners of War and Combat Veterans YUVAL NERIA, PILD.,1 ZAHAVA SOLOMON, PILD.,1 AND RACHEL DEKEL, M.A.1 The current study assesses the psychological and psychiatric aftermath of war captivity, 164 Israeli ex-POWs and 189 comparable controls were assessed for posttrau-matic stress disorder, intrusion and avoidance tendencies, and generalized psychiatric symptomatology 18 years after the war. Findings indicated that trauma-related psychosynthotonanous or yours are the war. Immor numerous management among POWs than among their matched controls. In addition, captivity experience, exist support at homecoming, and, above edit, octodemographic and military factors were found to be strongly correlated with the outcome measures. Theoretical and clinical implications of the aftermath of captivity are discussed. War captivity entails some of the most tranmatic 1993), 71% (Crocq et al., 1991), and 76% (Sutker a experiences perpetrated by human beings. It is often Allain, 1996) among World War II POWs, and up to experienced subsequently to brutal combat and in-volves prolonged and repeated traumatization 86% (Sutker et al., 1991) and 88% (Sutker and Allai 1996) of POWs samples of the Korean conflict. A considerable body of research revealed not on typical posttraumatic symptomatology but also (Herman, 1992; Hunter, 1993). Most POWs are held in solitary confinement, at times blindfolded and handcuffed for months, in small cells under unsan-itary circumstances. They are subjected to deliberwide range of psychiatric symptomatology, particu-larly anxiety and depression (Dent et al., 198) ate and systematic violence on the part of their Engdahl et al., 1991a: Kluznik et al., 1986: Page al., 1991; Tennant et al., 1986; Ursano and Runde captors, including physical torture, deprivation of basic needs, and deliberate humiliation.

The current study examined the long-term trau-1990), hysteria (Sutker and Allain, 1991), parano (Klonoff et al., 1976), and hypochondria (Klonoff matic residuals in Israeli soldiers who were cap-tured by Syria and Egypt during the 1973 Your al., 1976; Sutker and Allain, 1991). POWs are also a high risk for long-term adjustment problems, include Kippur War. The Egyptian captivity lasted about 6 weeks, and the Syrian lasted 8 months. Both expeing unemployment (Sutker et al., 1986), financial di ficulties (Van Vranken, 1978), interpersonal proriences were extremely traumatic in terms of torlems, among them social isolation and lonelines ture, humiliation, and deprivation. suspiciousness, and hostility (Herman, 1992; Sutle Most empirical research on POWs has found that the traumatic stress of captivity produces deep and and Allain 1991), sexual dysfunction (Sutker et a 1986; Ursano et al., 1981), substance use disorder long lasting pathology: psychological (e.g., Kral et al., 1967; Sutker et al., 1986; Ursano et al., 1996), (Ursano and Rundell, 1990), family problems (Ursar somatic (Beebe, 1975; Engdahl et al., 1991b; Ohry et al., 1994; Tennant et al., 1986), cognitive (Sutker et al., 1981; Van Vranken, 1978). However, several empirical studies revealed th al., 1990a, 1991, 1992, 1995), and functional (Van Vranken, 1978) disorders. Among the psychological although there are widespread immediate detrime disorders, posttraumatic stress disorder (PTSD) is prominent (Solomon et al., 1994; Sutker and Allain, sient. Hall and Malone (1976) have found the although elevated emotional distress and impair 1996). Findings revealed high PTSD rates, ranging from 30% (Speed et al., 1989), 50% (Goldstein et al., functioning were prevalent in the first 2 years aft release, psychological reactions then abated. More

1987; Zeiss and Dickman, 1989), 70% (Sutker et al.,

¹The Bob Shapell School of Social Work, Tel Aviv University, Tel Aviv 69978, Israel, Send reprint requests to Dr. Noria. This research was supported by New Land Foundation. The authors thank Mr. Dow Har-Even and Dr. Toby Mosticher for

over, some studies (c.g., Sledge et al., 1980) inc

cated that considerable numbers of POWs attribut

beneficial consequences to their experiences. POV discovered increased inner strength, more se awareness, creativity, and a greater sense of fulfi







