

EFFECTIVENESS OF EQUINE ASSISTED PSYCHOTHERAPY
IN THE TREATMENT OF VETERANS WITH
POSTTRAUMATIC STRESS DISORDER

A Dissertation

by

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ABSTRACT

Equine Assisted Psychotherapy (EAP) is a non-traditional form of psychotherapy that addresses treatment goals with the use of horses. This small pilot study consisting of 5 veterans examines the effectiveness of EAP in the treatment of veterans with posttraumatic stress disorder (PTSD). The Equine Assisted Growth and Learning Association's model of EAP was used. With the vast majority of available literature being qualitative in nature and consisting largely of participant anecdotes, this study has aimed to provide a more controlled, quantitative approach. Results from this small sample study tentatively suggest that EAP was an effective form of treatment for veterans with PTSD. Results indicated that 2 out of 5 participants experienced a statistically significant reduction in PTSD symptoms and 3 out of 5 participants no longer met DSM-IV diagnostic criteria for PTSD by follow-up. All participants demonstrated a statistically significant increase in positive affect and 4 out of 5 participants demonstrated decrease in negative affect following each session. Clear evidence of treatment effects in social and interpersonal functioning was not found with only minor benefit reported for improvement in social functioning for 2 of 5 veterans and minor improvement reported in only 1 out of 5 veterans in interpersonal functioning. These data were acquired using the Posttraumatic Stress Disorder Checklist – Civilian version (PCL – C), The Patient-Reported Outcomes Measurement Information System (PROMIS) Social Health measures, Outcome Questionnaire 45 – Interpersonal Roles subscale, and a visual analog adaptation of the Positive and Negative Affect scale

(VPANAS). Recommendations for future research are also discussed including a need for a more comprehensive theoretical understanding of how change occurs in EAP and stronger study designs. Implications for practice are included as well.

DEDICATION

“Dearest, you are spoiling us. How many ‘impossible’ dreams are we yet to enjoy? Not only are we extremely proud of you, but of the way you are proud of yourself. Keep up the good practice. Much, much love” (Mom & Dad, 2007).

I would like to dedicate this work to my parents. Mom, how I tenderly wish you could be here with me today to make you proud. Thank you for teaching me to dream the impossible dreams. Dad, I count my blessings for you every day. Thank you for teaching me the art of hard work and dedication. I truly needed the heart and perseverance you both gifted me during this journey. I Love you more than anything.

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CHAPTER I

INTRODUCTION

Equine Assisted Psychotherapy (EAP) is an experiential approach that uses horses to address treatment goals. It has been described as a treatment approach that requires the participant to be attentive to the process in a way that is unmatched compared to traditional talk therapy (Irwin, 2001). Available literature in this young field is limited and composed primarily of anecdotal and qualitative data; however, it has been used to treat numerous mental health concerns, including symptoms of trauma. Investigation into treatment methods that effectively reduce symptoms of trauma is of benefit, particularly for the veteran population. Prevalence of posttraumatic stress disorder (PTSD) and suicide among veterans is significantly higher than the general population (United States Department of Veterans Affairs, 2012). This prevalence becomes even more troubling with mental health stigma being a major barrier to treatment. Alternative therapy approaches such as animal assisted therapies have been used to assist veterans and has received positive reviews (United States Department of Veterans Affairs, 2012), but unfortunately, little empirical data is available to support these claims.

This study aims to gain a better understanding of the effectiveness of EAP to help treat the unique needs of veterans with PTSD. In addition to EAP demonstrating decreases in trauma symptoms, increases in social and interpersonal functioning have been reported (Kemp, 2013; Russell-Martin, 2006; Schultz, 2005; Tetrault, 2006). This

would be beneficial for veterans because social support has been identified as a preventative factor in the development of PTSD and unfortunately, social functioning typically decreases when symptoms of PTSD develop (Brewin, Andrews, & Valentine, 2000; Friedman, 2006).

Furthermore, literature on human interactions with animals and a response of calm has been reported (Kruger et al., 2004), but is most often discussed from a physiological perspective such as a decrease in blood pressure (Friedmann et al., 1983). More so, the evidence has not been consistent (Herzog, 2011). Changes in affect such as the calm that is often reported in the interaction between human and animal have not been measured empirically with the use of EAP. Such a change could be of benefit to veterans that often suffer from mood problems in addition to their symptoms of PTSD (DSM-IV TR, 2000).

In addition to a need for further empirical research, there is a lack of a coherent psychological theory in the area of animal assisted therapy which is needed to guide research, interpret results, and integrate findings in a meaningful way. To assist in narrowing this gap in the literature, this preliminary study will determine the effectiveness of EAP in reducing PTSD symptomology in veterans diagnosed with PTSD and addresses some of these theoretical gaps. Based off of the current available literature on the potential benefits of equine therapy and the potential fit with the treatment of veterans with PTSD, this study will examine the following:

- 1) What are the effects of Equine Assisted Psychotherapy on symptoms of Posttraumatic Stress Disorder in veterans with Posttraumatic Stress Disorder?

- 2) What are the effects of Equine Assisted Psychotherapy on social functioning and interpersonal relations in veterans with Posttraumatic Stress Disorder?
- 3) What are the effects of Equine Assisted Psychotherapy on negative and positive affect in veterans with Posttraumatic Stress Disorder?

CHAPTER II

LITERATURE REVIEW

There are several challenges to initiating research on Equine Assisted Psychotherapy (EAP), the most critical of which, are loose definitions of EAP and varying forms of this therapy being practiced. This increases confusion and inconsistency in this young, rapidly developing field. Terms often used synonymously with Equine Assisted Psychotherapy or Therapy (EAP/T) include Equine Facilitated Psychotherapy or Therapy (EFP/T), Equine Assisted or Equine Facilitated Learning (EAL/EFL), Equine Assisted Counseling (EAC), and Equine Assisted Experiential Therapy (EAET) (e.g. Ewing, MacDonald, Taylor, & Bowers, 2007; Klontz, Bivens, Leinart, & Klontz, 2007; Trotter, Chandler, Goodwin-Bond, & Csey, 2008). Although therapeutic riding is often labeled as such, some EAP programs may include a riding component while others focus only on interacting with the horse on the ground. For the purpose of this study, the term EAP will be used consistently, even if a riding portion is included, unless referring to literature on therapeutic riding that it is explicitly labeled that way. In that case, it would be labeled as therapeutic riding and not EAP.

The Equine Assisted Growth and Learning Association (EAGALA) and the Professional Association of Therapeutic Horsemanship International (PATH Intl., formerly the North American Riding for the Handicapped Association or NARHA) are the primary organizations that dictate regulation and certification of EAP. Their approaches are alike in their treatment goals and yet there are distinct differences

between the two in terms of how the horse is used in therapy. PATH Intl.'s approach to EAP involves the use of the client on horseback, whereas EAGALA's approach is strictly groundwork. These differentiations within EAP have not been highlighted in previous literature (e.g. Selby & Smith-Osborne, 2013) and the differences between the EAGALA and PATH Intl. may result in poor replicability as well as varying levels of effectiveness. Since both organizations have equal goals and involve at least groundwork, the EAGALA model is being used for this study to examine the effectiveness of EAP. This chapter will review the practice of EAP under the EAGALA model in greater detail, as well as, available literature on EAP, animal assisted therapy as it relates to EAP, and how this approach may be of benefit for the veteran population with PTSD.

Overview of EAGALA EAP Approach

EAGALA defines EAP as an experiential approach that utilizes horses to promote emotional growth and learning. They engage in activities such as maneuvering a horse through a series of obstacles and then process thoughts or behaviors that they associated with the activity (EAGALA, 2009, p. 13). This approach consists of a sequence of these interactive activities with horses for the purpose of building awareness and trust, stimulating problem solving skills, learning goal setting, and processing (Mandrell, 2006).

By definition, Equine Assisted Psychotherapy is an experiential approach. EAGALA uses The Association for Experiential Education's (AEE) principles to capture's EAP's experiential approach. The AEE (2011) indicates that the experiential

learning process requires the participant to take action and initiative and be accountable for the outcome. Taking initiative may take the form of making decisions, asking questions or attempting different solutions to a problem. It is a dynamic approach that requires the participant to engage at a cognitive, social, and physical level that makes the experiential approach feel authentic, meaningful, and personal (AEE, 2011). The facilitator's role is to help support the learning environment by promoting opportunities for growth and challenge. Facilitation of the learning process may take the form of asking questions, choosing activities that require problem solving skills, and always ensures safety at a physical and emotional level (AEE, 2011).

Due to the pervasive limitations in available research in defining and clarifying EAP, details on EAGALA's form of EAP will be outlined in detail as dictated by EAGALA (2009) as this approach was the foundation of this study. Within the EAP community, EAGALA strives to set the standard for ethical practice with a certification program, a developed code of ethics, an ethics committee, established standards of practice, and required continuing education to maintain certification in EAP. In an effort to establish clear guidelines for the practice of EAP, the EAGALA model was developed and is composed of four essential parts: the team approach, focus on the ground, solution-oriented approach, and code of ethics.

Team approach. EAP under EAGALA's standards requires that there be a qualified team of professionals in the treatment of a given client (EAGALA, 2009). Each session requires a treatment team that is composed of a mental health professional (MH) and an equine specialist professional (ES). This approach requires that the mental health

professional be licensed in their appropriate state (i.e. licensed psychologist, licensed professional counselor, licensed social worker, etc.). In addition, it is best practice that both professionals be certified in EAP by EAGALA; however, only one certification in EAP is required between the two professionals to treat a client.

The Mental Health professional (MH) is accountable for monitoring client progress and symptom reduction, as well as ensuring interventions are related to the treatment goals. Although each professional has different specializations, mutual knowledge and experience often increases team cohesion and openness of discussion, leading to discussion on how to best treat the client and reach treatment goals.

The Equine Specialist (ES) is designated to create the horse-assisted activities to help meet the treatment goals. Their specialized knowledge of horses helps ensure that both client and horse are physically safe and assists in reading the horse's body language, mood, as well as other non-verbal communication and redirects the attention in the session to the horse. Body language is an important aspect of the process. Ideally, the ES will make note of body language, and the MH will then take that information to a "deeper level" with the client (Equine Assisted Growth and Learning Association [EAGALA], 2009, p. 18). For example, an ES may prompt a client by saying, "What was the horse doing when you were just speaking about..." as a way of redirecting the attention to the horse's behavioral response to the client. This offers the MH an opportunity to prompt the client further about what this may imply for the client.

Groundwork only. EAP under the EAGALA model consists solely of groundwork with the horse. It is a typical misconception that using a horse as part of a

therapeutic intervention would include riding the horse. This is not the case in the EAGALA model of EAP. Because the horse has its unique sensibility to mood, it is vital that the horse be in a state that promotes these qualities. EAP specialists find that mounted work requires more instruction and detracts from the process. Participating in mounted work also increases safety hazards as the majority of horse-related injuries occur when riding. According to EAGALA (2009), there are two activities that tend to “sour” horses, making them less ideal for therapy work. These activities include having several beginner riders ride them in a variety of ways as well as having several people picking feet. Picking feet is a tactic that involves individuals attempting to lift the horse’s foot. Being on the ground allows the horse to be more natural and fulfill their role successfully in the practice of EAP.

Solution-oriented. The EAGALA model of EAP includes a “solution-oriented” approach. EAGALA believes that, “whether it be their relationship with the horses or their relationship to people, places, things, or concepts in their lives, clients have their own best solutions if just given the opportunity to discover them.” (Equine Assisted Growth and Learning Association [EAGALA], 2009). In EAP, rather than telling the client what to do, they are given the opportunity for self-exploration to find the answer within them, similar to a non-directive psychotherapy approach. EAGALA suggests that EAP re-creates life situations that are uncomfortable and challenging for the client to promote the opportunity for growth and change through the work with horses. By staying true to their solution-oriented approach, EAP sessions provide a therapeutic

environment that allows clients the opportunity to work through a challenging situation, problem-solve, and ultimately practice new ways of living (EAGALA, 2009).

EAGALA EAP sessions are also to include the following four elements: (a) avoidance of directive teaching about horses/horsemanship; (b) use of the Socratic Method; (c) focus on the process; and (d) focus on long-term solutions. EAGALA believes that if a facilitator chooses to show a client how to do a particular activity, it eliminates the opportunity for the client to experience the problem-solving process and find what works for them in their own unique relationship. EAGALA states that directive teaching about horses also takes away from the therapy as the goal is to accomplish treatment goals and increase problem solving, not educate the client about horses since the majority of clients do not typically encounter horses prior to treatment and will not typically encounter horses following treatment. In reference to the Socratic Method, EAGALA sessions are comprised of observation statements, reflective listening, and asking questions without the use of judgment, criticism, or blame to process the session and guide the client toward reaching their treatment goals and finding solutions. The focus on the process is to facilitate growth and learning that occurs through the course of therapy and not the goal of completing a task with a horse.

Code of ethics. Lastly, the EAGALA approach to EAP includes a code of ethics to ensure safety and well-being of clients. A code of ethics is used to promote the integrity of EAGALA's EAP approach and work towards their goal of establishing a therapy approach that is valid, professional, safe, and respected. All practitioners are expected to abide by the guidelines to maintain these standards. The safety and well-

being of the client is first and foremost, followed by care for the well-being of the horse. Standards of confidentiality and informed consent are required and mental health practitioners must be licensed in the state or country in which they practice. Dual relationships, ethical considerations of professionalism, and misrepresentation are also detailed to ensure good practice (EAGALA, 2009).

EAGALA session snapshot. An EAP session typically begins with a task as planned by the MH and ES. Depending on the client and treatment plan, the task may vary from a client grooming the horse to a client completing an activity or obstacle with the horse or horses. As the session progresses, the treatment team works together to facilitate the session, observe and question interactions between horse and client, and initiate further activities based on the client's needs. EAGALA advises that sharing interpretations with the client is highly discouraged as it deters from the client finding their own answer and rather promotes the facilitators to confirm their own hypothesis about the client. Instead, vocalizations of observations made between the horse and client as well as open-ended questions are encouraged to facilitate client growth (EAGALA, 2009).

Additional Equine and Animal Therapy Terms

In addition to the variability in the practice of EAP, other equine treatment modalities have also been developed and used to treat a variety of disorders. Some equine assisted treatments outside of EAP that are used and discussed in the literature include therapeutic riding or vaulting, and hippotherapy (e.g. Benda, McGibbon, & Grant, 2003; Kaiser, Smith, Heleski, & Spence 2006). According to the American

Hippotherapy Association (2010), therapeutic riding is a term that has been used broadly to capture a variety of equine activities used for individuals with disabilities and consequently results in a lack of clarity due to its vagueness. This term is often used in the literature with little reference to more specifics on the intervention.

Hippotherapy is a form of equine therapy that involves being on horseback. The American Hippotherapy Association (2010) defines this approach as a form of physical, occupational, or speech and language therapy that utilizes equine movement in the treatment. It is commonly used to treat individuals with movement dysfunctions and those on the autism spectrum to assist in language facilitation. In the practice of hippotherapy, the client is not in control of the horse, but rather, is positioned on the horse while the therapist prompts the horse to move, allowing the client to respond to the movement. Activities are modified by the therapist as needed to best address the client's treatment goals (American Hippotherapy Association, 2010). As made readily apparent, this form of equine therapy varies greatly from EAP.

EAP as a form of Animal Assisted Therapy. Animal Assisted Therapy (AAT), also known as pet-facilitated therapy, is a widely used term in the literature on therapeutic animal-human interactions. Although AAT has been used synonymously in the literature with pet-facilitated therapy, this is not the equivalent to benefits acquired from pet ownership. EAP would fall under the AAT umbrella term as would any other animal that serves a specific function in attaining therapy goals as part of a treatment plan.

AAT was founded by clinical psychologist Boris Levinson, following an accidental introduction between his dog, Jingles, and a child being brought in for services by his mother. Upon observing the interaction between the two and the child's subsequent improved use of communication, the field was born (Brooks, 2005). AAT focuses on the use of animals in facilitating a client's progress toward specific therapeutic goals (Fine, 2010). This approach consists of a credentialed therapist setting therapeutic goals and guides the interaction between the client and animal, measuring the progress toward meeting those goals and evaluating the treatment process (Cole & Gawlinski, 1995). Animals in AAT may influence the therapeutic process in multiple ways including being a social facilitator for therapy, reinforcing feelings of independence (Corson & Corson, 1980), and stimulating awareness (Kalfon, 1991). The reported effects of EAP as a subset of AAT will be reviewed in further detail in this chapter.

In understanding the literature, it is of importance to discriminate between Animal Assisted Therapy (AAT) and Animal Assisted Activities (AAA). AAT used animals to reach distinct, defined therapeutic goals for a particular client, whereas AAA simply exposes individuals to animals without specified treatment goals or objectives. Delta Society formally defines Animal Assisted Activities, indicating that, "AAA provides opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life. AAAs are delivered in a variety of environments by specially trained professionals, paraprofessionals, and/or volunteers, in association with animals that meet specific criteria" (Delta Society, 2009, p. 1). Delta Society describes

AAA as a casual “meet and greet” consisting of pets visiting people and can be used repeatedly with many people, unlike AAT which is tailored for a particular client. Discriminating between these differing animal-based practices is crucial in understanding these distinct approaches and for the development of further research. In the practice of EAP, equines are a part of goal-centered activities consistent with AAT as opposed to simple exposure like AAA. While some Equine Assisted Psychotherapy activities may involve grooming, observation of the horse, or similar, these are still a part of an intentional treatment plan. It is hoped that the clarification of terms and practices are of benefit as the previous lack of concretely defined treatment and limited available research has caused significant difficulties in generalizability, replicability of studies, and cohesiveness within the literature.

AAT and Attachment Theory

Attachment theory is most often identified as the underlying theory on animal assisted therapies, but is typically discussed in the context of pet-assisted therapy due to the bond that is said to develop between animal and human. Attachment theory as described by Bowlby (1982) and expanded upon by subsequent researchers (e.g. Ainsworth, 1991; Mikulincer & Shaver, 2007), is said to extend beyond the parent-child relationships to include partnerships among adolescents and adults when meeting the following criteria: (a) proximity maintenance- preference in being near the attachment figure, especially when under distress or in need; (b) using the attachment figure as a symbolic “safe haven” that may provide comfort or support to relieve distress; (c) use of the attachment figure as a “secure base” that increases the one’s sense of security; and

(d) development of separation distress when the attachment figure is unavailable (Zilcha-Mano, Mikulincer, & Shaver, 2011). While human-pet relations differ from relations between two people, it was suggested that individuals sought a pet as a source of love, acceptance, emotional support, and emotional regulation which may have predisposed pet owners to attach to a particular pet (Zilcha-Mano et al., 2011). It is unknown how much of attachment theory may apply to EAP as the use of the horse as a tool and dynamic participant differs from the relationship one may have with a pet; however, some of the available literature on attachment theory as the underpinning of AAT, appears to coincide with descriptions of EAP and thus will be further explored for the purpose of this study.

Researchers Zilcha-Mano, Mikulincer, and Shaver (2011b) report that viewing the animal within a therapeutic context as a “safe haven” or “secure base” may facilitate awareness in regards to client projections of a part of themselves onto the animal. They add that the use of a pet in therapy may provide the client with an outlet to express parts of themselves which may be unpleasant (i.e., a need to control others or a refusal to compromise) by identifying these traits as the animal’s as opposed to their own. This use of projection within the model of attachment theory is consistent with the widely identified projection that often occurs in EAP. For example, in a basic activity such as choosing a horse to work in a session of EAP, it is common to find that clients choose a horse that reflects their own description of self and core issues (Rothe, Vega, Torres, Soler, & Pazos, 2005).

Similarly, in discussing interpersonal dynamics, Chris Irwin (2001, p. 49) notes that, “often, we bring our excess stress and problems with control from these other relationships into our relationship with our horse.” Parallels are often drawn in EAP sessions between the client’s approach towards the horse and how this plays out in a similar fashion in other relationships. It is reported that within the context of AAT, a client may learn more about their maladaptive consequences and work on their “interpersonal” skills with a forgiving animal as opposed to a potentially unappreciative human partner (Zilcha-Mano et al., 2011b).

In an effort to discern the applicability of attachment theory to EAP, it is worth noting that this treatment approach is often brief and a particular client may engage with numerous horses throughout their sessions. Although consistency of the use of a specific horse or group of horses may vary, numerous EAP participant anecdotes have described a connection between themselves and the animal, further suggesting that some form of bond or connection occurs in their interaction. While literature on animal assisted interventions (AAI) contains an abundance of anecdotes about the attachment or “loving bond” between animal and human (Bardill & Hutchinson, 1997; Harbolt & Ward, 2001; Kale, 1992), Fine (2010) posits that although little question stands in regards to individuals creating attachments to animals, correlations between this bond and positive therapeutic outcomes are yet to be convincing, but attachment theory provides a helpful conceptual start.

EAP and Acceptance and Commitment Therapy

Attachment theory offers some insight into the therapeutic process, but discussion of the theoretical underpinnings for the mechanism of change in EAP is severely lacking in the literature. EAP has primarily been used on its own as a free standing therapy approach, but has also been used in conjunction with other therapy approaches, such as Gestalt therapy (Kirby, 2010) and psychodynamic therapy (Karol, 2007). In an effort to understand how this process may be producing change, it would be helpful to better understand the process of EAP in itself and how this may be similar to other established approaches. To begin with, it appears the interaction between animal and human helps cultivate an environment of safety and non-judgment (Zilcha-Mano et al., 2011b) which are key ingredients in establishing a good therapeutic alliance (Rogers, 1961). This is important because the therapeutic alliance has been identified as the most important factor in establishing whether a therapy is successful or not (Wampold, 2001). In addition, EAP describes the process as one that incorporates a solution-focused approach. The aim is for a client to be able to explore alternative ways of approaching and perceiving their problem to construct a better outcome (Hoyt & Berg, 1998). It is the ability to change the manner in which one approaches their problems and the drawing on one's strengths and resources that produces a change (Hoyt & Berg, 1998). The practice of EAP allows for many opportunities to challenge ones perception and manner of approaching a problem. In EAP, sessions consist of the client(s) engaging in activities with the horse, which typically includes obstacles that are set-up in the arena. The objective is to confront the obstacles and work with the horse to successfully navigate

them. This typically requires problem solving and exploring alternative approaches (EAGALA, 2009). Metaphor is a key part of this approach and the obstacles are meant to serve as opportunities to associate difficult emotional experiences or events in the client's life. It is the altering of the perspective and the confrontation with one's life problems that helps one learn to better navigate their life.

EAGALA (2009) identifies a solution-focused approach as a basis of EAP; however the practice of EAP seems to incorporate additional elements that are similar to an experiential Acceptance and Commitment Therapy (ACT). In ACT, a client takes a more compassionate, kind, and accepting approach to their symptoms of distress (Forsyth & Eifert, 2007). Rather than avoiding the problem or further battling with anxieties, a client is to accept their emotional distress, choose the direction they would like to take their life in, and then actively engage in steps to actualize this vision (Forsyth & Eifert, 2007). EAP seems to parallel this process nicely as the client confronts their life obstacle and works toward their goal. Also similar to ACT's kind, compassionate approach of confronting problematic thoughts and behavior, in EAP the client must enter into the activity more calm and relaxed to be successful or the horse will react to underlying tensions and will not work optimally (Lentini & Knox, 2009). This seems to better grasp the mechanism of change in EAP than does a solution-focused approach. Not only is the client changing their cognitive perception and behavioral approach to a problem to actualize an alternative result, clients are also changing their approach on an emotional level. ACT has interesting parallels with EAP and helps further understanding

as to why EAP may elicit therapeutic change, but further exploration into the theoretical framework and the mechanism of change is needed for EAP.

Research Findings on EAP and Animal Assisted Therapy

In this section, the uniqueness of working with horses will be reviewed as it is discussed in primarily qualitative and anecdotal publications. Mental health benefits of the EAP approach and a summary of prominent quantitative studies on EAP will be then be reviewed. The current equine interventions that exist today in the form of groundwork or riding encompass many perceived or proposed benefits of the animal-human interaction. For the purpose of this study, psychological benefits of interacting with animals, and specifically horses, will be the focus. However, due to the aforementioned difficulty in deciphering what therapeutic equine activities translate to in the literature, EAP that includes a riding component will be included to a limited extent. Literature on solely therapeutic riding is limited or excluded in this chapter when made explicitly clear that a given study was on therapeutic riding as opposed to primarily groundwork. In the same way, findings that did not seem generalizable to the ground-focused EAP were also excluded. Literature on animal assisted therapy or the animal-human interaction is included only as deemed relevant to the current study.

Unique qualities of working with horses in EAP. Those that have studied EAP have noted unique differences as well as similarities between traditional therapy versus working with a horse therapeutically. The literature highlights five unique characteristics that may benefit clients who participate in EAP. They will be examined below.

Horse as non-judgmental therapeutic rapport builder. Participants' qualitative self-reports are generally consistent on the importance of the horse being a source of non-judgment and honesty, making clients feel more accepted and less defensive. According to a previous study on EAP, findings suggested that clients perceived the horses to lack a negative judgmental stance (Meinersmann, 2008). Unconditional positive regard as a key component of the therapeutic alliance was most emphasized by Carl Rogers (Rogers, 1961). The importance of the therapeutic alliance was later identified as the most salient factor influencing success in therapy (Wampold, 2001). This further supports the importance of cultivating this type of therapeutic environment for the sake of client progress.

One individual participating in an equine study by Yorke, Adams, & Coady, (2008) exclaimed, "they don't try and analyze you." Another participant of the same study echoed that, "it has a lot to do with his innocence, he's completely pure, who he is. There is no second guessing what he is thinking" (p. 23). A female participant in a separate study of EAP expressed that, "they [the horses] are an instant mirror... it's not a mirror that you judge and judges you. So there are no defense mechanisms that you have for this horse except the fact that... she's bigger than you... you're not having a mirror of another person that puts you on the defensive" (Meinersmann, 2008, p. 40). It appears that this non-judgmental stance in the interaction between horse and human results in greater openness on behalf of the person and facilitates communication and interaction.

Research on using animals in the context of therapy suggests that there is an increased likelihood that clients will perceive their therapist as more open, more

empathic, less judgmental, and less threatening when compared to more traditional settings without animals, thus promoting client openness, rapport, and decreasing client defensiveness (Fine, 2010). The improved perception of the therapist should promote the development of the therapeutic alliance, which has been shown to be a critical component of successful outcomes across all genuine psychological therapies (Wampold, 2001). An additional suggested benefit of animal-assisted interventions is that there is an apparent increase in compliance with psychotherapy, especially with populations who tend to be inconsistent with therapy sessions (Beck, Seraydarian, & Hunter, 1986). One study supported this claim, suggesting that therapists who incorporated animals into their practice (i.e. a cage of birds in a group therapy room) resulted in an increase in more regular attendance on behalf of clients than practitioners who did not incorporate animals (Beck et al., 1986).

Additional research suggests that animals were instant ice-breakers in therapy. Fine (2010) noted that his dogs often met the clients at the door and his birds would begin “speaking” to the clients, resulting in almost all clients immediately talking about the presence of the animals, aiding in the development of rapport between client and counselor. In previous EAP research, the horse has been described in similar terms. For example, a less verbal client becomes more inclined to talk during activities with the horse than with the practitioner alone (Masini, 2010). Within the context of EAP, sessions place focus on the nature of the horse(s), which helps remove the intensity of a participant’s anxieties, further promoting relaxation and decreasing the client’s defensive barriers (Tyler, 1994).

Equine and therapist similarities. The similarities between the client-therapist bond and horse-client bond are striking. Yorke et al. (2008), finds that the relationships participants established with their horses contributed significantly to the healing from their trauma. Furthermore, it has been suggested that “good equine-human” relationships parallels “good therapist-client” relationships, both in terms of the nature of the bond and the healing qualities they produce (Yorke et al., 2008, p. 25). The establishment of a bond has been described as one of the key and vital ingredients in forming an effective therapeutic alliance. In fact, strong therapeutic alliances have proven more effective as variables in predicting client outcomes than treatment techniques (Hougaard, 1994). Client disclosures in a study by Meinersmann (2008) suggest that the client-animal interaction is unique in that the animal offers a sense of unconditional positive regard. This notion, paired with the non-judgmental stance, parallels Rogerian thought about creating a therapeutic environment. EAP research suggests that the intimacy/nurturing bond between horse and client was the most significant aspect of the relationship in contrast to the relationship between client and therapist (Yorke et al., 2008).

Yorke et al. (2008) also suggest that the relationship between horse and client may have even more benefits than the traditional therapist-client relationship. They incorporated the use of riding in their approach to EAP, and found that the intimacy/nurturing component of the horse-human bond did seem to echo the same characteristics of the therapist-client alliance with features such as mutual liking, warmth, trust, and respect. They found, however, that this relationship seemed to extend beyond intimacy achieved in a more traditional setting due to the accepting,

nonjudgmental nature of the horses (compared to humans) as well as establishing a deep bond strengthened by exchanges of physical affection; something ethically impossible or significantly limited in therapist-client relationships.

The benefit of touch. Touch as a component of EAP is an element that is especially unique to this form of therapy. Due to ethical constraints and potential consequences of touching a client, physical touch is typically not present in traditional psychotherapy. Research on AAT, has shown that touch can be especially beneficial when clients are in a time of emotional vulnerability and feel the need for closeness and touch, something the therapist is unable to provide (Lefkowitz, Paharia, Prout, Debiak, & Bleiberg, 2005). In Yorke et al.'s (2008) study that incorporated therapeutic riding, a participant who was reflecting on both touch and sense of intimacy with the horse in which she could wrap her arms and cry with the horse in a way that felt accepting and comforting as she disclosed her story.

Horse as “mirror.” This concept of horse as “mirror” is also a predominantly observed characteristic in working with horses. Unlike dogs, cats, or other predator animals that may be used in the context of therapy, horses are prey animals. They are naturally hyper-vigilant as a result, and thus are extremely responsive to subtle shifts in mood and behavior (Meinersmann, 2008). Kirby (2010) explains that horses are prey animals. They are inherently attuned to the internal process of a predator in their environment and read their intention carefully to determine their level of safety or not. In a similar way, if a human approaches the horse in an incongruent way the horse responds accordingly (e.g. confusion, stress, fleeing) even though the outward behavior may be

positive (Kirby, 2010). Renowned horse specialist Chris Irwin (2001) adds to this theme, indicating that from his experience horses can detect a person who is defended or displaying an inaccurate portrayal of themselves on the outside. He indicated that to work successfully with the horse, a person must be authentic and confident in their approach as opposed to displaying an act of confidence (Irwin, 2001).

Linda Kohanov refers to this as “socio-sensual awareness”, the ability of someone else’s mood to affect you in both a physical and emotional level and vice versa. She explains that we often lack conscious awareness of how someone else is breathing, their blood pressure, and muscular tensions is affecting us and yet a person may not actually have to touch us or even speak to us to transfer the general tone of that feeling. We may suddenly feel agitated and start reacting to the emotion without being aware that it actually stems from an individual several feet away (Kohanov, 2001, p. 229). She adds that horses have a high level of this socio-sensual awareness.

This mirroring is often discussed in the literature, but empirical data is lacking in peer-reviewed journals. It has been found in a yet to be peer-reviewed pilot study, that by measuring heart rate patterns and changes when horse and human interact, there is some sort of regulation of heart rate taking place; however, it is inconclusive whether the horse is accommodating its heart rate to match the human or vice versa (Gehrke, 2010). It is postulated that in EAP, clients must be consistent in their behavior and feelings to work successfully with the horse. More so, while a therapist in a traditional talk therapy setting may not be aware of dissonance, it is believed that the horse may display unsettled behavior until the client becomes internally consistent (Lentini & Knox, 2009).

This translates to the clients engaging in EAP and causing the horses to read the client's mood and behavior and react accordingly. It has been reported that, "when we see our own behavior reflected back to us, we gain consciousness... in essence, horses give us living biofeedback because they show externally our inner processes..." (McCormick & McCormick, 1997, p. 67). Brooks (2005) touches on this idea of living biofeedback as well in her work with horses and children who have high energy and boundary problems, suggesting that children learn how to better harness their energy when approaching an animal for it to respond favorably and not move away from their intensity. The aim in EAP would be to use the horse's unique "mirroring" capacity to teach individuals respect of boundaries and internal/external congruency without compromising a positive interaction with the other.

Horse as projection object and metaphor. The use of a horse in intervention has also served as a safe projection object for uncomfortable feelings; for example, a client expresses, "he [the horse] is in a bad mood today" (Masini, 2010, p. 31). Clients may also label horses as individuals in their lives as well, identifying a particular horse as "Mom", "Dad", etc. Horses have distinct personalities, attitudes, and moods. An approach that seems to work with one horse does not necessarily work with another. EAP specialists find that because of this, horses present countless opportunities for metaphorical learning (EAGALA, 2009). The use of metaphors within EAP is a distinctive and predominant characteristic of this therapeutic approach. Specialists find that using metaphors, whether in discussion or activity, is an effective tool when working with even the most challenging clients (EAGALA, 2009).

In addition, horses parallel humans in that they are social animals with defined roles within their herd. This similarity of social patterns provides multiple opportunities for metaphorical learning, a key technique of EAP. Common activities may include the building of obstacles that the client is asked to navigate the horse(s) through. Clients may be asked to label or identify an obstacle or horse, creating room for metaphorical dialogue and thought about parallels to the client's life.

Client presenting problems are in essence recreated and reflected within the context of the arena. By offering this unique experiential approach, clients are given a different perspective and opportunity to see their issues in a different light. It is suggested that by placing focus on the horse, this helps reduce anxieties and defensive barriers. This in turn allows the opportunity for clients to engage more fully in the sessions to develop new perspectives and insights from old relationships and behavior patterns (Tyler, 1994).

Benefits of EAP in nature. Additional benefits stem from EAP taking place outdoors, in nature. Research suggests that participants' feelings about the rural environment where EAP took place helped positively impact client outcome. A research participant in an EAP study reported that, "going to the barn and mucking out, and turning out, and feeding, being out in the country, being at one with nature, there's a whole warmth to it, and it's a very healing, positive warmth." (Yorke et al., 2008, p. 25). EAGALA emphasizes that horses require work, whether in caring for the horses or working with them. EAP specialists state that, "in an era when immediate gratification and the 'easy way' are the norm, horses require people to be engaged in physical and

mental work to be successful, a valuable characteristic in all aspects of life” (EAGALA, 2006, p. 14). On a similar note, renowned equine specialist Chris Irwin (2001), who went on to create his own branch of EAP called Equine Assisted Personal Development, notes that, “horses also give us a comforting sense of familiarity, a safe reminder of all things basic, a primal memory and perhaps an ancestral connection to our grounding roots” (p. 159).

Mental health benefits of EAP. Several mental health benefits have been reported in research on EAP. Qualitative and quantitative findings regarding the impact of EAP on symptoms of trauma, social and interpersonal functioning, confidence and self-esteem, and affect will be highlighted below. A summary of empirical studies on EAP and conflicted findings will also be reviewed.

Decreases in trauma symptoms. Limited research on EAP in the treatment of trauma has been conducted and focuses on sexual trauma; however the findings appear positive. In a recent quantitative study by Kemp, Signal, Botros, Taylor, and Prentice (2013) decreases in trauma symptoms with the use of EAP were found. When comparing 6 sessions of traditional therapy with 9-10 sessions of EAP in the treatment of sexual assault survivors, results indicated that the EAP group experienced further reductions in their symptoms of trauma than did the traditional therapy group. A qualitative study by Meinersmann, Bradberry, and Roberts (2008) examined the impact of EAP on 5 women who experienced sexual trauma. Their study identified four patterns in the participant’s stories including: I Can Have Power, Doing It Hands On, Turned My Life Around, and

Horses as Co-Therapists. Their disclosures regarding their experience with EAP serve to support the effectiveness of this approach to treat sexual trauma.

Social functioning and interpersonal improvement. Social benefits have also been reported with improvement in social interaction and communication. It has been found that inpatient participants engaging in animal-assisted therapy with dogs, rabbits, ferrets, and guinea pigs, socialized more with other patients compared to the control group and were observed to be smiling and demonstrating pleasure in their activities (Marr et al., 2000). Available quantitative studies on the social benefits acquired through EAP are focused on maladaptive social behaviors in at-risk children and adolescents with improvements being found in communication and social functioning (Shultz, 2005; Tetreault, 2006; Trotter, Chandler, Goodwin-Bond, & Casey, 2008). Trotter et al. (2008) found that compared to a classroom-based counseling group, at-risk children and adolescents experienced greater social, emotional, and behavioral improvements in EAP. Improvements included better social skills, decreased aggression, reductions in their difficulties with internalizing or externalizing problems, and improved adaptability. Schultz (2005) and Tetreault (2006) also found some evidence of social functioning improvement with EAP on their master's thesis studies. Shultz (2005) found that at-risk youth ages 12-18 who participated in EAP experienced greater improvements in psychosocial functioning compared to those who did not receive treatment. Improvements were found using both parent reports and observer reports. Tetreault (2006) conducted a study on the effectiveness of EAP on 10 students diagnosed with an

emotional disorder. Participants engaged in five sessions of EAP and found that 8 of 10 students experienced improvements in communication and social skills.

In working with horses, Brandt (2004) notes that the large size of the horse, compared to human partners, brings about an element of danger into the interaction that is rarely present with dogs or cats and requires an establishment of effective communication. It is suggested that because horses rely primarily on body language to communicate, the body becomes the basis from which a system of communication can develop (Brandt, 2004). Together the human and horse must develop a system of communication employing a medium that they both can understand. Brandt also notes that expanding the concept of what counts as language and examining nonverbal communication, opens the door for greater understanding of human-animal interaction, providing a space for the body to be understood as a basis for symbolic interaction. More so, the element of danger involved in horse-human interaction, reinforces the importance of communication for safety and to successfully work together in a goal-oriented fashion (Brandt, 2004). Participants of EAP are thus challenged to rethink their methods of communication to work effectively with the horse and reach their desired goals; a skill that may benefit them outside of the arena.

Confidence and self-esteem. EAGALA specialists find that horses are large, powerful animals that create a natural opportunity for individuals to face and overcome fear as well as develop confidence. The size and power of the horse are naturally intimidating to many people. It is suggested that completing a task involving the horse, in spite of those fears, generates confidence in the client (EAGALA, 2009).