Posttraumatic Stress Disorder (PTSD)

PTSD is a fear-based disorder

DSM-5:

- 1. Experiencing or witnessing a traumatic event (i.e., EXPOSURE to actual/threatened death, serious injury, sexual violence)
- 2. Symptoms in four areas (after exposure):
 - Re-experiencing symptoms
 - Avoidance
 - Negative alterations in cognitions and mood
 - Hyperarousal
- 3. Significant impairment in major spheres of life

Veterans with PTSD

- Significant suicide rate (~20 per day; 18% of all suicides)
- ~50% do not seek or receive treatment
- Veterans avoid treatment due to mistrust, stigma, concerns about the treatment experience, low emotional readiness, and logistical barriers
- Treatment response in veterans is lower than in civilians (<50%)
- Years of non-specific or ineffective treatments have demoralized veterans
- Innovative treatments are highly needed

Equine Assisted Treatment for PTSD

Hypotheses:

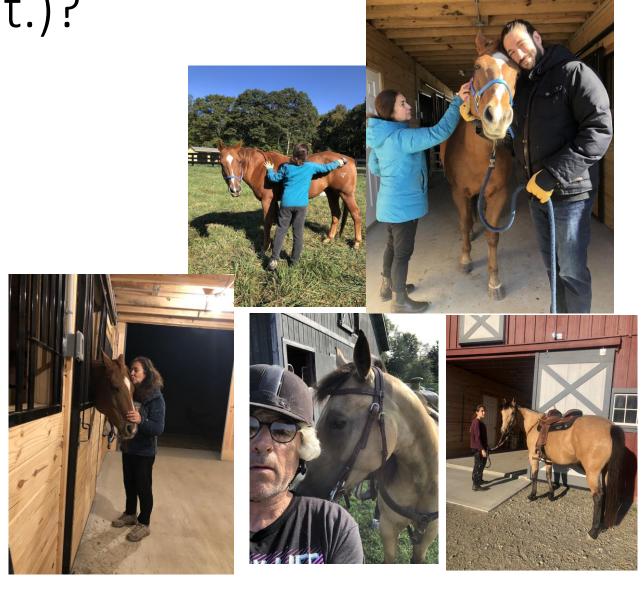
- Horse-human interaction experiences during therapy can foster insight and behavioral changes in patients
- Horse-human interactions offer a platform for eliciting thoughts, feelings, and behaviors related to patients' lives outside treatment

Why Horses?

- Horses are sensitive to verbal and nonverbal cues, providing patients immediate feedback during the horse-human interactions
- Hoses are hypervigilant just like people with PTSD
- Horse-Human interactions afford patients and therapists opportunities to foster emotional awareness, reflection, and attunement to thoughts, behaviors, and forms of communication

Why Horses (Cont.)?

- Horses evoke feelings of:
 - Self-efficacy
 - Receptiveness
 - Connectivity
 - Communication
 - Patience
 - Emotional Comfort
 - Trust & Closeness







Florence Nightingale -1860

"the horse...is often an excellent companion for the sick."

Horses and Veterans with PTSD: a perfect opportunity

- Horses are prey animals: easily frightened, insecure and hypervigilant
- People with PTSD are hypervigilant, feeling unsafe and not sure about other people and surroundings.
- Horses are large and intimidating, an opportunity to engage fear network
- Horses and people are social, looking for attachment figures and eager to feel safe and secure
- Horses have a calming effect
- Non-verbal. Communication

EAT Research So Far...

Extant EAT research is scarce and generally poorly designed, characterized by small sample sizes, inconsistent assessments, unstandardized treatment procedures, and researcher conflicts of interest

- No well-specified treatment manuals of how to deliver EAT
- No adequate safety, feasibility, and efficacy research of EAT
- Biased research lacking adequate standardization or clear therapeutic goals

EAT Research So Far...