A qualitative study examining interview themes of seven at-risk youth participating in EAP and EAL found that participants experienced an increase in self-confidence and developed a sense of empathy toward the horses (Burgon, 2011). In a pre versus post treatment quantitative study of EAP in the treatment of 164 at-risk youth, results also demonstrated an improvement in self-esteem in addition to a decrease in social stress, a decrease on the behavioral symptoms index, decrease in externalization of problems, decrease in hyperactivity, decrease in aggression, and fewer conduct problems (Trotter, Chandler, Goodwin-Bond, & Casey, 2008).

All and Loving (1999) examined horseback riding therapy and suggested that one of the most profound benefits of the approach is the improvement of confidence and self-esteem that comes from being able to maneuver and control an animal that weighs in excess of 1000 pounds. All and Loving (1999) suggest that riding encourages risk taking behavior and assists in the development of patience, emotional control and self-discipline, a sense of normality, and expansion of the locus of control. A quantitative study of therapeutic riding with a group of adolescents with special education needs found a small increase in self-concept as well (Cawley, Cawley, & Retter, 1994).

Although EAP as defined by EAGALA does not include a riding component, Burgon (2011) makes references to the element of risk as a necessary component in developing self-confidence and the need to overcome fear and lack of confidence in order to engage with the horses. She finds that it is the taking of risk to carry out a challenging task that helps foster a greater self-esteem and sense of confidence.

Working with a horse helps participants work on assertiveness by providing wonderful metaphors for clients dealing with other intimidating or challenging situations in their lives (EAGALA, 2009). Some theorists argue that the power and size of the horse allows opportunity for riders to explore issues with vulnerability, power, and control (Lentini & Knox, 2009). Participants in a therapeutic riding program reported that meeting the challenge of fear in riding the horses was crucial in their increasing sense of achievement and accomplishment, providing an anchor for future efforts and activities and resulted in improvements in self-efficacy and self-esteem (Bizub, Joy, & Davidson, 2003). A study by Ewing, McDonald, Taylor, and Bowers (2007) demonstrated contradictory evidence, finding that after nine weeks of EAP, no improvements were found in self-esteem for at-risk children with emotional disorders. This contradiction in findings serves to further reinforce the importance of continued research and well-designed, well-controlled studies on the effects of EAP.

Change in affect: Increasing sense of calm. The human-animal interaction and the resulting sensation of calm is also discussed in the literature, but is commonly described from a physiological perspective. Friedmann et al. (1983) conducted a largely cited study on the influence of animal companions and found that children with a dog in the same room as them experienced a decrease in their heart rate. The children were separated into two groups with one group being with the dog present from the start and the second group being with the dog not being brought in later. Results suggest a positive impact on the central nervous system, producing a reduction in physiological arousal and greater sense of calm. It was speculated that the decrease in blood pressure

was due to the child interpreting the environment and experimenter as less threatening and friendlier. This study is often cited as a primary argument for the benefit of animal-human interaction.

Herzog (2011) makes note of conflicting results, which suggest that the largely cited Friedmann et al. (1983) study on the benefits of decreased blood pressure is not a consistent finding. Additional research found no short-term effects on blood pressure when performing a stressful task in the presence of a dog (Straatman, Hanson, Endenburg, & Mol, 1997) and no differences were found on blood pressure or risk of hypertension between pet and non-pet owners, although this last study also found that participants exercised less and were more likely to be overweight (Wright, Kritz-Silverstein, Morton, Wingard, & Barrett-Connor, 2007).

Kruger, Trachtenberg, and Serpell (2004) add to the discussion on animals producing a sense of calm by stating that from an evolutionary perspective, humans judge the safety of their environment by signals of calm or anxiety exhibited by animals. The calm an animal in therapy may convey to a survivor of trauma is that the therapy room is safe and that the therapist is a safe person as well (Kruger et al., 2004). The previously mentioned EAP literature contradicts this, suggesting that rather than producing calm, working with the horses may cause natural fear in working with such a large, powerful animal; however, it is also suggested that by learning to work through the fear, this may in turn produce greater confidence. The impact of EAP in regards to affect has yet to be examined empirically.

Summary of quantitative EAP findings. Few quantitative studies on the effectiveness of EAP are available in the literature with many being of poor quality and lacking in control or comparison groups. Limitations in the empirical literature on EAP are further discussed at the end of this chapter. Table 1 contains empirical studies on the effectiveness of EAP, highlighting studies that contain control/comparison groups and highly cited quantitative studies. Therapeutic riding literature was not included due to significant differences with EAGALA model of EAP. Unpublished works were also not included with the exception of those using the EAGALA model.

Table 1. Summary of prominent empirical EAP studies

| Author, Year | Design | Key Findings |
|---|---|--|
| Bachi, Terkel, & Teichman (2011) | Control group vs. Equine facilitated psychotherapy; n = 15; mixed gender, at-risk adolescents; ages 14-18 | No statistically significant findings; however, positive trend found on self-image, self-control, trust, & general life satisfaction |
| Ewing, MacDonald, Taylor, & Bowers (2007) | Control vs. Equine facilitated learning; n = 26; ages 10-13; mixed gender with severe emotional disorders | No increase in Self-esteem; No change in interpersonal empathy. Post-test results that did not show increased feelings of internal locus of control; No self-reported decrease in depression was found |
| Kemp, Signal, Botros, Taylor, & Prentice (2013) | Comparative: first 6 weeks of traditional psychotherapy only vs. later 9-10 weeks of equine facilitated therapy only; n = 15; sexually abused children and adolescents; ages 8-17 | More effective in decreasing trauma symptoms than traditional counseling setting; decrease in depression, anxiety, and maladaptive social/emotional/overt behaviors |
| Klontz, Bivens, Leinert, & Klontz (2007) | pre-test vs. post-test, and 6-month follow-up; open clinical trial; n = 31 for analysis; mixed gender; ages 23-70 | Decrease in psychological distress, increase in psychological well-being, stable improvement through follow-up |

Table 1 continued

| Author, Year | Design | Key Findings |
|--|--|--|
| ^a Russell-Martin (2006) | Comparative: equine facilitated couples therapy vs. solution focused couples therapy; n = 40; ages 21-45; data gathered at weeks 1, 3, & 6 | EFT & SFT groups demonstrated improvements in similar areas, with EFT resulting in significantly higher marital satisfaction & relational adjustment by the 6th week |
| ^a Shultz (2005) | EAGALA model; control group vs. EAP group; n= 29; mixed gender residential/outpatient group | Claims improved psychosocial functioning compared to control group |
| Schultz, Remick-Barlow, & Robbins (2007) | EAGALA model; pre-test vs. post-test; n = 63; ages 4-16; children with behavioral and mental health problems | All children demonstrated improvement on GAF; Greatest improvement seen in children with history of intra-family violence and substance use; Statistically significant correlation between GAF improvements and number of sessions |
| ^a Tetreault (2006) | EAGALA model; pre-test vs. post-test; n = 10; mixed gender group with emotional disturbance; ages 10-12 | Claims improvement in behavior management; Improved communication and social skills |
| Trotter et al. (2008) | Comparative: Equine Assisted Counseling vs. classroom-based counseling; n = 164 for analysis; children grades 3-8 at risk of academic & social failure due to behavior problems, learning difficulties, or social adjustment problems; child self-report and parent report | EAC group demonstrated improvements in 17 behaviors areas compared to 5 from classroom based counseling group; EAC demonstrated improved social behavior ratings, increases in positive behaviors and decreases in negative behavior |

Note. ^aGray literature study (unpublished master's thesis or doctoral dissertation)

The available empirical research on EAP reports the following benefits, increases in well-being (Klontz et al., 2007), decreases in psychological distress (Klontz et al., 2007; Schultz, et al. 2007), improvements in relational adjustment (Russell-Martin,

2006), and improvements in social behavior (Shultz, 2005; Tetreault, 2006; Trotter et al., 2008). Decreases in trauma symptoms, depression, anxiety, and maladaptive social/emotional/overt behaviors were also found following EAP treatment (Kemp et al., 2013). No statistically significant findings were reported in a study of EAP as it relates to self-image, self-control, and trust by Bachi et al. (2011), but a positive trend was found. The effects of EAP on self-esteem, interpersonal empathy, and internal locus of control were also examined, but no treatment effects were established (Ewing et al., 2007).

Within the few empirical studies on EAP, there are conflicting findings. No statistically significant decreases in depression were found by Ewing et al. (2007) while significant changes were found in a newer study by Kemp et al. (2013). In a similar way, statistically significant findings were not found when examining the effects of EAP on general life satisfaction by Bachi et al. (2011) while statistically significant findings were found in a previous study on well-being by Klontz et al. (2007). These conflicted findings are representative of a larger criticism of inconsistent results within the available qualitative literature on EAP and previous studies in AAT.

Despite the claimed benefits, research in the field of AAT and EAP is inconsistent at best. To make matters worse, of the limited empirical studies available on EAP, many lack control or comparison groups. Studies that lack comparison groups and the inconsistent findings regarding the effects of animal-human interaction make it difficult to determine how some of the reported benefits may be applicable to the interaction between horse and human in EAP. In addition, due to the differences of

animal assisted therapy with a horse compared to a dog or otherwise, findings based on EAP may not generalize to findings using other animals.

Summary of research findings on EAP and AAT. In spite of limited quantitative studies and poorly designed studies that lack control/comparison groups and produced conflicting findings, several benefits and unique qualities have been more consistently reported regarding EAP as an AAT approach. Reported benefits in the anecdotal and qualitative literature have been discussed and include improvements in social and interpersonal functioning (Kemp et al., 2013; Marr et al., 2000; Russell-Martin, 2006; Shultz, 2005; Tetreault, 2006; Trotter et al., 2008), increases in confidence and self-esteem (Bizub, Joy, & Davidson, 2003; Burgon, 2011; Trotter et al., 2008), decreases in psychological distress (Klontz et al., 2007; Schultz, et al. 2007), decreases in trauma symptoms, depression, and anxiety (Kemp et al., 2013), the benefits of being in nature (Irwin, 2001; Yorke et al., 2008), and increases in well-being (Klontz et al., 2007). Decreases in trauma symptoms and anxiety were also found following EAP treatment (Kemp et al., 2013). Most of the anecdotal and qualitative evidence has not been studied quantitatively; something that is needed in the field to better understand the effectiveness of EAP and AAT approaches.

Unique benefits of human-horse interactions were also discussed with the horse being a non-judgmental therapeutic rapport builder (Fine, 2010; Masini, 2010; Meinersmann, 2008; Tyler, 1994; Yorke et al., 2008), the horse acting as a “mirror” or representing the client’s inner experience (Kirby, 2010; Lentini & Knox, 2009; McCormick & McCormick, 1997; Meinersmann, 2008), the horse providing an

opportunity for use as a projection object and metaphor (Masini, 2010; Tyler, 1994), and the horse providing potential benefit from physical contact (Lefkowitz et al., 2008). Despite the lack of well controlled studies and inconsistent findings, increasing numbers of animal assisted programs have surfaced to assist veterans in need of therapeutic support. The remainder of this chapter discusses the nature of PTSD symptoms in the military and how EAP may address some of their needs.

Posttraumatic Stress Disorder in the Military

As the field of EAP has evolved, interest has increased in the research and development of animal assisted approaches with veterans. With increasing attention on the mental health needs of veterans as they adjust to civilian life post deployment and suffer potential emotional consequences such as Posttraumatic Stress Disorder (PTSD), several EAP programs have surfaced to help meet their needs. Further details regarding the characteristics of PTSD, its effects in the military population, and the potential fit between EAP and treatment of PTSD will be further detailed in the remainder of this chapter.

PTSD diagnostic criteria. First, this study will define criteria for PTSD as derived from the DSM-IV TR. The main assessment tool for establishing PTSD symptoms used in this study is the PTSD Checklist Civilian Version (PCL-C) which was developed based on the DSM-IV TR criteria exactly to allow for diagnostic use in addition to determining symptom severity. Symptoms of PTSD occur following an extreme traumatic event that threatens an individual's life or threatens serious injury (DSM-IV TR, 2000). Symptoms may also occur due to witnessing a life threatening

event or due to learning of a family member's unexpected or violent death (DSM-IV TR, 2000).

The DSM-IV TR criteria for PTSD includes a traumatic stressor followed by subsequent symptoms of intrusive thoughts, numbing/avoidance, and hyper-arousal. Intrusive thoughts may include flashbacks or recurrent memories of the trauma that cause distress. Intrusive recollections may be so distressing that it feels as though the trauma were reoccurring. Nightmares may also be present. Additionally, exposure to stimuli that resemble characteristics of the trauma can trigger intrusive thoughts and psychological and physical distress (DSM-IV TR, 2000). Avoidance and numbing criteria must be persistent and may include effort to avoid any stimuli associated with the trauma such as avoiding people, places or activities that trigger thoughts of the trauma. There may be an inability to remember important details about the trauma as well as a sense of foreshortened future. Survivors may also feel numb, detached, or restricted range of affect. Finally, survivors will have developed hyper-arousal which may include difficulties with sleep, irritability, anger outbursts, difficulties with concentration, hyper-vigilance, and may be easily startled. Symptoms must be present for a minimum of 30 days and symptoms may develop immediately after the trauma (without delayed onset) or six or more months after the trauma (delayed onset). Symptoms must cause a significant impairment in social, occupational, or other important areas of functioning (DSM-IV TR, 2000).

Prevalence of PTSD. Prevalence of PTSD is significantly higher in the military population when compared to civilians, causing significant room for concern. Reported

prevalence also varies within the military population depending on the wartime trauma. The National Vietnam Veterans Readjustment Study (NVVRS) was conducted between November 1986 and February 1988 and consisted of 3,016 American Veterans. This study found that 15.2% of male and 8.1% of female veterans participating in the study of Vietnam veterans were found to currently have the diagnosis of PTSD; however, it was estimated as high as 30.9% of men and 26.9% of women from the Vietnam war will have developed the disorder in their lifetime (United States Department of Veterans Affairs, 2011). Kang and others conducted a study to estimate the prevalence of PTSD in Gulf War Veterans from 1995 to 1997 using a sample of 11,441 and predicted a diagnosis of 10.1% within the population. The RAND Corporation, Center for Military Health Policy Research, published a population-based study in 2008 on PTSD prevalence in Veterans of Operation Enduring Freedom/Operation Iraqi Freedom and found 13.8% of veterans met criteria for PTSD (United States Department of Veterans Affairs, 2011). These figures are significantly higher compared to the national prevalence of 1.8% among men and 5.2% among women (National Comorbidity Survey, 2005). Research finds that individuals who spontaneously recover from symptoms of PTSD will typically do so within the first three months (Solomon & Davidson, 1997), but nearly one-third of persons with PTSD never achieve a full recovery, even after many years (Kessler, Sonnega, Bromer, Hughes, & Nelson, 1995).

Prevalence of suicide in the military population has also gained increasing attention as rates have reached an all-time high. Criticism of studies on veteran suicide from samples based on U.S. Veterans Affairs (VA) data has been noted in the research

because of the potential underestimation of true suicide rates due to lack of representation of veterans outside the system. A study whose sample included those who did not seek care in the VA system found that male veterans have twice the likelihood of dying by suicide compared to a civilian (Kaplan, Huguet, McFarland, & Newsom, 2007). For further comparison, The Center for Disease Control and Prevention (CDC) reported 105 completed suicides per day in the United States versus 22 veteran suicides per day in 2010 (United States Department of Veterans Affairs, 2012b). With the high prevalence of PTSD in the military versus civilian populations and increasing rates of suicide, it has become abundantly clear that therapeutic support is needed to address these issues.

Stressors impacting the development of PTSD. Friedman (2006) observed specific stressors from combat-related experiences for veterans from Iraq and Afghanistan impacting the development of PTSD. These included a feeling of helplessness to alter the course of potentially lethal circumstances; being exposed to combat situations in which their fellow soldiers, are killed or injured; having personally killed enemy combatants or innocent bystanders; being exposed to unpredictable or uncontrollable life-threatening attacks; experiencing consequences of post-combat exposure, which may include observation or handling the remains of civilians, enemy soldiers, or allied personnel; being exposed to smells, sights, or sounds of dying men and women; and observing destruction and devastation of homes, communities and observing refugees due to combat. Similar results were suggested by Green, Grace, Lindy, Gleser, and Leonard (1990) as well as by Schnurr, Lunney, and Sengupta (2004),

indicating that when examining risk factors for developing PTSD in veterans, the primary contributors were experienced during periods of active duty and included exposure to warzone, grotesque death, and serving in a patrol unit that involved a life threatening event.

Friedman (2006) suggests that secondary to these stressors, military personnel may develop sustained anticipatory anxiety due to potential threats at any hour of the day; this constant combat-ready state results in a pervasive and uncontrollable sense of danger. Military personnel who return from deployment face challenges of adjustment as they shift from a state of constant, combat-ready hypervigilance to a quiet domesticity (Friedman, 2006). Ongoing stressors may also prove problematic for military returnees. Friedman finds that upon return to civilian life, military returnees may be faced with new problems such as changes that occurred at home during their deployment or confrontation with issues at home that preceded time in Iraq or Afghanistan. Ongoing or secondary stressors, such as marital or familial discord, have been identified as risk factors for developing PTSD. To compound the issue, people with PTSD often have an impaired capacity to cope with typical stressors of everyday life (Friedman, 2006). For example, transitioning from disarming an Improvised Explosive Device in the U.S. Army to managing a discontented child at home may prove difficult to navigate. This finding was further supported by Schnurr et al. (2004), adding that in addition to warzone exposure, peritraumatic dissociation, and aspects of the recovery environment (such as emotional sustenance at homecoming and recent life events), may also impact the development of PTSD.

Risk factors for PTSD in military population. The United States Department of Veterans Affairs (2010) finds that pre-traumatic risk factors for developing PTSD include: ongoing life stress; lack of social support; young age at the time of trauma; a pre-existing psychiatric disorder(s) or substance misuse; history of previous traumatic events (e.g., motor vehicle accident); and previous history of PTSD. Other pre-traumatic risk factors for developing PTSD include: female gender; low socioeconomic status; lower education level; lower intelligence level; race (e.g., Hispanic, African-American, American Indian, and Pacific Islander); reported history of childhood abuse or other adverse factors during childhood, family history of psychiatric disorders and poor training or preparation for the traumatic event (United States Department of Veterans Affairs, 2010). Post-trauma risk factors for developing PTSD include: ongoing life stress; lack of a positive support system; bereavement or traumatic grief; a major loss of resources; negative social support which may include shaming or blaming environment; poor coping skills; or other post-traumatic factors which may include children at home or a distressed spouse (United States Department of Veterans Affairs, 2010).

Protective factors for preventing PTSD. Schnurr et al. (2004) report that lack of social support is a risk factor for developing PTSD among Vietnam veterans. Although social support can be a powerful protective factor (Brewin, Andrews, & Valentine 2000), the protective aspect of social support is influenced by the capacity of an individual to accept the support when made available (Benight & Bandura, 2004). Acceptance of social support may be especially difficult for individuals with PTSD, as

typical symptoms include avoidance, alienation, and detachment, which can impede the client from benefitting from available support systems (Friedman, 2006).