- Extant evidence for the efficacy of animal-assisted therapies for PTSD, including EAT, has been mostly anecdotal
- Research has focused on countering dissociative symptoms, emotional numbness, social isolation, and hyperarousal
- These difficulties have precluded a more mainstream acceptance of EAT
- In sum, it is often not clear what EAT comprises or means, let alone whether it works







Addressing the gaps....

Establishing the Man O' War Project at Columbia University with the following goals:

- Developed and manualize a group EAT for PTSD (EAT-PTSD) comprising of eight 90-minute weekly group sessions
- 2. Pilot testing: small sample (N=8 patients from two EAT groups)
- 3. Large open trial (N=63)
- 4. Brain imaging study (N=19; multimodal)





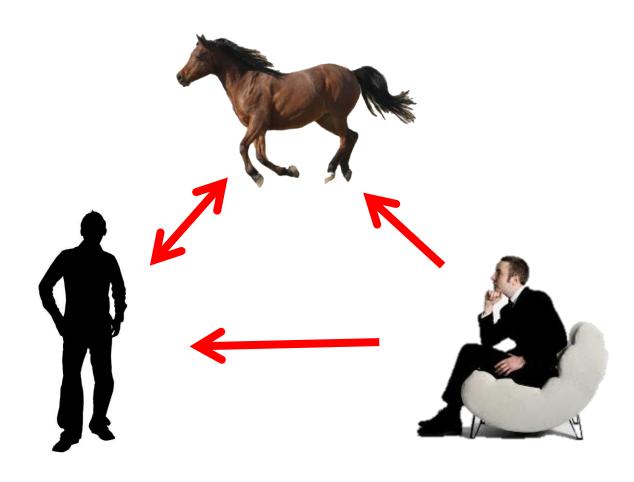


Treatment team

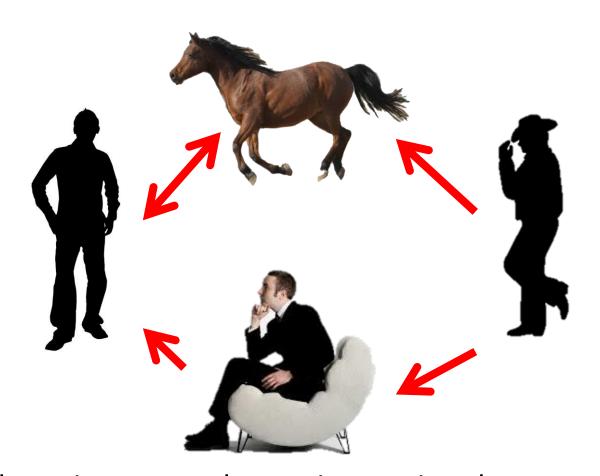
- PIs: Drs. Yuval Neria and Prudence Fisher (Columbia University, NY)
- Equine specialists:
 - Jody Jacob-McVey, Sue Stegmeyer
- Mental health professionals:
 - Bonnie Malajian, LCSW, Debra Farber, LPC
- Horse wrangler:
 - April Neumann, Bergen Equestrian Center
- Horses Chuck, Gordon, Ollie, Crafty, Jack...
- *All humans are "EAGALA certified"







Therapist gets to observe interactions between client and horse



Therapist gets to observe interactions between client and horse; horse professional observes effects on horse and client







Manualizing the Treatment (EAT-PTSD)

- Ground-based (no riding)
- Groups of 4 (3 -6) -- mixed gender, mixed traumas
- Eight 90-minute weekly sessions
- Take place in "round pen" privacy
 - Team approach
 - 90 minute sessions; once per week
 - 4-6 veterans, 2-3 horses (constant)
 - 8 weeks
 - Structured (but experiential)
 - Progressive







EAT-PTSD includes common features of psychotherapy

- Affective arousal (encouraging and allowing emotional connection)
- Feeling understood by therapist
- Developing a framework for understanding yourself
- Benefitting from professional expertise
- Having a therapeutic procedure
- Developing optimism for improvement
- Having successful (and pleasant) experience

Equine-Assisted Therapy for Veterans with PTSD: Manual Development and Preliminary Findings

Shay Arnon, BA*,†; Prudence W. Fisher, PhD*,†,†; Alison Pickover, PhD*,†,† Ari Lowell, PhD*,†; J. Blake Turner, PhD*.†; Anne Hilburn, MA*; Jody Jacob-McVey, BS‡, §; Bonnie E. Malajian, LCSW‡; Debra G. Farber, LPC, MA, MCIS±: Jane F. Hamilton, PhDII: Allan Hamilton, MDII: John C. Markowitz, MD*, †; Yuval Neria, PhD*, †, **

ABSTRACT Introduction: Equine-assisted therapy (EAT) for post-traumatic stress disorder (PTSD) has attracted great interest despite lacking empirical support, a manual, and a standardized protocol. Our team of experts in EAT and PTSD developed an eight-session group EAT treatment protocol for PTSD (EAT-PTSD) and administered it to two pilot groups of military veterans to assess initial effects. Materials and Methods: We describe the development of the treatment manual, which was used with two pilot groups of veterans. Protocol safety, feasibility, and acceptability were assessed by reported adverse events, treatment completion rates, and self-rated patient satisfaction. Preliminary data on PTSD, depressive, and anxiety symptoms and quality of life were collected pretreatment, midpoint, post-treatment, and at 3-month follow up. Results: No adverse events were recorded. All patients completed treatment, reporting high satisfaction. Preliminary data showed decreases in clinician-assessed PTSD and depressive symptoms from pre to post-treatment and follow-up (medium to large effect sizes, d = .54-1.8), with similar trends across self-report measures (d = 0.72-1.6). In our pilot sample, treatment response and remission varied; all patients showed some benefit post-treatment, but gains did not persist at follow-up. Conclusions: This article presents the first standardized EAT protocol. Highly preliminary results suggest our new manualized group EAT-PTSD appears safe, well-regarded, and well-attended, yielding short-term benefits in symptomatology and quality of life if unclear length of effect. Future research should test this alternative treatment for PTSD more rigorously.

INTRODUCTION

Post-traumatic stress disorder (PTSD), a pervasive and debilitating disorder, occurs following traumatic events involving exposure to, or threat of, physical harm, death, or sex- cal health, and delayed treatment seeking.²⁻⁵ Equine-assisted ual violence to oneself or another. Symptoms include re-therapy (EAT) is an increasingly popular but widely variable, experiencing (e.g., nightmares, flashbacks), avoidance behaviors, negative cognitions and mood, and altered arousal and exposed patients. Its utility in treating PTSD is unclear.

hyper-reactivity.1 PTSD can persist for years and is associated with significant functional impairment, psychiatric comorbidity, suicidality, substance use, chronic pain, poor physiunstandardized, and understudied intervention for trauma-

Military service members face high trauma risk through

combat, injury, captivity, and sexual assault.6-9 In one study, up to 95% of post-9/11 service members surveyed endorsed experiencing attacks, ambushes, or seeing human remains.7

U.S. adults overall have lifetime PTSD prevalence below 10%, 10 whereas prevalence among post-9/11 veterans reaches

Veterans often avoid seeking mental health treatment: one study found that only 23-40% of post-9/11 veterans screening positive for a probable mental health disorder had sought care.7 Barriers to care include inadequate education about PTSD, logistical impediments, stigma, concerns about treatment experience, and low-emotional readiness. 12-14 Patients who do present for treatment rarely enroll in evidencebased exposure interventions (e.g., prolonged exposure, and cognitive processing therapy), 15-17 and dropout is high. 18-21 One-third to one-half of patients receiving exposure-based treatments for military service-related PTSD demonstrate no clinically significant improvement, and two-thirds retain their PTSD diagnosis post-treatment.²² Medications (most commonly, serotonin reuptake inhibitors) may benefit patients, 23 yet some veterans report side effects, do not improve, or

doi:10.1093/milmed/usz444

Published by Oxford University Press on behalf of the Association of Military Surgeons of the United States 2019. This work is written by (a) US Government employee(s) and is in the public domain in the US.