Treatment for PTSD

The United States Department of Veterans Affairs (2010b) advocate exposure and cognitive based therapy approaches to treat PTSD in the VA/DoD Clinical Practice Guidelines with three of the most highly utilized psychotherapeutic interventions including Cognitive Behavioral Therapy (CBT), Cognitive Processing Therapy (CPT), prolonged exposure, and eye movement desensitization and reprocessing (EMDR). According to Friedman (2006), CBT has been the treatment of choice in all PTSD practice guidelines that are published to date, addressing the conditioned fear and cognitive distortions (or irrational beliefs) which are associated with PTSD. Cognitive-based therapies consist of cognitive restructuring, challenging automatic or acquired beliefs about the traumatic event (e.g. beliefs about safety or trust), but may include relaxation techniques as well as discussion of the traumatic event orally or through writing (United States Department of Veterans Affairs, 2010b). Research on the effectiveness of CBT was done by a large scale, randomized, controlled study Schnurr et al. (2007), finding a reduction of PTSD symptoms in female veterans to where 41.0% no longer met DSM and 15.2% achieved full remission.

Cognitive Processing Therapy (CPT) was specifically designed to treat PTSD and consists of both cognitive and exposure components (Resick & Schnicke, 1992). This therapy approach begins with a focus on assimilated-distorted beliefs (i.e. denial, self-blame) and then focuses on challenging their overgeneralized beliefs and

assumptions (Resick, Nishith, Weaver, Astin, & Feuer, 2002). Originally intended for survivors of sexual assault, it is now a predominant form of treatment for PTSD in veterans (Foa, Keane, & Friedman, 2000). Research indicates that in veterans with military-related PTSD, 40% of participants who engaged in CPT treatment no longer met criteria for a PTSD diagnosis and 50% had a reliable change (change not due to chance) in their PTSD symptoms at post treatment assessment (Monson et al., (2006).

Prolonged Exposure (PE) is a therapy approach used for PTSD that aims to help trauma survivors emotionally process their trauma to reduce symptomology (Foa, Hembree, & Rothbaum, 2007). Exposure-based therapies consists of in-vivo, imaginal, and narrative (oral/written) exposure, but also typically include elements of cognitive restructuring (e.g. evaluating accuracy of beliefs about danger), relaxation techniques, and self-monitoring of anxiety (United States Department of Veterans Affairs, 2010b). Therapists guide constructed narratives about the traumatic events repeatedly, producing a progressive reduction in distress levels (Foa & Rothbaum, 1998; Rothbaum, Meadows, Resick, & Foy, 2000). Research on the effectiveness of PE on women with PTSD due to sexual assault found that 53% no longer met criteria for the disorder at post treatment (Resick et al., 2002). Both exposure and cognitive therapies performed with equal efficacy in treating symptoms of PTSD and both are considered first-line treatments for PTSD (Resick et al., 2002; Ursano et al., 2004).

Eye Movement Desensitization and Reprocessing (EMDR) is another treatment method for PTSD. The EMDR Institute, Inc. (2011) defines this approach as an information processing therapy that consists of an eight phase approach to address

experiential contributors of a wide range of pathologies. Various procedures are used in treatment; one of which is termed dual stimulation, which uses bilateral eye movements, tones or taps. The client attends momentarily to past memories, present triggers, or anticipated future experiences while simultaneously focusing on an external stimulus; during this time, clients generally experience additional insight, changes in memories or new associations (EMDR Institute, Inc., 2011). EMDR has an exposure component to the trauma as well (talking about the traumatic experience, holding distressing memories in mind without verbalizing them) combined with a cognitive component (e.g., identifying a negative thought, finding an alternative positive thought, and assessing the validity of the thought), and relaxation or self-monitoring techniques which may include breathing or a body awareness (United States Department of Veterans Affairs, 2010b). Although alternating eye-movements are part of the classic EMDR technique, comparable effect sizes have been found with or without eye movements or other forms of kinesthetic stimulation (United States Department of Veterans Affairs, 2010). A meta-analysis of EMDR studies was conducted and found that this approach was not better than exposure-based treatments; however, clients were found to be better off compared to no treatment (Davidson & Parker, 2001).

Psychotropic medication is an additional form of treatment and may include antidepressants, mood-stabilizing agents/anticonvulsants, adrenergic inhibitors, antianxiety agents, and antipsychotic agents. Reeves (2008) warns that physicians should not consider pharmacotherapy as the primary form of treatment for PTSD and should be used rather in conjunction with therapy as it is more effective. Unfortunately, veterans

may successfully acquire psychotropic medication yet fail to engage concurrently in therapy.

Mental health stigmas. Due to the unique nature of veteran issues, this population may find it especially difficult to acquire mental health assistance. Reasons for this may vary from stigma within the military culture about having mental health issues, adjustment problems following war, or seeing a ‘shrink.’ Owing and associates report that stigmatization was disproportionately greatest among returning veterans of Operation Iraqi Freedom and Operation Enduring Freedom (OIF/OEF) as they reported the greatest amount of severe symptoms and yet they were the least likely to seek mental health attention out of fear that it would harm their careers, cause difficulties with their peers, become a source of embarrassment that they would be perceived as weak (Friedman, 2004). Research indicates that individuals with PTSD may not seek treatment for their symptoms or if they do, they may delay in seeking professional services for years (Sayer et al., 2009; Sayer, Clothier, Spont, & Nelson, 2007; Sayer, Spont, & Nelson, 2004; Wang, Lane, Olfson, Pincus, Wells, & Kessler, 2005). In establishing insight into barriers to seeking treatment, it is reported that individuals with mental health problems hold beliefs that can hinder participation in treatment. For example, individuals in need of mental health services may believe that they do not need treatment, that problems will solve themselves on their own or can be resolved without professional help, may feel hesitant about treatment effectiveness, or may fear the stigma that can be associated with seeking mental health services (Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004; Kessler et al., 2001; Leaf, Livingston, Tischler,

Weissman, Holzer, & Myers, 1985; Mojtabai, Olfson, & Mechanic, 2002; Sayer et al., 2009).

Observations of psychological consequences from warfare such as anger, crying, screaming, dissociation, and irritability began to be documented during World War I (Herman, 1997). Traditionalist perspectives on the psychological effects of warfare would include notions such as, “a normal soldier should glory in war and betray no sign of emotion”, “he should not succumb to terror” otherwise, he was at best a “constitutionally inferior human being”, “a malingerer”, or “a coward” (Herman, 1997, p. 21). These traditionalist views continue to impact modern military culture as they serve as barriers to pursuing mental health treatment. It is common to observe resistance to seeking treatment outside the military realm. To compound the issue, military personnel may be discouraged from seeking help as they find it detrimental to their careers to have mental health issues as a part of their record. Although it is not necessary for a therapist to have first-hand experience when it comes to client trauma or presenting problems, in consulting with military personnel for this study, it was common to hear that veterans prefer assistance from those who understand military culture first hand, their jargon and the experience of deployment as it is quite distinct from the civilian environment. These obstacles make it difficult for veterans and mental health practitioners alike.

It is argued that despite the existing approaches, there is still a need for additional forms of treatment for PTSD as numerous treatment approaches are currently in use with varying degrees of acceptability and effectiveness (Bomyea & Lang, 2012; Bradley,

Greene, Russ, Dutra, & Westen, 2005; Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008). Bomyea and Lang (2012) emphasize the importance of alternative intervention approaches for individuals with PTSD who failed to respond to empirically supported approaches or who prefer a different type of intervention. It is also suggested that rather than focusing on a specific treatment modality, perhaps several treatment approaches could be combined successfully (Shalev, Bonne, & Eth, 1996).

EAP in the Treatment of PTSD

Available literature on EAP suggests a potential bridge to successfully reach veterans with PTSD and treat their symptoms. This process may begin by reducing the interaction between client and mental health practitioner, a role that has been described as stigmatizing in this population and re-focusing on the relationship between client and horse. It is proposed that this alternate interaction may help reduce stigma and facilitate initiation into therapy. Distinct from other forms of therapy to treat PTSD which are largely exposure-focused, EAP may decrease pressure or defensiveness by not forcing the client to talk about the trauma and rather allowing the client to recreate their given environment and experiences within the context of the arena, utilizing the horses as metaphors or symbolic representations. With the EAP team vocalizing their objective observations rather than psychological analysis of the activity within the arena and use of open ended questions, the client is given the opportunity to take ownership of the session, allowing them power and control to address their trauma on their own and facilitating client self-awareness.

EAP appears to be a good potential fit with trauma victims and may positively impact interpersonal relations. Trauma expert, Judith Herman (1997), finds that recovery from trauma, among other socio-emotional problems, requires a close personal connection that is characterized as caring, consistent, trusting, and safe. In the context of recovery from sexual assault, research suggests that the grooming and riding (if applicable) of a horse allows for the opportunity to feel the healing effects of “safe” touch within a close relationship (Yorke et al., 2008). Lefkowitz et al. (2005) posits that individuals who have the most difficulty connecting with the therapist or any other unfamiliar person, and especially individuals who have suffered trauma of an interpersonal nature would benefit from AAT because animals may respond more to individuals who appear more isolated or withdrawn. It is speculated that animals will respond more to these individuals because they are perceived by animals as less likely to respond aggressively towards them (Lefkowitz et al., 2005). Although no prior quantitative studies on the effects of EAP on symptoms PTSD in veterans have been conducted to date, a recent quasi-experimental comparative study found that children and adolescents who were victims of sexual abuse, demonstrated a greater reduction in their traumatic symptoms than the traditional counseling group (Kemp et al., 2013).

Similar to Prolonged Exposure therapy, EAP may promote habituation of fear and anxiety symptoms by having the survivor confront uncomfortable memories that trigger anxiety and remain in that state until the anxiety begins to decrease naturally. Lefkowitz et al. (2005) suggest that AAT may decrease anxiety, lower physiological arousal, facilitate social interactions, and enhance the therapeutic alliance among

participants, making Exposure Therapy less intimidating to survivors. They suggest that AAT may “enhance the value of PE [prolonged exposure therapy] by making it more accessible to survivors, increasing social interaction, and perhaps decreasing the number of sessions required for habituation to the traumatic memories” (Lefkowitz et al., 2005, p. 275). As with any therapeutic approach, treatment compliance is vital to allow opportunity for successful client outcomes. This is of importance in working with the veteran population in particular due to the high level of mental health stigma. With empirical data supporting greater treatment compliance when incorporating animals into the therapeutic environment, it appears that EAP may potentially decrease drop-out rates for the veteran population (Beck et al., 1986).

Empirical studies of the effectiveness of EAP in the treatment of veterans with PTSD are absent in the literature; however, Lancia (2008) suggested that EAP might benefit veterans in multiple ways, making the numerous observations based on his extensive experience with EAP in the military population. From his clinical observations, he suggested that veterans benefitted from using metaphors from the EAP sessions such as learning to “harness” the fear that comes with recurring thoughts about the trauma. Lancia (2008) also posits that learning to lead the horse has also served as a helpful metaphor as the veteran learns to transition from being a leader in the military to a leader in his family or community. The feeling of being accepted by the horses through the sessions seemed to be a key part of their experience. Lancia (2008) shared that veterans would often talk about the healing effect of feeling accepted and how this seemed to “open the floodgates” or grief and other deeply felt emotion. Lancia (2008)

also observed that the numbing and detached manner that veterans display in war does not work when trying to engage with a horse. As a result, the EAP process helped the veteran become more aware of and in touch with their feelings. The qualitative nature of Lancia's (2008) observations and deductions are largely uncritical, but may assist in the development of future studies on the effectiveness of EAP in the treatment of war veterans.

Limitations in Current EAP Research

The available literature on the effectiveness of EAP is severely limited leaving large empirical gaps. Within the few quantitative studies available, many are in reference to therapeutic riding, or are too heavy on riding as a component of treatment, to be representative of the EAGALA EAP approach or similar EAP methods. Methodical literature reviews completed by Cantin and Marshall-Lucette (2011) and Selby and Smith-Osborne (2010) make note of minimal quantitative data and mixed research quality with studies often lacking control or comparison groups and consisting of small sample sizes. A systematic review by Selby and Smith-Osborne (2013) on equine therapy found only 2 studies of moderate quality out of 14 quantitative studies available in the literature (theses, dissertations, and papers included). No random clinical trials have been conducted. The few empirical studies on the effectiveness of EAP that contain control/comparison groups and highly cited quantitative studies were reviewed in this study with only one of them (Kemp et al., 2013) involving treatment focused on trauma.

Weighing the applicability of the more common anecdotal, qualitative studies, poorly designed studies, and limited empirical studies is challenging and a more

conservative approach leaves little room for directional hypothesis. Future studies with improved designs and greater use of comparison and/or control groups are needed to assist in determining the effectiveness of EAP and in what ways it may be beneficial. Further challenges in interpreting available literature on equine assisted psychotherapy are found due to the essential problem of defining exactly what this treatment is across studies. This may parallel the lack of consistent practice of EAP in the field which further complicates this problem due to several different organizations or individuals utilizing similar terms in reference to equine therapy.

To further compound the issue, EAP lacks a solid theoretical framework. The field contains many unknowns regarding why this approach would be effective. The attachment theory that is often discussed in AAT is not consistently identified and is not well-developed and it is unclear how the principles of attachment theory may apply to EAP. Chandler, Portrie-Bethke, Barrio Minton, Fernando and O'Callaghan, (2010) matched AAT techniques and intentions to counseling theories and found a variety of commonalities between AAT and numerous approaches. These included cognitive behavioral therapy, solution-focused therapy, Adlerian therapy, Person-Centered Therapy, Behavioral therapy, Psychoanalysis, Gestalt, Existential therapy, and Reality therapy. However, because of the importance of relationship factors in successful therapeutic outcomes, discussion on how AAT could be used to promote the relationship was encouraged (Chandler et al., 2010). Despite noted commonalities with attachment theory and multiple commonly used counseling approaches, lack of theoretical grounding remains a prevalent issue.

The Current Study

The goal of this study was to investigate the effectiveness of EAP as a form of treatment for veterans with Posttraumatic Stress Disorder using the EAGALA model. Upon reviewing the literature, it is apparent that some benefits have been reported, but that due to the limited empirical data, conflicted findings, and largely anecdotal, qualitative research base, a directional hypothesis could not be established. Due to the increasing need to provide therapeutic support for veterans and the increasing interest in animal assisted approaches to meet their needs, this study aimed to examine whether EAP makes an impact on symptoms of veterans with PTSD. Some benefit to trauma survivors has been reported in EAP (Kemp, 2013; Yorke et al, 2008) and AAT (Lefkowitz et al., 2005), but further research is needed to help determine this. Due to the role social functioning and interpersonal relations play in both the protective factors and risk factors in developing PTSD (Brewin et al., 2000; Schnurr et al., 2004), it was hoped that EAP may produce a positive impact in these areas as well. The limited research has demonstrated some improvement in interpersonal relations with AAT, but because of inconsistent findings, this cannot be clearly determined as of yet (Ewing et al., 2007). It was also hoped that veterans would experience change in affect with their experience of EAP. There have been anecdotes and some limited findings regarding the interactions with animals promoting a positive, calming experience (Friedmann et al., 1983; Kruger et al., 2004), but it remains unclear whether change in positive/negative affect levels would be likely following sessions.

This study investigated the potential treatment effect of EAP on PTSD symptoms, social role functioning, interpersonal functioning and positive and negative emotion. Change in pre to post session positive and negative affect were also investigated. A single-case design was chosen using a small sample as this is a preliminary study and would offer the opportunity to gain insight for further research. Although single-case designs are limited in that the use of few subjects makes it difficult to determine characteristics that may impact response to treatment such as age, sex, and race, they can also be more informative in that they allow for a more detailed inspection of an individual's response to treatment (Kazdin, 1982). While several empirical studies in the EAP literature consist of data collection before and after treatment, this study uses a short baseline prior to treatment and then tracks the client's progress with data collection at each session. This multiple baseline single-case design provides numerous advantages including the ability to assess the client's functioning prior to treatment in the baseline phase and then compare any differences that may arise as a result of the treatment. Different from comparisons made between a treatment group and a control group, this design allows the investigator to more directly assess any change experienced by each individual as a result of the treatment when compared to baseline performance. There is a direct connection between the individual and the treatment effect. Barlow, Nock, & Hersen (2009) make note of this, indicating that, "the power of such designs comes from demonstrating that change occurs when, and only when, the intervention is directed at the behavior, setting, or subject in question." (p. 202). Thus, this approach to a study design offers greater clarity on whether treatment effects are present.

CHAPTER III
METHODOLOGY

Participants

This IRB approved study originally consisted of 6 participants. Due to participant availability and interest in differing geographic areas, 2 groups were formed. The first group took place in: Houston, Texas at Red Dun Ranch and the other group met in Tyler, TX at Bent Anchor Ranch. Table 2 below outlines participant demographics.

Table 2. Participant demographics

| Participant | Sex | Age | Race | Military branch | Deployment | Identified trauma |
|-------------|-----|-----|------------------|---------------------|----------------------|-------------------|
| 1 | F | 26 | Caucasian | U. S. Marine Corps | None | Sexual |
| 2 | F | 49 | Caucasian | U. S. Army | None | Sexual |
| 3 | M | 41 | Caucasian | U. S. Air Force | OIF/OEF; Gulf War | Combat |
| 4 | M | 29 | African American | U. S. Army Reserves | OIF/OEF | Combat |
| 5 | M | 66 | Caucasian | U. S. Marine Corps | Vietnam War | Combat |
| 6 | M | 55 | Caucasian | U. S. Marine Corps | None | N/A |

Note. OIF/OEF = Operation Iraqi Freedom/Operation Enduring Freedom

The Houston group consisted of 2 female, Caucasian veterans with no deployment history. Participant 1 was 26 years old and served in the U.S. Marine Corps. Participant 2 was 49 years old and served in the U.S. Army. The Tyler group consisted of 3 (originally 4) male veterans. Participant 3 was a 41-year-old Caucasian who served in the U.S. Air Force. He completed two tours to Iraq in Operation Iraqi

Freedom/Operation Enduring Freedom (OIF/OEF) and one tour in the Gulf War. Participant 4 was a 29-year-old African American who served in the U.S. Army Reserves. He completed one tour in Iraq in OIF/OEF. Participant 5 was a 66-year-old Caucasian who served in the U.S. Marine Corps. He served in the Vietnam War. Finally, Participant 6 was a 55-year-old Caucasian who served in the U.S. Marine Corps. He was not deployed, but served overseas (i.e. Panama, Thailand, Hong Kong) in no combat zones. No disclosure of specific cause or event of trauma was required; however, it was volunteered that the Houston group developed symptoms of PTSD secondary to sexual trauma, while the Tyler group reported symptoms of PTSD secondary to combat. All participants denied any current substance abuse.

Participants were labeled in this study by number with the Houston group consisting of Participants 1 and 2 and the Tyler group consisting of Participants 3, 4, and 5. The Tyler group had a 6th participant; however, he fell ill during the data collection phase and his results were removed from the analysis as he did not complete the treatment. Following the study, Participant 6 was available for an interview regarding his experience of the 4 out of 6 sessions he did attend.

Participants heard about the study from various sources in the community (flyers placed with organizations that specifically support veterans needs, therapist offices that treat military personnel, and word of mouth) and were selected for the study as they met criteria. Qualified candidates for this study were interviewed to verbally confirm their veteran status. They obtained a minimum score of 33 on the Posttraumatic Stress Disorder Checklist – Civilian version (PCL-C) and also met diagnostic criteria for PTSD

as outlined on the DSM-IV TR. Potential participants who were not qualified for the study (3 additional veterans did not successfully join the study for various reasons including time conflict, being physically incapable of being outdoors and standing for extended periods of time, or being too far geographically to attend) were redirected to Veterans Affairs and given a list of referrals in the community for support. All participants were educated on the study, potential benefits/consequences, and signed a consent form and waiver for each ranch.