^{*}New York State Psychiatric Institute, 1051 Riverside Drive, New York, NY 10032

[†]Department of Psychiatry, Columbia University Irving Medical Center, 1051 Riverside Drive, New York, NY 10032

[‡]Bergen Equestrian Center, 40 Fort Lee Road, Leonia, NJ 07605 §EquiSense Solutions LLC, 33 West 93rd Street, 3B, New York, NY

^{||}Rancho Bosque Equestrian Center of Excellence, House Hamilton Business Group, PLC, 8649 E Woodland Road, Tucson, AZ 85749

TDepartment of Surgery, University of Arizona Health Sciences Center, 1501 N. Campbell Avenue, Tucson, AZ 85724

^{**}Department of Epidemiology, Columbia University Irving Medical Center, 722 West 168th Street, New York, NY 10032

[†]This work reflects equal contribution of the first three authors.

The study was supported by a gift from the Earle I. Mack Foundation (to Prudence W. Fisher and Yuval Neria).

ClinicalTrials.gov Identifier: NCT03068325

Previous presentations: This study was previously presented at the International Society for Traumatic Stress Studies 33rd Annual Meeting (Chicago, IL, USA; November 9, 2017), Milken Global Conference (Beverly Hills, CA; May 1 2018)

EAT Treatment

- <u>Session 1</u>: orientation (rationale, description, possible benefits). It provides psychoeducation (e.g., common reactions to trauma, development and maintenance of PTSD), a barn tour, and ends with meeting the horses in a private "round pen."
- <u>Early phase</u> (sessions 2-3): acquainting patients with the horses, on grooming exercises, and on learning "leading" directing the horses with a rope or a wand
- <u>Middle phase</u> (sessions 4-7): advanced exercises to facilitate patient mastery and comfort with the horses. For example, patients learn to use a wand to distance the horse, creating personal space, or to collaboratively maneuver a horse onto a tarpaulin, fostering teamwork and cooperation.
- <u>Final session</u>: graduation ceremony celebrating patients' treatment progress and accomplishments