Procedure

Prior to conducting this study, IRB approval was attained at Texas A&M University, and APA ethical guidelines were complied with in the conduct of this research. The research design for this study is a simple AB design consisting of a baseline, treatment, and follow-up phase. The participant's test battery included the PTSD Checklist Civilian Version (PCL-C; Weather, 1993), The Patient-Reported Outcomes Measurement Information System (PROMIS; National Institute of Mental Health; 2013) Satisfaction with Participation in Social Roles (SPSR), PROMIS Satisfaction with Participation in Discretionary Social Activities (SPDSA), PROMIS Ability to Participate in Social Roles and Activities APSRA), Outcome Questionnaire 45 (OQ-45; Lambert et al., 2004) interpersonal relations subscale, and a visual analogue scale adaptation of the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). To acquire the baseline, participants completed the 10-15 minute test battery once per week beginning 2 weeks prior to treatment and again on the day of their first session prior to beginning EAP, for a total of three baseline data points. Participants

began the intervention process on the third week at their designated location. Prior to each session, participants completed the full test battery (PCL-C, PROMIS SPSR, SPSDSA and APSRA, OQ-45 IR, and VPANAS). Following completion of the session, each participant was re-administered the VPANAS. Participants completed 6 sessions of EAP in a group setting which occurred once per week for a total of 6 weeks of treatment. To acquire follow-up data, participants were asked to complete the final test battery once per week for two weeks immediately following their final session. The participants then mailed-in their follow-up test batteries. All participants completed treatment with knowledge of community resources for additional support following the study. As a supplement to the quantitative data, all participants were contacted via telephone following the completion of the study to acquire additional information on their experience during treatment and to gain additional insight into their perceived benefit or lack thereof.

During the data collection, Participant 2 did not complete one VPANAS post session questionnaire. During this particular administration with the Houston group, the session was rescheduled to accommodate the other participant's lack of attendance. Participant 2 then missed the rescheduled session date and no showed by accident, resulting in the failure to complete the VPANAS post session questionnaire. Participant 5 was unable to attend one session as well due to illness.

The EAP Process. Upon arrival at the ranch, the participants met with the EAGALA certified treatment team. At the Red Dun Ranch location in Houston, Texas, the treatment team consisted of two facilitators. The first facilitator was a female

licensed Clinical Psychologist who is both an EAGALA Mental Health practitioner (MH) and Equine Specialist (ES) due to her extensive knowledge of the Red Dun Ranch herd. The second facilitator was a female, Master's level, licensed professional counselor intern who is an EAGALA certified MH and ES. An additional EAGALA certified ES was present as a substitute for the second facilitator on session 5 when a scheduling conflict arose.

The EAGALA model outlines the need for two individuals in the treatment team (one MH and one ES with at least one team member being EAGALA certified at a minimum); however, additional team members may be included if consistent with the treatment goals. This was the case in the group taking place in Tyler, Texas. This treatment team consisted of a female EAGALA certified ES and a female, Master's level, EAGALA certified MH. An additional male licensed mental health practitioner with military culture expertise and partial completion of EAGALA certification was present due to his extensive experience, but was only able to attend half of the sessions due to limited availability. All three facilitators were present for the first session. A secondary ES (the adult daughter of the ES facilitator) was also present at the ranch for half of the sessions to assist the ES as needed.

The treatment teams were allowed freedom to choose which horses to use for the study and the horses remained consistent for each session. Participants were given the autonomy to choose which horses they wanted to work with each session. The treatment team was also given autonomy in regards to which activities they would develop for the treatment. Each session followed the EAGALA model which consisted of the following

four components: treatment team, ground-focused, solution-oriented approach, and commitment to EAGALA code of ethics. Each session lasted approximately one hour in length.

Instruments

The participant's test battery consists of the PTSD Checklist Civilian version, the PROMIS social health subscales, Outcome Questionnaire 45 Interpersonal Relations subscale, and visual analog PANAS scale. Each of these instruments will be reviewed below including their psychometric properties.

PTSD Checklist Civilian Version (PCL-C; Weather, 1993). The PCL-C is a validated instrument developed by Weathers and colleagues (1993) to assess symptoms of Posttraumatic Stress Disorder. It consists of 17 items utilizing a 5 point Likert-type scale (Not at all to Extremely). The PCL-C takes approximately 5-10 minutes to complete and produces a severity score that ranges from 17-85 (National Center for PTSD, 2010). Increasing scores denote an increase in symptom severity and decreasing scores denote a decrease in symptom severity. This assessment is designed to parallel diagnostic criteria B, C, and D for PTSD as defined by the DSM-IV. Thus, the PCL-C may yield information with greater diagnostic relevance than other measures that are not designed using the DSM-IV criteria. The National Center for PTSD (2010) indicates that a diagnosis by a clinician can be made with the PCL by:

1. Determining whether an individual meets DSM-IV symptom criteria, i.e., at least 1 B item (questions 1-5), 3 C items (questions 6-12), and at least 2 D items

(questions 13-17). Symptoms rated as "Moderately" or above (responses 3 through 5) are counted as present.

2. Determining whether the total severity score exceeds a given cut-off point (see Table 3)

3. Combining methods (1) and (2) to ensure that an individual has sufficient severity as well as the necessary pattern of symptoms required by the DSM.

To measure clinically significant change, the United States Department of Veterans Affairs (2010) recommends interpreting a minimum of a 5 point change on the PCL-C denoting "reliable change" or change not due to chance. A minimum 10 point change denotes "clinically significant change" meaning that the individual's score has gone from a dysfunctional, problematic range, to more akin to the functional population (Jacobson, Follette, & Revenstorf, 1984; Jacobson & Truax, 1991). This is recommended due to previous research by Monson et al. (2008) that suggests a 5-10 point change in scores as clinically reliable and 10-20 point change in scores as clinically significant.

Table 3. Suggested cut-off scores for screening and diagnosis (The National Center for PTSD, 2010)

| Setting | Goal of Assessment | |
|--|--------------------|-----------|
| | Screening | Diagnosis |
| VA PTSD specialty mental health clinic | 48 | 56 |
| VA primary care clinic | 25 | 33 |
| Active duty Iraq/Afghanistan (OIF/OEF) | 25 | 28 |

For the purpose of this study, a participant cut-off score of 33 was required for optimal participant fit and to determine whether DSM-IV criteria had been met by examining PCL item-by-item as previously outlined. As outlined in Table 3 above, a diagnostic cut-off score of 33 is suggested for the VA primary care clinic. This option does not require the severity in scores that the VA PTSD specialty mental health clinic requires, but is also more stringent than the suggested cut-off for active duty OIF/OEF veterans, offering a middle option between the two.

Three variations of this assessment exist although there are very small differences between them: PCL- Military, PCL- Civilian, and PCL- Specific (The National Center for PTSD, 2010). Not all available research on the validity of the PCL differentiates between these versions. According to the National Center for PTSD (2010), the PCL-M (military) asks about symptoms in response to "stressful military experiences." It is often used with active service members and veterans. The PCL-C (civilian) asks about symptoms in relation to "stressful experiences" as opposed to a stressor that is specifically military in nature. The PCL-C is more generalizable as it can be used with any population and allows for greater flexibility in regards to the nature of the trauma. For example, 2 of the veterans in this study experienced sexual trauma. The use of the PCL-C as opposed to the PCL-M allows for measurement of their trauma in addition to the veterans who may have solely experienced trauma from combat. The symptoms endorsed may not be specific to just one event, which can also be helpful when assessing survivors who have symptoms due to multiple events. The PCL-S (specific) asks about symptoms in relation to an identified "stressful experience." The

PCL-S is able to clearly link symptoms to a specified event. While it is optimal to assess traumatic event exposure to ensure that the event meets Criterion A (National Center for PTSD, 2010) as the PCL-S does, this information can be acquired verbally as well.

PCL-C psychometric properties. Ruggiero (2003) reported internal consistency coefficients of .94, .85, .85, and .87 respectively for the PCL-C total, re-experiencing, avoidance, and hyperarousal scores. Evidence for convergent validity was also found in Ruggiero's study, with high correlations (i.e., $r > .75$ at $p < .001$) between PCL total scores and scores from two other highly used measures of PTSD: Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and The *Mississippi Scale for PTSD*, Civilian version (MS-C; Vreven, Gudanowski, King, & King, 1995). Discriminant validity was adequate given a significantly higher correlation between the PCL and MS-C than between the PCL and scores on the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1983). Test-retest correlation coefficients for total scores on the PCL-C were .92 ($p < .001$) for immediate re-testers, .88 ($p < .001$) for participants with 2-week retest intervals.

The PCL-C has been found to be an effective method of detecting whether female veterans may be suffering from PTSD among primary care physicians (Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003). This further supports the appropriateness of the PCL-C version among a wider population, including veterans.

The Patient-Reported Outcomes Measurement Information System (PROMIS) Social Health measures. The PROMIS Social Health measures used for this study include: the Satisfaction with Participation in Social Roles (SPSR),

Satisfaction with Participation in Discretionary Social Activities (SPDSA), Ability to Participate in Social Roles and Activities APSRA). These short forms were developed by the National Institute of Mental Health (NIMH) as a means of establishing a valid self-report assessment from methodically chosen items for clinical research. The SPSR and SPDSA are 7 items long and are designed to be answered using a 5 point Likert-type scale (Not at all to Very much) with raw scores ranging from 7-35. The APSRA is 6 items long and is also designed on a 5 point Likert-type scale (Never to Always) with raw scores ranging from 6-30. All three PROMIS social health measures take approximately 2-3 minutes each to complete. Increasing scores signify an improvement in social functioning and decreasing scores denote a worsening in social functioning. Raw scores are converted to T-scores for interpretation purposes with a mean of 50 and standard deviation of 10.

PROMIS Social Health measures validity. Items were chosen with the use of focus groups (Anatchkova & Bjorner, 2010) and subsequent revisions were made to improve item content and the unidimensionality of constructs (Bode, Hahn, DeVellis, & Cella, 2010; Reeve et al., 2007). Findings from an initial study evaluating the measurement invariance of the PROMIS Satisfaction with Participation in Social Roles supports its use for comparing symptoms and quality of life indicators across different diagnoses and age ranges (Cook, Bamer, Amtmann, Molton, & Jensen, 2012). Further research is needed to accomplish NIMH's goal of creating an empirically supported, valid measure for clinical research. No other published information regarding validity of the PROMIS Social Health measures are currently available.

The Outcome Questionnaire – 45 (OQ-45) interpersonal relations. The OQ45 is a self-report measure intended for repeated assessment use to track client progress throughout the course of treatment (Lambert et al., 2004). This measure consists of three subscales including symptom distress, interpersonal relations, and social role performance. This study used the interpersonal relations subscale that consists of 11 items on a 5 point Likert-type scale (Never to Almost Always) with raw scores ranging from 0-44. It takes approximately 3-5 minutes to complete. Increasing scores denote worsening in interpersonal relations and decreasing scores represent improvement.

The OQ-45 has been found to effectively measure change in a relatively short amount of time, making this a good measure for tracking client progress (Doerfler, Addis, & Moran, 2002; Vermeersch et al., 2004). The OQ-45 interpersonal relations subscale showed a statistically significant, but modest correlation of ($r = .43; p < .001$) with a comparable measure, Eisen's (1996) Behavior and Symptom Identification Scale's relation to self and others subscale (Doerfler et al., 2002). Concurrent validity was assessed using three clinical samples (college counseling center, outpatient, and inpatient). The OQ-45 demonstrated statistically significant ($p < .001$) moderate correlations between participant results on the OQ-45 and the SCL-90R, Inventory of Interpersonal Problems (IIP; Horowitz et al., 1988), and the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976). Statistically significant ($p < .001$) correlations for the OQ45 Interpersonal subscale were found with the comparable subscales of the SCL-90R at .45, IIP at .49, and SAS at .53. In the outpatient setting, statistically significant (p

<.001) correlations were .62 with the SCL-90R, .64 with the IIP, and .62 with the SAS. Finally, in the inpatient setting, statistically significant ($p < .001$) correlations were .68 with the SCL-90R, .57 with the IIP, and .69 with the SAS (Umphress, Lambert, Smart, Barlow, & Clouse, 1997). The OQ45-IR subscale test-retest reliability was .80 ($N = 157$) and the internal consistency coefficient alpha was .74 ($N = 157$) (Lambert et al., 1996).

VPANAS psychometric properties. A visual analogue scale was constructed for this study to assess positive and negative affect. The visual analogue scale consists of 5 positive affect items and 5 negative affect items taken from the Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988). It takes approximately 1 minute to complete. The 10 items were chosen from factor analysis results and were the most strongly loaded items to positive and negative affect domains (Watson, Clark, & Tellegen, 1988). Scores range from a minimum of 0 to a maximum of 10. The original PANAS scale consists of two 10-item mood scales. These scales are shown to have high internal consistency, were largely uncorrelated to one another, and to be stable at appropriate levels over the course of a 2 month time period (Watson et al., 1988). The PANAS score intercorrelations and internal consistency reliabilities were calculated using coefficient alpha and such reliabilities were found to be acceptably high ranging from .86 to .90 for the positive scale and from .84 to .87 for the negative scale. The correlations between the positive and negative scales are invariably low and range from -.12 to -.23 (Watson et al., 1988). Due to the modification of the PANAS for this study, the scale is termed “VPANAS” in this paper avoid confusion or misrepresentation. The VPANAS was anchored with “Not at all” on one end of the spectrum and “Most intense

feeling imaginable” on the other. The scores could range from 0-10 with the highest scores denoting greater intensity (i.e. high score on positive affect scale indicates stronger positive affect, high score on negative affect scale indicates stronger negative affect).

Analytical methods for current study. To determine treatment effects two statistical methods were used, the Improvement Rate Difference (IRD) (Parker, Vannest, & Brown, 2009) and Tau-U (Parker, Vannest, Davis, & Sauber, 2010). The IRD examines non-overlapping data points between phases (Parker et al., 2009). The maximum IRD score is 100% or 1.00. In this case, all intervention phase scores exceed all baseline scores, indicating an improvement with treatment. An IRD of 50% or .50, indicates that half of the scores are overlapping and thus did not improve significantly between phases. When the IRD = .50, there is only chance-level improvement from baseline to treatment phases (Parker et al., 2009). Similarly, the Tau-U calculates improvement between the first and second phase by determining non-overlap or the percentage of data indicating improvement between phases (Parker, et al., 2010; Parker & Vannest, 2009). In addition, the Tau-U produces a “*p*” value and also provides confidence intervals.

Tau-U and IRD scores are limited in their capacity to identify change. Both of these calculations have a maximum result of 1, indicating 100% non-overlap in a given phase. Unfortunately, a set of scores could present with maximum non-overlap of 1 with either a slight change between phases or a large difference between phases. In both instances the statistical methods would yield the same result, 100% non-overlap. Yet, in

spite of this limitation, to Tau-U is one of the better performing analytic methods and IRD was included as a comparison method (Parker, Vannest, & Davis, 2010). Visual analysis was conducted to further assist in determining treatment effects due to the Tau-U and IRD limitations in determining change. Both visual and statistical analysis are recommended as complementary analytic procedures when analyzing single-case data (Barnett, Heinemann, Libin, Houts, Gassaway, Sen-Gupta, Resch, & Brossart, 2012; Brossart, Parker, Olsen, & Mahadevan, 2006). A statistical analysis and visual analysis were completed for each participant. In addition, a Tau-U weighted average was completed for each cohort (Houston and Tyler) as well as for the entire sample.

CHAPTER IV

RESULTS

Participants have been numbered from 1 through 5 with the Houston group consisting of Participants 1 and the Tyler group consisting of Participants 3, 4, and 5. Results are organized by assessment and focus on significant changes between baseline and intervention phases. For each assessment, individual results are described first, followed by results at the cohort level. A table of IRD and Tau-U results are provided for each assessment. A secondary table of mean and standard deviation scores is also provided for each assessment for greater context. A graph is included for each assessment for a visual representation of participant data across phases.

Posttraumatic Checklist – Civilian Version

Only Participant 2 demonstrated both statistically and visually compelling changes in the PCL-C scores (see Table 4 and Figure 1). There was a significant non-overlap of data between baseline and intervention phases (Tau-U = -0.87; $p = 0.05$; IRD = 0.8) and visual analysis suggests there was a reduction in PTSD symptoms with treatment (lower scores indicate fewer symptoms of PTSD). Visual analysis also suggests that Participant 2 maintained improvement by follow-up. Additionally, Participant 2 demonstrated clinically significant reduction (change in score of 10 or more) on the PCL-C with a mean difference of 10.6 between baseline and intervention and a mean difference of 14.5 between baseline and follow-up.

Participant 3's scores demonstrated statistically significant non-overlap between baseline and intervention phases with a 100% non-overlap ($\text{Tau-U} = -1$; $p = 0.03$; $\text{IRD} = 1$); however, visual analysis suggests a slight decrease in symptoms of PTSD so that change appears minimal. No statistically significant non-overlap was found with treatment for Participants 1, 4, and 5. Visual analysis also does not suggest a treatment effect for these participants.

Participant 4's data varied widely ($\text{SD} = 18.1$; see Table 5) during the intervention phase with and a significant drop in scores at follow-up ($\text{Tau-U} = -1$; $p = 0.05$; $\text{IRD} = 1$). Participant 4 demonstrated clinically significant reductions (change in score of 10 or more) on the PCL-C with a mean difference of 36 between baseline and follow-up and a mean difference of 36.8 between intervention and follow-up. It is unknown what may have impacted Participant 4's widely varied scores on the PCL-C during intervention. However, when comparing his response pattern to the other measures, a similar pattern was found on VPANAS, suggesting that on days when he had experienced his worst symptoms of PTSD, he was also feeling particularly negative.

All participants continued to exceed the cut-off score of 33 on the PCL-C following treatment indicating that they continued to experience considerable symptoms of PTSD despite their statistically significant reductions in symptoms for Participants 2 and 3. Even so, Participants 1, 3, and 4 no longer met DSM-IV criteria for PTSD by follow-up. This was determined by endorsement of items (or lack thereof) on the PCL-C, which maps onto specific criterion requirements for PTSD as denoted by the DSM-IV (see Table 6). Veterans varied in which criteria they no longer met by the end of the

study. It is worth noting that while Participant 3 did not meet DSM-IV criteria for PTSD in either of the follow-up PCL-C administrations, there was a lack of consistency in regards to which criterion was no longer met.

When the participants were examined by cohort, statistically significant non-overlap in scores on the PCL-C were found using the Tau-U weighted average, which provides an overall treatment effect that the IRD is unable to calculate. Statistically significant non-overlap was found for both Houston and Tyler cohorts as well as for the entire sample (Houston: $\text{Tau-U} = -0.66$; $p < .01$; Tyler: $\text{Tau-U} = -0.47$; $p = 0.01$; All: $\text{Tau-U} = -0.55$; $p < .01$). These findings suggest that when the participants were examined from a group perspective that there was, on average, an overall decrease in symptoms of PTSD.

Table 4. PCL – C IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|----------------------|------|-------|----------|-------------------|
| Participant 1 | | | | |
| B vs. I | 0.27 | -0.07 | 0.88 | -0.711< >0.577 |
| I vs. P | 0.50 | -0.80 | 0.12 | -1.544< >-0.056 |
| B vs. P | 0.50 | -0.83 | 0.15 | -1.665< >-0.002 |
| Participant 2 | | | | |
| B vs. I | 0.80 | -0.87 | 0.05 | -1.511< >-0.223 |
| I vs. P | 0.00 | -0.50 | 0.33 | -1.244< >0.244 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 3 | | | | |
| B vs. I | 1.00 | -1.00 | 0.03 | -1.679< >-0.321 |
| I vs. P | 0.50 | -0.75 | 0.16 | -1.528< >0.028 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 4 | | | | |
| B vs. I | 0.60 | 0.20 | 0.65 | -0.444< >0.844 |
| I vs. P | 1.00 | -1.00 | 0.05 | -1.744< >-0.256 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 5 | | | | |
| B vs. I | 0.27 | 0.20 | 0.65 | -0.444< >0.844 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544< >0.944 |
| B vs. P | 0.67 | -0.33 | 0.56 | -1.165< >0.498 |
| Cohort | | | | |
| Houston | | -0.66 | 0.00 | -0.9624< >-0.3552 |
| Tyler | | -0.47 | 0.01 | -0.7188< >-0.2183 |
| All | | -0.55 | 0.00 | -0.7383< >-0.352 |

Note. B = baseline; I = intervention; P = post or “follow-up”

Table 5. PCL-C mean and standard deviation by participant

| | M | SD |
|---------------|------|------|
| Participant 1 | | |
| Baseline | 58.7 | 4.0 |
| Intervention | 58.6 | 3.5 |
| Post | 49.0 | 7.1 |
| Participant 2 | | |
| Baseline | 65.0 | 5.3 |
| Intervention | 55.6 | 5.6 |
| Post | 50.5 | 2.1 |
| Participant 3 | | |
| Baseline | 46.0 | 1.7 |
| Intervention | 41.3 | 1.5 |
| Post | 39.5 | 0.7 |
| Participant 4 | | |
| Baseline | 70.0 | 3.5 |
| Intervention | 70.8 | 18.1 |
| Post | 34.0 | 0.0 |
| Participant 5 | | |
| Baseline | 47.7 | 4.9 |
| Intervention | 48.8 | 6.1 |
| Post | 47.5 | 0.7 |

Note. The Mean and SD were calculated for all data points in each phase for every participant.

Table 6. DSM-IV diagnostic criteria as indicated by PCL-C administrations

| | Intrusive Recollection (min 1) | Avoidance/Numbing (min 3) | Hyper-arousal (min 2) |
|---------------|--------------------------------------|------------------------------|--------------------------|
| Participant 1 | | | |
| Baseline 1 | yes/4 | yes/3 | yes/4 |
| Baseline 2 | yes/5 | yes/5 | yes/3 |
| Post 1 | yes/3 | no/1 | yes/5 |
| Post 2 | yes/4 | no/2 | yes/5 |
| Participant 2 | | | |
| Baseline 1 | yes/5 | yes/5 | yes/5 |
| Baseline 2 | yes/4 | yes/7 | yes/5 |
| Post 1 | yes/3 | yes/6 | yes/5 |
| Post 2 | yes/3 | yes/3 | yes/4 |
| Participant 3 | | | |
| Baseline 1 | yes/3 | yes/3 | yes/3 |
| Baseline 2 | yes/3 | yes/3 | yes/3 |
| Post 1 | yes/3 | no/2 | no/1 |
| Post 2 | yes/3 | yes/3 | no/1 |
| Participant 4 | | | |
| Baseline 1 | yes/5 | yes/7 | yes/5 |
| Baseline 2 | yes/5 | yes/7 | yes/5 |
| Post 1 | no/0 | no/0 | no/0 |
| Post 2 | no/0 | no/0 | no/0 |
| Participant 5 | | | |
| Baseline 1 | yes/4 | yes/4 | yes/5 |
| Baseline 2 | yes/4 | yes/4 | yes/3 |
| Post 1 | yes/2 | yes/5 | yes/4 |
| Post 2 | yes/3 | yes/6 | yes/4 |

Note. Criterion minimum of 1 for Intrusive Recollection, 3 for Avoidance/Numbing, and 2 for Hyper-arousal.

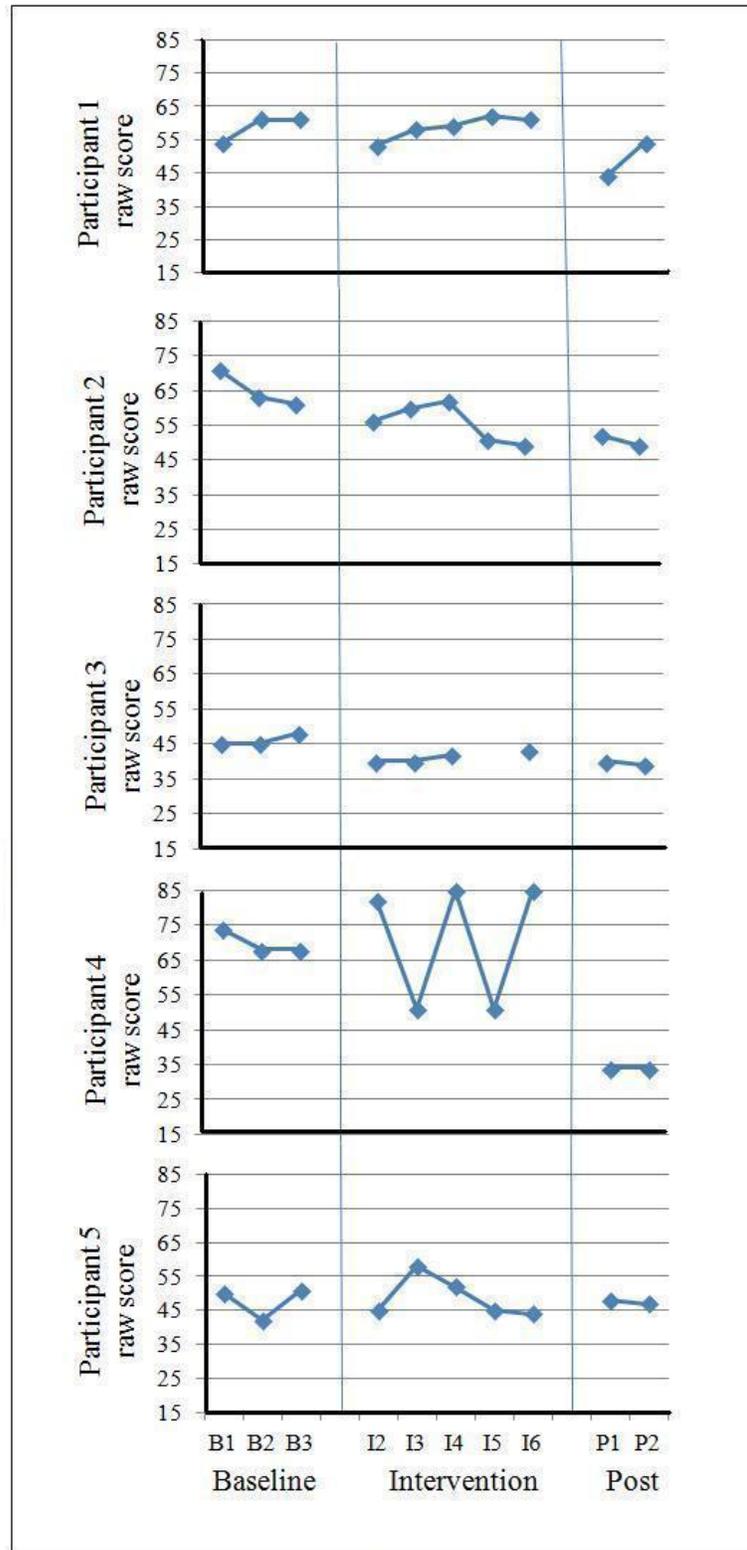


Figure 1. PCL-C participant raw scores

PROMIS Social Health Measures

Results on the PROMIS Social Health measures consisted of the Satisfaction with Participation in Social Roles (SPSR), Satisfaction with Participation in Discretionary Social Activities (SPDSA), and Ability to Participate in Social Roles (APSR). Increasing scores on these measures indicate improvement in social functioning.

Participation in Social Roles (SPSR). Only Participant 2 demonstrated both statistically significant non-overlap and visually compelling changes demonstrating an increasing trend (see Table 7 and Figure 2). There was notable non-overlap on the PROMIS SPSR between baseline and intervention phases ($\text{Tau-U} = 1$; $p = 0.03$; $\text{IRD} = 1$), which indicates an improvement during treatment. Statistically significant non-overlap and was also found between intervention and follow-up phases with a 100% non-overlap ($\text{Tau-U} = 1$; $p = 0.05$; $\text{IRD} = 1$). This was also supported by visual analysis, suggesting continued improvement through follow-up.

Participant 1 showed statistically significant non-overlap on the PROMIS SPSR between baseline and intervention with 93% non-overlap found between the baseline and intervention phases ($\text{Tau-U} = .93$; $p = 0.04$). The IRD produced a similar results ($\text{IRD} = 0.8$). Visual analysis, however, suggests minimal improvement with a slight, increased level change during the intervention phase, which was not maintained during the follow-up phase.

Participant s 3, 4, and 5 did not demonstrate statistically significant change on the PROMIS SPSR between baseline and intervention (P3: $\text{Tau-U} = 0.25$; $p = 0.60$; $\text{IRD} =$

0.5; P4: Tau-U = 0.6; $p = 0.18$; IRD = 0.67; P5: Tau-U = -0.27; $p = 0.55$; IRD = 0.27).

Visual analysis also did not suggest treatment effects. Refer to Table 8 for a summary of mean and standard deviation scores.

When analyzed by cohort, only the Houston group produced statistically significant non-overlap on the SPSR (Tau-U = 0.60; $p < .01$). The Tyler cohort did not demonstrate statistically significant non-overlap on the SPSR (Tau-U = 0.30; $p = 0.08$). When participant data was analyzed as an entire group, statistically significant non-overlap was found (Tau-U = 0.42; $p < .01$), suggesting an overall improvement on the SPSR on average across participants.

Table 7. PROMIS SPSR IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------------|------|-------|----------|-----------------|
| Participant 1 | | | | |
| B vs. I | 0.80 | 0.93 | 0.04 | 0.289< >1.577 |
| I vs. P | 0.50 | -0.90 | 0.08 | -1.644< >-0.156 |
| B vs. P | 0.67 | 0.50 | 0.39 | -0.331< >1.331 |
| Participant 2 | | | | |
| B vs. I | 1.00 | 1.00 | 0.03 | 0.356< >1.644 |
| I vs. P | 1.00 | 1.00 | 0.05 | 0.256< >1.744 |
| B vs. P | 1.00 | 1.00 | 0.08 | 0.169< >1.831 |
| Participant 3 | | | | |
| B vs. I | 0.50 | 0.25 | 0.60 | -0.429< >0.929 |
| I vs. P | 0.00 | 0.25 | 0.64 | -0.528< >1.028 |
| B vs. P | 1.00 | 1.00 | 0.08 | 0.169< >1.831 |
| Participant 4 | | | | |
| B vs. I | 0.67 | 0.60 | 0.18 | -0.044< >1.244 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544< >0.944 |
| B vs. P | 0.67 | 0.67 | 0.25 | -0.165< >1.498 |
| Participant 5 | | | | |
| B vs. I | 0.27 | -0.27 | 0.55 | -0.911< >0.377 |
| I vs. P | 0.00 | 0.30 | 0.56 | -0.444< >1.044 |
| B vs. P | 1.00 | -0.17 | 0.77 | -0.998< >0.665 |
| Cohort | | | | |
| Houston | | 0.60 | 0.00 | 0.2989< >0.9061 |
| Tyler | | 0.30 | 0.08 | 0.0526< >0.5532 |
| All | | 0.42 | 0.00 | 0.2304< >0.6167 |

Note. B = baseline; I = intervention; P = post or “follow-up”

Table 8. PROMIS SPSR mean and standard deviation by participant

| | M | SD |
|---------------|------|-----|
| Participant 1 | | |
| Baseline | 37.2 | 1.9 |
| Intervention | 41.0 | 1.4 |
| Post | 38.7 | 0.6 |
| Participant 2 | | |
| Baseline | 38.2 | 0.9 |
| Intervention | 43.5 | 1.7 |
| Post | 47.3 | 1.4 |
| Participant 3 | | |
| Baseline | 45.3 | 0.0 |
| Intervention | 45.7 | 3.7 |
| Post | 47.3 | 1.4 |
| Participant 4 | | |
| Baseline | 42.0 | 2.1 |
| Intervention | 43.9 | 1.2 |
| Post | 44.4 | 0.0 |
| Participant 5 | | |
| Baseline | 45.4 | 2.5 |
| Intervention | 44.1 | 2.7 |
| Post | 45.4 | 1.3 |

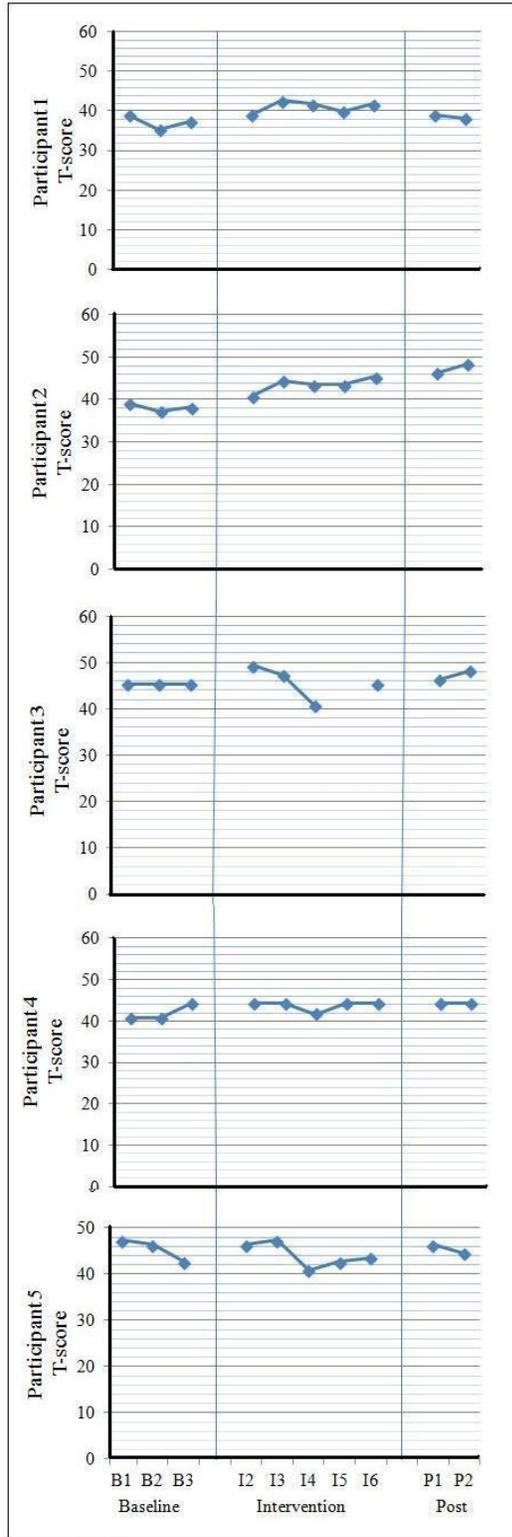


Figure 2. PROMIS SPSR participant T-scores

PROMIS Satisfaction with Participation in Discretionary Social Activities

(SPDSA). Participant 1 and 2 demonstrated statistically significant non-overlap but visual analysis suggested minimal change (see Table 9 and Figure 3). Participant 1 demonstrated statistically significant improvement with treatment with a 93% non-overlap on the PROMIS SPDSA between baseline and intervention phases (Tau-U = 0.93; $p = 0.04$). The IRD produced a similar finding (IRD = 0.8). Visual analysis for Participant 1 suggests a slight improvement during the intervention phase and minimal loss of improvement by follow-up. This is reflected in the mean scores for the phases (M intervention = 45.9; M post = 44.0). Similarly, Participant 2 improved and demonstrated statistically significant non-overlap between baseline and intervention phases with an 87% non-overlap (Tau-U = 0.87; $p = 0.05$). The IRD produced similar results (IRD = 0.8). Visual analysis also supports an increase in scores with treatment and sustained improvement by follow-up when attending to mean phase level (M intervention = 44.4; M post = 43.5).

Participants 3, 4, and 5 from the Tyler cohort did not show any statistically significant non-overlap on the PROMIS SPDSA between baseline and intervention (P3: Tau-U = 0.33; $p = 0.48$; IRD = 0.67; P4: Tau-U = 0.07; $p = 0.88$; IRD = 0.8; P5: Tau-U = 0.07; $p = 0.88$; IRD = 0.27). Visual analysis was also unable to determine a treatment effect. Refer to Table 10 for a summary of mean and standard deviation scores.

When analyzed at the cohort level, only the Houston group demonstrated statistically significant non-overlap on the PROMIS SPDSA as calculated by a Tau-U weighted average of non-overlap in data (Tau-U = 0.45; $p = 0.03$), suggesting an

improvement in their scores with treatment. However, despite the statistically significant finding, the Tau-U demonstrates a weighted average of 45% non-overlap which does not strongly support change. Visual analysis coincides with these findings, suggesting only a slight positive trend for the Houston cohort with the intervention. Results for the Tyler cohort did not demonstrate statistically significant non-overlap on the PROMIS SPDSA (Tau-U = 0.07; $p = 0.68$), suggesting no improvement in their scores with treatment. Similarly, no statistically significant non-overlap on the PROMIS SPDSA was found when data was analyzed as an entire group (Tau-U = 0.22; $p = 0.10$), suggesting no improvement in their scores with treatment. Visual analysis supported this finding, also suggesting a lack of treatment effect.