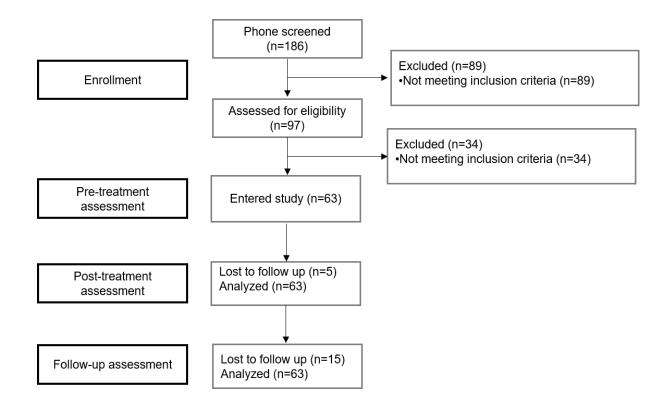




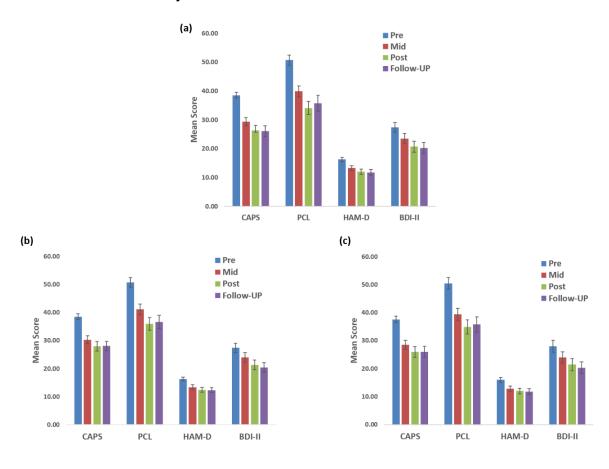
Assessments by Reliable Assessors

- 1. Assessment of PTSD and depression at midpoint (after week 4)
- 2. Assessment of PTSD and depression end of protocol (after week 8)
- 3. Assessment of PTSD and depression 3 months later
- 4. Patient is compensated for assessments (\$100) and provided with boots for the barn.
- 5. If agrees (and eligible) for MRI (baseline and end of treatment

Participants' Progress through Study Stages



Changes in PTSD (CAPS, PCL) and Depression (HAM-D and BDI-II) Scores



Discussion

- EAT-PTSD is potentially safe, well-tolerated, with large effect size improvement on standard ratings
- Treatment benefits across all outcome measures largely persisted three months following treatment
- 51% and 54% of veterans demonstrated clinically significant change at post-treatment and follow-up
- 46% and 37% scoring below the cutoff score at post-treatment and follow-up, respectively
- Randomized controlled trials are needed now







Brain Imaging: Magnetic Resonance Imaging (MRI)

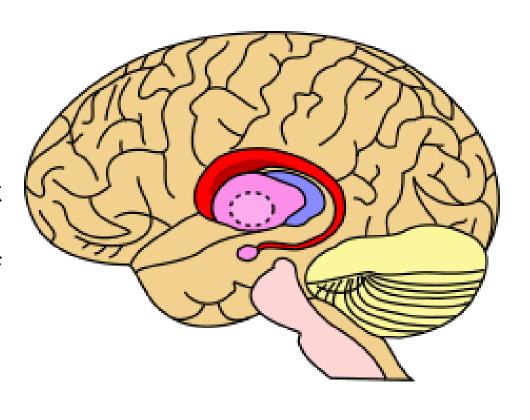
<u>Goal:</u> to employ longitudinal neuro-imaging, including structural magnetic resonance imaging (sMRI), resting state-fMRI (rs-fMRI), and diffusion tensor imaging (DTI), to determine mechanisms and predictors of EAT outcomes for PTSD

Method

- 19 veterans with PTSD completed eight weekly group sessions of EAT, undergoing multimodal MRI assessments before and after treatment
- Clinical assessments were conducted at baseline, post-treatment and at 3-month follow-up.

Caudate Nucleus

- Part of the Corpus
 Striatum
- A component of the Basal Ganglia Network (BGN)
- A region that is part of the reward system: underlying pleasure seeking and experience



Thalamus

Functions: large hub relaying sensory signals including motor signals to the cerebral cortex and involved in regulation of consciousness, sleep, and alertness



Results

- At post-treatment patients showed a significant increase in functional connectivity (FC) and reduction in the gray matter density of the thalamus and the caudate.
- The increase of caudate FC was positively associated with clinical improvement seen immediately at post-treatment and at 3-month follow-up.
- Higher baseline caudate FC was associated with greater PTSD symptom reduction post-treatment.

Discussion

- Abnormal functioning within the caudate has been documented in depression substance abuse, and PTSD
- The limbic-basal ganglionic reward system may be modified by the eight-weeklong EAT employed for the treatment of PTSD
- The caudate nucleus is involved in reward anticipation and response
- Increase in functional connectivity together with pruning effect in the caudate from pre- to post-treatment
- PTSD have a disrupted, dysfunctional reward circuitry, that might be alleviated through EAT
- Overall: increase capacity to seek and experience pleasure

Conclusion

- PTSD is prevalent and debilitating
- Current treatments are limited
- Novel effective treatments are needed
- Horse-human interactions have promise
 EAT is safe, innovative, and seems to be effective
- Clinical and brain results are innovative suggesting clinical effects are associated with tangible changes in the brain
- Effects on both fear (PTSD symptoms) and reward systems

- Thank you!
- Questions?