Table 9. PROMIS SPDSA IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------------|------|-------|----------|-----------------|
| Participant 1 | | | | |
| B vs. I | 0.80 | 0.93 | 0.04 | 0.289<>1.577 |
| I vs. P | 0.80 | -0.70 | 0.18 | -1.444<>0.044 |
| B vs. P | 0.50 | 0.83 | 0.15 | 0.002<>1.665 |
| Participant 2 | | | | |
| B vs. I | 0.80 | 0.87 | 0.05 | 0.223<>1.511 |
| I vs. P | 0.00 | -0.30 | 0.56 | -1.044<>0.444 |
| B vs. P | 1.00 | 1.00 | 0.08 | 0.169<>1.831 |
| Participant 3 | | | | |
| B vs. I | 0.67 | 0.33 | 0.48 | -0.345<>1.012 |
| I vs. P | 0.00 | 0.50 | 0.35 | -0.278<>1.278 |
| B vs. P | 0.67 | 0.33 | 0.56 | -0.498<>1.165 |
| Participant 4 | | | | |
| B vs. I | 0.20 | 0.07 | 0.88 | -0.577<>0.711 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544<>0.944 |
| B vs. P | 0.00 | 0.33 | 0.56 | -0.498<>1.165 |
| Participant 5 | | | | |
| B vs. I | 0.27 | 0.07 | 0.88 | -0.577<>0.711 |
| I vs. P | 0.50 | -0.70 | 0.18 | -1.444<>0.044 |
| B vs. P | 0.50 | -0.50 | 0.39 | -1.331<>0.331 |
| Cohort | | | | |
| Houston | | 0.45 | 0.03 | 0.1422<>0.7493 |
| Tyler | | 0.07 | 0.68 | -0.1788<>0.3218 |
| All | | 0.22 | 0.10 | 0.0291<>0.4153 |

Note. B = baseline; I = intervention; P = post or "follow-up"

Table 10. PROMIS SPDSA mean and standard deviation by participant

| | M | SD |
|----------------------|------|-----|
| Participant 1 | | |
| Baseline | 41.3 | 1.9 |
| Intervention | 45.9 | 1.7 |
| Post | 44.0 | 0.6 |
| Participant 2 | | |
| Baseline | 39.3 | 2.1 |
| Intervention | 44.4 | 2.5 |
| Post | 43.5 | 1.3 |
| Participant 3 | | |
| Baseline | 41.4 | 6.6 |
| Intervention | 44.4 | 3.3 |
| Post | 47.2 | 0.0 |
| Participant 4 | | |
| Baseline | 20.0 | 1.7 |
| Intervention | 19.6 | 3.1 |
| Post | 21.0 | 0.0 |
| Participant 5 | | |
| Baseline | 47.6 | 3.1 |
| Intervention | 46.8 | 1.1 |
| Post | 44.9 | 2.0 |

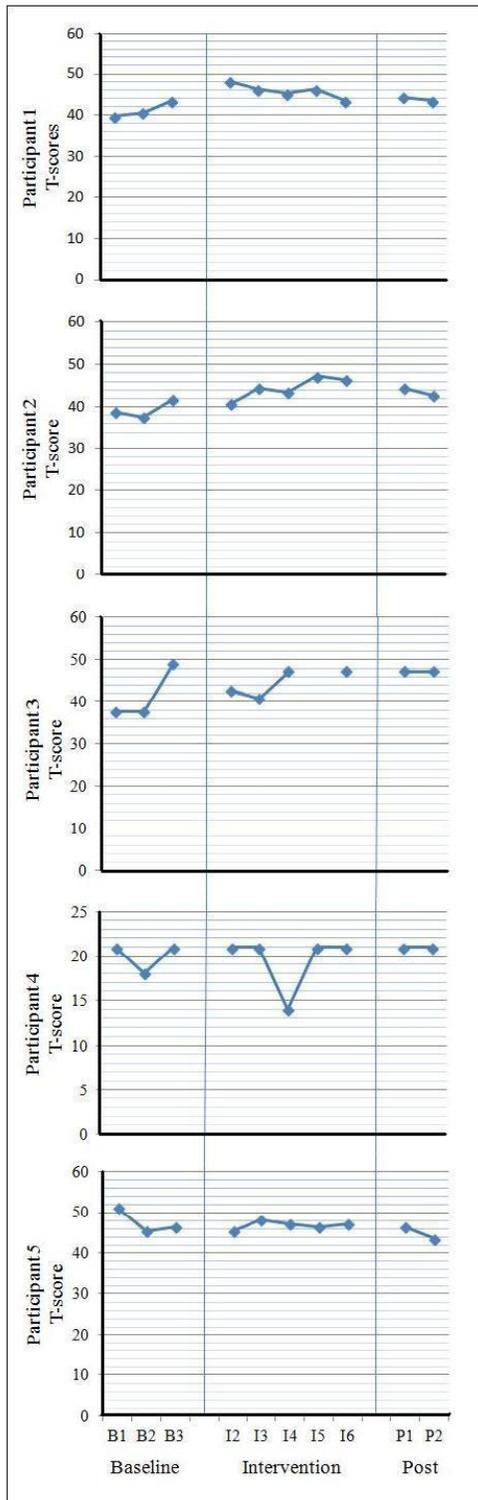


Figure 3. PROMIS SPDSA participant T-scores

PROMIS Ability to Participate in Social Roles (APSR). None of the participants demonstrated statistically significant non-overlap on the PROMIS APSRA between baseline and intervention (P1: Tau-U = -0.27; $p = 0.55$; IRD = 0.6); P2: Tau-U = 0.2; $p = 0.65$; IRD = 0.6; P3: Tau-U = 0; $p = 1$; IRD = 0.25; P4: Tau-U = -0.2; $p = 0.65$; ; IRD = -0.2; P5: Tau-U = -0.27; $p = 0.55$; IRD = -0.27; see Table 11). Visual analysis suggests that Participants 1 and 2 showed very slight improvements with treatments, but change was negligible (see Figure 4). Overall, visual analysis was unable to determine a treatment effect for any of the participants. Refer to Table 12 for a summary of mean and standard deviation scores.

When analyzed at the cohort level, a statistically significant difference was found for the Houston group only on the PROMIS APSRA (Tau-U = 0.42; $p = 0.05$). No statistically significant non-overlap was found for the Tyler cohort (Tau-U = -0.0815; $p = 0.64$) or when analyzed as an entire group (Tau-U = 0.12; $p = 0.37$).

Table 11. PROMIS APSRA IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------------|------|-------|----------|------------------|
| Participant 1 | | | | |
| B vs. I | 0.60 | -0.27 | 0.55 | -0.911< >0.377 |
| I vs. P | 0.50 | 0.80 | 0.12 | 0.056< >1.544 |
| B vs. P | 1.00 | 1.00 | 0.08 | 0.169< >1.831 |
| Participant 2 | | | | |
| B vs. I | 0.60 | 0.20 | 0.65 | -0.444< >0.844 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544< >0.944 |
| B vs. P | 0.50 | 0.83 | 0.15 | 0.002< >1.665 |
| Participant 3 | | | | |
| B vs. I | 0.25 | 0.00 | 1.00 | -0.679< >0.679 |
| I vs. P | 0.00 | 0.00 | 1.00 | -0.778< >0.778 |
| B vs. P | 0.00 | 0.00 | 1.00 | -0.831< >0.831 |
| Participant 4 | | | | |
| B vs. I | 0.20 | -0.20 | 0.65 | -0.844< >0.444 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544< >0.944 |
| B vs. P | 0.00 | 0.00 | 1.00 | -0.831< >0.831 |
| Participant 5 | | | | |
| B vs. I | 0.27 | -0.27 | 0.55 | -0.911< >0.377 |
| I vs. P | 0.00 | -0.10 | 0.85 | -0.844< >0.644 |
| B vs. P | 0.67 | -0.33 | 0.56 | -1.165< >0.498 |
| Cohort | | | | |
| Houston | | 0.42 | 0.05 | 0.1167< >0.7238 |
| Tyler | | -0.08 | 0.64 | -0.3318< >0.1688 |
| All | | 0.12 | 0.37 | -0.0726< >0.3137 |

Note. B = baseline; I = intervention; P = post or “follow-up”

Table 12. PROMIS APSRA mean and standard deviation by participant

| | M | SD |
|---------------|------|-----|
| Participant 1 | | |
| Baseline | 44.7 | 0.8 |
| Intervention | 44.2 | 2.7 |
| Post | 49.4 | 3.5 |
| Participant 2 | | |
| Baseline | 41.6 | 1.3 |
| Intervention | 42.6 | 4.4 |
| Post | 44.9 | 2.8 |
| Participant 3 | | |
| Baseline | 45.6 | 0.0 |
| Intervention | 44.9 | 2.3 |
| Post | 45.6 | 0.0 |
| Participant 4 | | |
| Baseline | 44.2 | 0.0 |
| Intervention | 40.7 | 7.8 |
| Post | 44.2 | 0.0 |
| Participant 5 | | |
| Baseline | 45.1 | 3.3 |
| Intervention | 44.0 | 3.1 |
| Post | 43.6 | 0.9 |

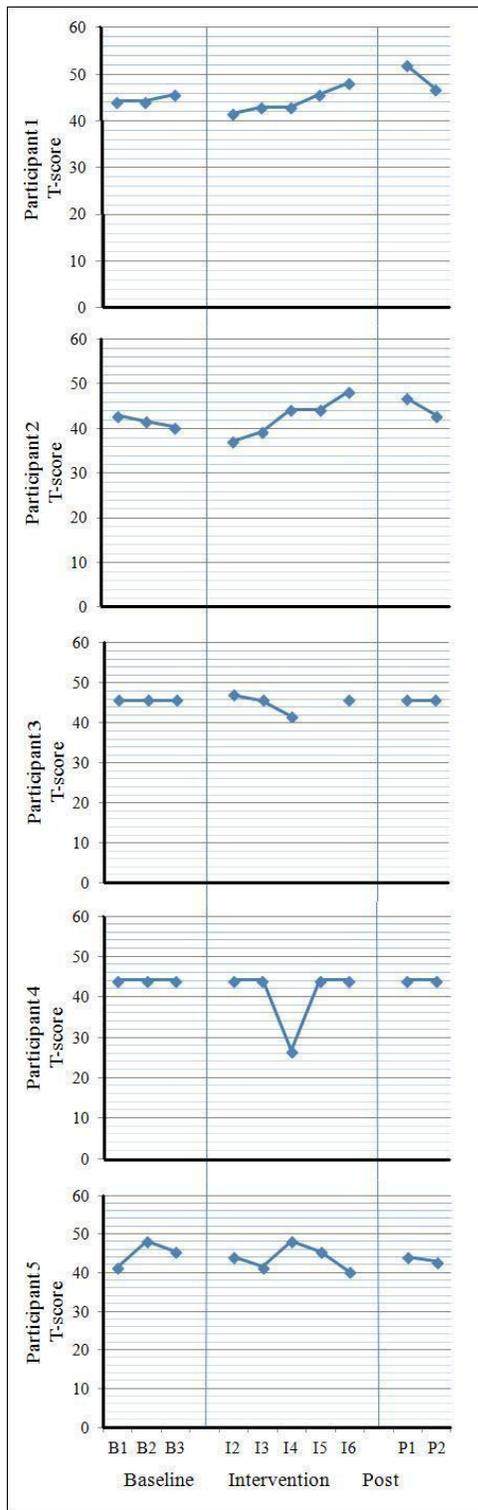


Figure 4. PROMIS APSRA participant T-scores

Outcome Questionnaire 45 – Interpersonal Role Subscale

On the OQ45-IR, increasing scores suggest worsening in interpersonal relation functioning while decreasing scores suggest improvement. An error in the construction of the measure was noted approximately halfway through the study (originally administered on a 4-point Likert scale as opposed to the originally intended 5-point). The measure was corrected to the intended 5-point scale and the data was re-scored to minimize invalidation. Due to differing start times for the group, the Houston group was given the corrected form beginning with the 4th administration and the Tyler group was given the corrected form beginning with the 7th administration. There were 10 administrations in total between baseline, intervention, and follow-up. The measure was originally meant to be scored as follows: Never = 0, Rarely = 1, Sometimes = 2, Frequently = 3, and Almost Always = 4. Unfortunately, the “sometimes” option was left out of the early administrations. The form was corrected and the data was rescored as follows: Never = 0, Rarely = 1, Sometimes = 1, Frequently = 1, and Almost Always = 2. It is unknown how much of an impact this error had on the results.

On an individual level, only Participant 1 of the Houston group showed statistically significant non-overlap on the OQ45 –IR subscale between baseline and intervention phases with an 87% non-overlap (Tau-U = -0.87; $p = 0.05$; see Table 13), suggesting an improvement in interpersonal relationships. The IRD produced similar results to a somewhat lesser extent (IRD = 0.67). Visual analysis also did not strongly support this statistically significant finding, suggesting such a slight level change that a treatment effect appears minimal and it was not sustained in follow-up (see Figure 5).

Results for Participants 2, 3, 4, and 5 did not demonstrate statistically significant non-overlap between baseline and intervention phases on the OQ45-IR (P2: Tau-U = 0.07; $p = 0.88$; IRD = 0.27; P3: Tau-U = -0.83; $p = 0.08$; IRD = 0.67; P4: Tau-U = 0.8; $p = 0.07$; IRD = 0.67; P5: Tau-U = 0.6; $p = 0.18$; IRD = 0.67), suggesting no treatment effect. Participants 2 and 4 demonstrated a statistically significant non-overlap following treatment between intervention and follow-up phases (P2: Tau-U = 1; $p = 0.05$; IRD = 1; P4: Tau-U = 1; $p = 0.05$; IRD = 1). Visual analysis supported this finding with no readily apparent level changes during the treatment phase. Refer to Table 14 for a summary of mean and standard deviation scores.

When analyzed at the cohort level, no statistically significant differences were found for the OQ45- IR subscale for the Houston or Tyler cohort or when analyzed as an entire group (Houston: Tau-U = -0.31; $p = 0.15$; Tyler: Tau-U = -0.22; $p = 0.21$; All: Tau-U = -0.25; $p = 0.06$), suggesting that on average there was no treatment effect.

Table 13. OQ-45-IR IRD and Tau-U results by participant

| | IRD | Tau-U | p | 85% C.I. |
|---------------|------|-------|------|-------------------|
| Participant 1 | | | | |
| B vs. I | 0.67 | -0.87 | 0.05 | -1.511< >-0.223 |
| I vs. P | 0.50 | 0.80 | 0.12 | 0.056< >1.544 |
| B vs. P | 0.00 | 0.17 | 0.77 | -0.665< >0.998 |
| Participant 2 | | | | |
| B vs. I | 0.27 | 0.07 | 0.88 | -0.577< >0.711 |
| I vs. P | 1.00 | -1.00 | 0.05 | -1.744< >-0.256 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 3 | | | | |
| B vs. I | 0.67 | -0.83 | 0.08 | -1.512< >-0.155 |
| I vs. P | 0.00 | -0.25 | 0.64 | -1.028< >0.528 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 4 | | | | |
| B vs. I | 0.67 | 0.80 | 0.07 | 0.156< >1.444 |
| I vs. P | 1.00 | -1.00 | 0.05 | -1.744< >-0.256 |
| B vs. P | 0.50 | -0.33 | 0.56 | -1.165< >0.498 |
| Participant 5 | | | | |
| B vs. I | 0.67 | 0.60 | 0.18 | -0.044< >1.244 |
| I vs. P | 0.50 | -0.40 | 0.44 | -1.144< >0.344 |
| B vs. P | 0.00 | 0.17 | 0.77 | -0.665< >0.998 |
| Cohort | | | | |
| Houston | | -0.31 | 0.15 | -0.6101< >-0.0029 |
| Tyler | | -0.22 | 0.21 | -0.4691< >0.0315 |
| All | | -0.25 | 0.06 | -0.4472< >-0.061 |

Note. B = baseline; I = intervention; P = post or "follow-up"

Table 14. OQ45 – IR mean and standard deviation by participant

| | M | SD |
|---------------|------|-----|
| Participant 1 | | |
| Baseline | 9.7 | 0.6 |
| Intervention | 8.2 | 0.8 |
| Post | 10.0 | 1.4 |
| Participant 2 | | |
| Baseline | 12.7 | 1.2 |
| Intervention | 12.6 | 0.5 |
| Post | 10.0 | 0.0 |
| Participant 3 | | |
| Baseline | 10.7 | 0.6 |
| Intervention | 9.3 | 1.0 |
| Post | 9.0 | 0.0 |
| Participant 4 | | |
| Baseline | 7.7 | 1.2 |
| Intervention | 9.8 | 1.3 |
| Post | 7.0 | 1.4 |
| Participant 5 | | |
| Baseline | 11.0 | 1.7 |
| Intervention | 12.8 | 0.8 |
| Post | 11.5 | 2.1 |

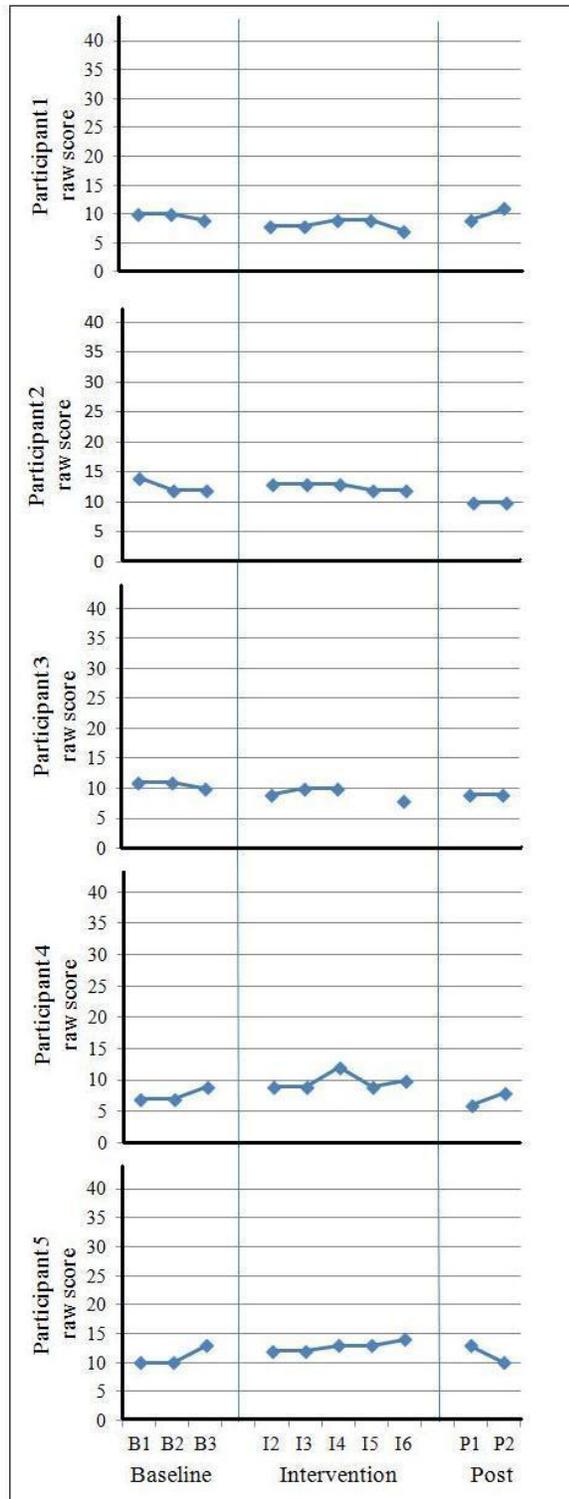


Figure 5. OQ45- IR participant raw scores

Visual Analog Positive and Negative Affect Scale (VPANAS)

The VPANAS data was analyzed twice. This was done to better understand changes in affect that occurred with each session as well as any changes in affect that may have been sustained with treatment. The two analyses of the VPANAS data are detailed below.

Post vs. Pre session analysis. This first analysis examines change in affect during the intervention phase by comparing participant's affect following the session to participant's affect before the session began. Each participant's pre-session affect score was subtracted from the post-session affect score to determine whether or not a difference occurred. A mean average was then taken to establish overall differences.

Table 15. VPANAS pre vs. post session mean comparison

| Participant | Average increase(+)/decrease(-) | |
|-------------|---------------------------------|-----------------|
| | Positive Affect | Negative Affect |
| 1 | 0.87 | -2.57 |
| 2 | 1.80 | -0.77 |
| 3 | 2.04 | -2.32 |
| 4 | 3.06 | -4.28 |
| 5 | 0.96 | 0.67 |

Results suggest that on average, all participants experienced an increase in positive affect following the session compared to the start of the session. As outlined in Table 15, positive affect mean differences ranged from 0.87 to 3.06 on a scale with a minimum of 0 and maximum of 10. In regards to negative affect, all participants but Participant 5, experienced an average decrease in negative affect following the session

compared to before the session began. Negative affect mean differences ranged from 0.67 (positive score indicating an increase in negative affect) to -4.28.

Analysis across phases. The VPANAS data was analyzed a second time comparing all positive affect scores and all negative affect scores between baseline, intervention, and follow-up phases to determine any significant change across phases. Participant's full test battery was completed prior to each session and therefore only pre session data was used to represent the intervention phase on the VPANAS.

No statistically significant non-overlap was found on positive affect for any of the participants (P1: Tau-U = 0.73; $p = 0.10$; IRD = 0.80; P2: Tau-U = 0.33; $p = 0.46$; IRD = 0.67; P3: Tau-U = -0.50; $p = 0.29$; IRD = 0.67; P4: Tau-U = 0.20; $p = 0.65$; IRD = 0.40; P5: Tau-U = -0.33; $p = 0.46$; IRD = 0.40; see Table 16), indicating a lack of treatment effect. Visual analysis supports these findings with varied results demonstrating no readily apparent treatment effects (see Figure 6). Refer to Table 17 for a summary of mean and standard deviation scores.

Similarly, no significant non-overlap was found with regards to negative affect for any of the participants (P1: Tau-U = 0.65; $p = -0.20$; IRD = 0.47; P2: Tau-U = -0.33; $p = 0.46$; IRD = 0.40; P3: Tau-U = 0; $p = 1.00$; IRD = 0.50; P4: Tau-U = 0.33; $p = 0.46$; IRD = 0.47; P5: Tau-U = 0.33; $p = 0.46$; IRD = 0.47; see Table 18), indicating a lack of treatment. Visual analysis supports these findings with varied results demonstrating no readily apparent treatment effects (see Figure 7). Refer to Table 19 for a summary of mean and standard deviation scores.

When analyzed at the cohort level, no statistically significant non-overlaps were found in regards to positive affect for the Houston or Tyler group or when analyzing data as an entire group (VPANAS positive: Houston: Tau-U = 0.32; $p = 0.13$; Tyler: Tau-U = -0.12; $p = 0.47$; All: Tau-U = 0.05; $p = 0.69$), suggesting that no treatment effect was found. Similarly, no statistically significant non-overlaps were found when analyzing negative affect at the cohort level or when analyzing as an entire group (VPANAS negative: Houston: Tau-U = -0.22; $p = 0.31$; Tyler: Tau-U = -0.11; $p = 0.52$; All: Tau-U = -0.15; $p = 0.25$), suggesting that no treatment effect was found.

Table 16. VPANAS positive affect IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------------|------|-------|----------|------------------|
| Participant 1 | | | | |
| B vs. I | 0.80 | 0.73 | 0.10 | 0.089< >1.377 |
| I vs. P | 0.50 | -0.20 | 0.70 | -0.944< >0.544 |
| B vs. P | 0.50 | 0.00 | 1.00 | -0.831< >0.831 |
| Participant 2 | | | | |
| B vs. I | 0.67 | 0.33 | 0.46 | -0.311< >0.977 |
| I vs. P | 0.50 | 0.60 | 0.25 | -0.144< >1.344 |
| B vs. P | 0.67 | 0.33 | 0.56 | -0.498< >1.165 |
| Participant 3 | | | | |
| B vs. I | 0.67 | -0.50 | 0.29 | -1.179< >0.179 |
| I vs. P | 0.75 | 0.50 | 0.35 | -0.278< >1.278 |
| B vs. P | 0.67 | -0.33 | 0.56 | -1.165< >0.498 |
| Participant 4 | | | | |
| B vs. I | 0.40 | 0.20 | 0.65 | -0.444< >0.844 |
| I vs. P | 0.00 | -0.20 | 0.70 | -0.944< >0.544 |
| B vs. P | 0.67 | -0.33 | 0.56 | -1.165< >0.498 |
| Participant 5 | | | | |
| B vs. I | 0.40 | -0.33 | 0.46 | -0.977< >0.311 |
| I vs. P | 0.00 | 0.20 | 0.70 | -0.544< >0.944 |
| B vs. P | 0.67 | -0.33 | 0.56 | -1.165< >0.498 |
| Cohort | | | | |
| Houston | | 0.32 | 0.13 | 0.0129< >0.6200 |
| Tyler | | -0.12 | 0.48 | -0.3739< >0.1267 |
| All | | 0.05 | 0.69 | -0.1395< >0.2467 |

Note. B = baseline; I = intervention; P = post or "follow-up"

Table 17. VPANAS positive affect mean and standard deviation by participant

| | M | SD |
|---------------|-----|-----|
| Participant 1 | | |
| Baseline | 4.6 | 0.7 |
| Intervention | 7.1 | 1.3 |
| Post | 5.7 | 3.2 |
| Participant 2 | | |
| Baseline | 4.0 | 3.8 |
| Intervention | 5.8 | 2.0 |
| Post | 7.2 | 1.2 |
| Participant 3 | | |
| Baseline | 6.2 | 0.7 |
| Intervention | 5.7 | 0.5 |
| Post | 5.8 | 0.1 |
| Participant 4 | | |
| Baseline | 5.5 | 1.4 |
| Intervention | 6.5 | 2.5 |
| Post | 5.1 | 0.1 |
| Participant 5 | | |
| Baseline | 6.5 | 1.0 |
| Intervention | 6.0 | 1.2 |
| Post | 6.6 | 0.1 |

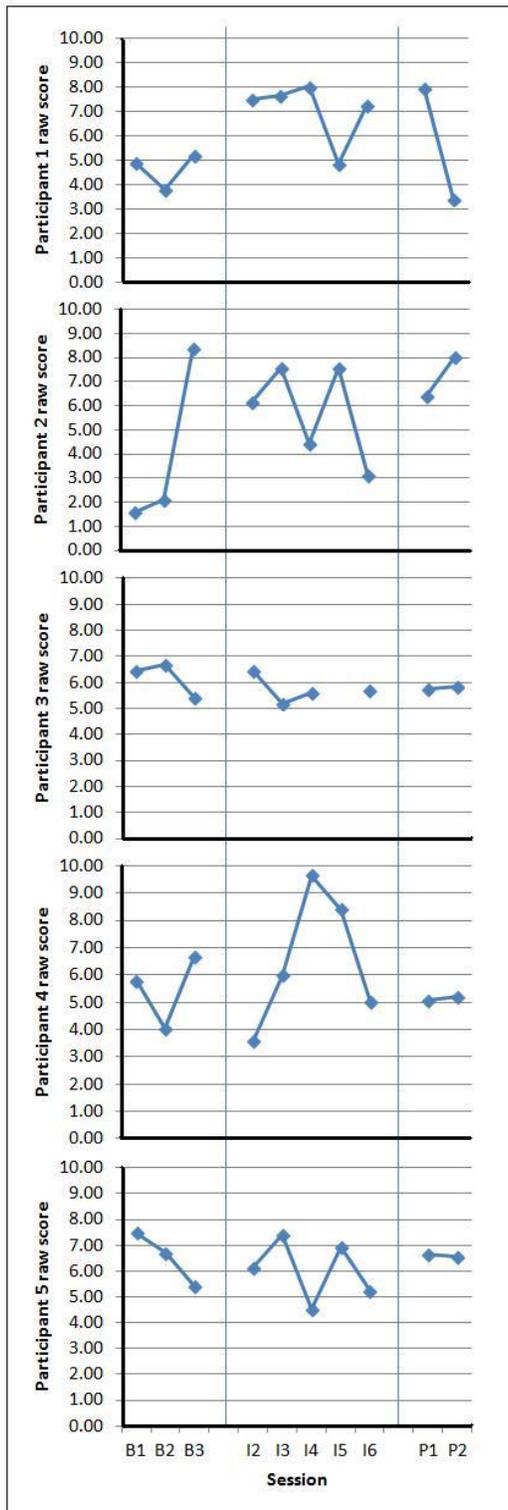


Figure 6. VPANAS positive affect participant raw scores

Table 18. VPANAS negative affect IRD and Tau-U results by participant

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|----------------------|------|-------|----------|------------------|
| Participant 1 | | | | |
| B vs. I | 0.47 | -0.20 | 0.65 | -0.844< >0.444 |
| I vs. P | 0.50 | -0.80 | 0.12 | -1.544< >-0.056 |
| B vs. P | 0.50 | -0.67 | 0.25 | -1.498< >0.165 |
| Participant 2 | | | | |
| B vs. I | 0.40 | -0.33 | 0.46 | -0.977< >0.311 |
| I vs. P | 0.50 | 0.40 | 0.44 | -0.344< >1.144 |
| B vs. P | 0.50 | 0.33 | 0.56 | -0.498< >1.165 |
| Participant 3 | | | | |
| B vs. I | 0.50 | 0.00 | 1.00 | -0.679< >0.679 |
| I vs. P | 0.00 | -0.25 | 0.64 | -1.028< >0.528 |
| B vs. P | 1.00 | -1.00 | 0.08 | -1.831< >-0.169 |
| Participant 4 | | | | |
| B vs. I | 0.47 | 0.33 | 0.46 | -0.311< >0.977 |
| I vs. P | 0.50 | -0.80 | 0.12 | -1.544< >-0.056 |
| B vs. P | 0.50 | -0.83 | 0.15 | -1.665< >-0.002 |
| Participant 5 | | | | |
| B vs. I | 0.47 | 0.33 | 0.46 | -0.311< >0.977 |
| I vs. P | 0.80 | 0.60 | 0.25 | -0.144< >1.344 |
| B vs. P | 0.67 | 0.33 | 0.56 | -0.498< >1.165 |
| Cohort | | | | |
| Houston | | -0.22 | 0.31 | -0.519< >0.0881 |
| Tyler | | -0.11 | 0.52 | -0.3621< >0.1385 |
| All | | -0.15 | 0.25 | -0.3467< >0.0396 |

Note. B = baseline; I = intervention; P = post or "follow-up"

Table 19. VPANAS negative affect mean and standard deviation by participant

| | M | SD |
|---------------|-----|-----|
| Participant 1 | | |
| Baseline | 5.3 | 1.2 |
| Intervention | 5.2 | 1.7 |
| Post | 3.2 | 1.2 |
| Participant 2 | | |
| Baseline | 5.3 | 3.2 |
| Intervention | 3.9 | 2.3 |
| Post | 6.0 | 3.9 |
| Participant 3 | | |
| Baseline | 6.3 | 0.1 |
| Intervention | 6.2 | 1.1 |
| Post | 5.5 | 0.4 |
| Participant 4 | | |
| Baseline | 3.8 | 1.2 |
| Intervention | 4.6 | 1.9 |
| Post | 2.2 | 1.2 |
| Participant 5 | | |
| Baseline | 4.2 | 0.9 |
| Intervention | 5.0 | 1.4 |
| Post | 4.9 | 0.1 |

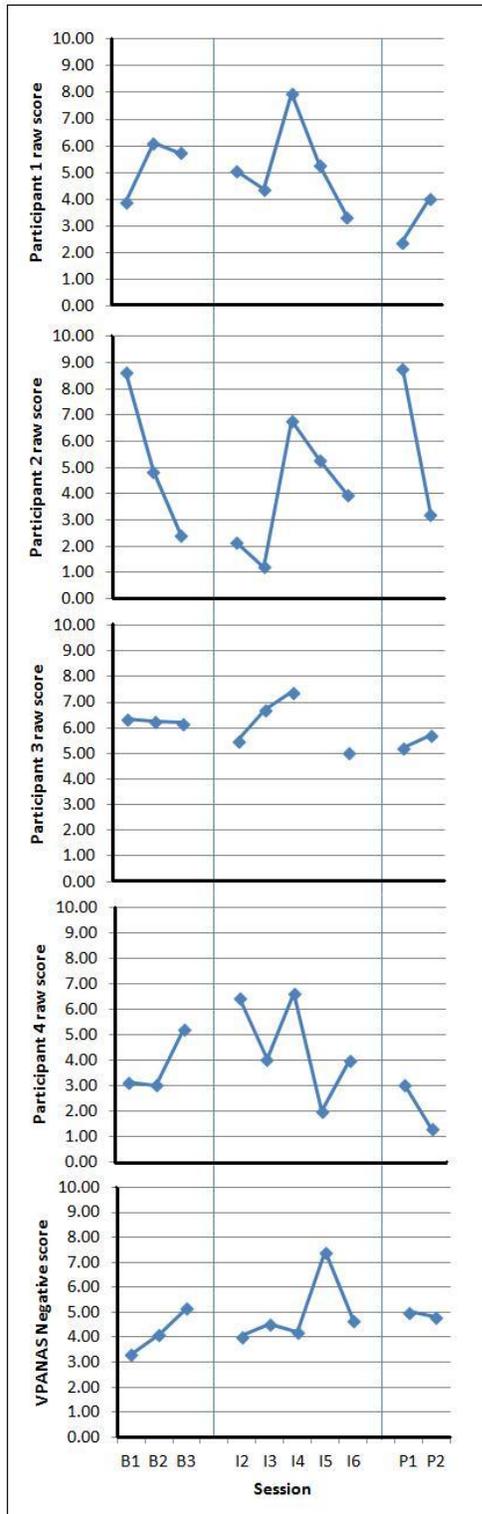


Figure 7. VPANAS negative affect participant raw scores

Supplemental Participant Disclosures

Participants were asked about their experience upon conclusion of EAP treatment for additional context and understanding of the quantitative data. Participant 6 from the Tyler cohort was not included for statistical analysis due to missing data when he fell ill; however, he was interviewed for supplemental information on his experience as he attended 4 out of the 6 sessions. Participants in the Houston group were unavailable for supplemental interviews; however, they did indicate in the final session that they had benefitted from the sessions and were highly interested in learning about potential opportunities to continue treatment out of pocket. No details on the specifics regarding their perceived benefit were attainable due to lack of contact (telephone follow-up attempts were not returned).

All 5 participants disclosed their enthusiasm for the therapy approach and reported benefit from having participated during their follow-up interviews. Several participants' disclosures mimicked the VPANAS results which indicated that participants left each session feeling a significant increase in positive affect and a significant decrease in negative affect. For example, Participant 3 reported that he thought the sessions were "great", "very relaxing", "very calming", and "enjoyed it a lot." More specifically, he disclosed that he entered the sessions feeling hesitant and anxious, but found that afterward, he felt relaxed and calm with a "take on the world" type attitude. Participant 4 reported that before beginning the session, he felt "so-so" from the week, but that following the session, he felt "really, really good." Participant 5 reported that the experience was "exciting, very, very exciting" and shared that he felt

“more down” when he began the sessions and would leave the sessions feeling “more up.” Participant 6’s disclosure also mimicked the VPANAS finding when comparing pre and post session data, sharing that he felt “a little bit tense” before the session, but afterwards, felt more relaxed.

When prompted more specifically about their perceived change following equine therapy, participants reported benefits along a similar theme to being more “relaxed”, but also included additional perceived changes. Participant 3 reported that following his experience with EAP, his most significant change was, “basically finding that I could relax, find some sort of peace... definitely able to find relaxation in the arena and apply it to other areas [of life].” Participant 4 reported that he felt more confident being around the horse and more at ease, causing him to feel as though he could “handle the situation.” He reported that this acquired sense of confidence and ease were transferable to other areas of his life as well. Participant 5 shared that he had grown more content from the sessions. He indicated that he felt a “little bit more self-esteem and positive attitude” compared to when he began. Participant 6 shared that had learned to “take a step back and look at the situation” before reacting and found the activities to be relatable to his life.

Participants were also asked about any prior experience in therapy and how their experiences with more traditional approaches have compared to EAP. Participant 3 reported that he had participated in a PTSD program that consisted of cognitive behavioral therapy. He reported that he was re-enrolled in cognitive behavioral therapy for individual treatment. He shared that he preferred the more “hands on” approach of

EAP, elaborating that traditional talk therapy is more about thoughts and emotions while EAP is “playing it out in real life.” He described the difference between CBT and EAP as being “2D” versus “3D.” Participant 4 shared that he had participated in cognitive behavioral therapy for 12 weeks the previous year. He reported that the CBT approach consisted of “writing things down” and reviewing his triggers. He found that EAP set-up “road blocks” that assisted him to learn how to go about working with obstacles in his life. He reported that ideally, he would like to do both CBT and EAP as he found them to go “hand in hand.” Participant 6 shared that he had done talk therapy approximately 4-5 years ago for 6 months. He reported that he did not benefit from this traditional approach, but felt he did benefit from EAP as he learned more from the process and was able to concretely identify change.

Participants were asked about any feedback they would like to give regarding their experience with EAP and were asked to reflect on any changes they would want to make to the sessions based on their experience. All participants reported that they would not want anything to change. Participant 4 did indicate, however, that he enjoyed the therapy so much that he did wish it were longer.

Participants were asked to share whether or not there was a specific horse they preferred working with. Responses varied with no veterans disclosing preference on a single horse. Some veterans disclosed that they enjoyed all of them, while others would specifically recall two. It appeared that while they did not develop significant attachment to any one given horse, their experience working with the horses was enjoyable and beneficial.

CHAPTER V

DISCUSSION

Prior to discussing the findings of this study, a design-analysis is presented to examine the structure of the study to assess the validity of asserting a functional relationship between the treatment and the outcome. Single-case designs (SCD) are unfamiliar to many so the design-analysis addresses the major threats to validity in a step by step manner. Without an appropriate design analysis, it may become difficult to discern the strength of a given study or how to properly interpret its results. It could be harmful if a study is interpreted as reliable or valid when it fails to meet an adequate design standard. It can also be disadvantageous if a study is prematurely judged as scientifically unworthy when it may actually contribute to existing literature or help provide insight into areas for future research. Therefore, a critical review of design strength and validity is best scientific practice and helps ensure the best use of study results.

Design-Analysis of Present Study

Specific criteria have been developed by researchers in an effort to assess study design quality in a systematic way and ascertain a clear understanding of validity and interpretation of results. For example, the CONSolidated Standards of reporting Trials (CONSORT) statement was developed to assess Random Clinical Trials (RCTs). Similarly, the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement was developed by the Center for Disease Control and Prevention to

establish a clear understanding of the results of quasi-experimental designs and enable comparisons between one study and the next. In the same spirit, the What Works Clearinghouse (WWC) developed criteria to assess internal validity and design quality of SCD research. For purposes of best practice, WWC's SCD evaluation outline by Kratochwill et al. (2010) was used to determine threats to internal validity and to assess the strength of this study's SCD. This will aid in the evaluation of the results and the extent to which change reported by veterans was a result of the EAP treatment.

Evaluation of threats to internal validity. The WWC criterion includes nine major threats to validity. The current study will be evaluated on these nine threats to validity. They are reviewed below.

Ambiguous temporal precedence. This threat to internal validity is defined as a "lack of clarity about which variable occurred first may yield confusion about which variable is the cause and which is the effect" (Kratochwill et al., 2010, p. 7). This study's independent variable (equine therapy intervention) was manipulated by the researcher in that the intervention took place following a 3-week baseline. This sequence increased the likelihood that changes in the dependent variable were a result of the treatment. Therefore, an ambiguous temporal precedence threat is unlikely.

Selection. Selection threat is defined as "systematic differences between/among conditions in participant characteristics [that] could cause the observed effect" (Kratochwill et al., 2010, p. 8). This study consists of two groups (an all female Houston group consisting of 2 participants and an all male Tyler group consisting of 3, originally 4, participants). Participants were not selected and assigned to each group, but rather,

were formed due to interest in participating and the participant's geographical location. The Houston group members responded to flyers and did not know one another prior to the study. The Tyler group by contrast was somewhat of a pre-existing group. They knew one another prior to the study, were in regular contact with one another, and did not initiate contact to participate in the study. This group of veterans was approached and educated on the study and then indicated interest in the study. Thus, a selection threat is more likely to be present with the Tyler group, but may have affected both groups. In regards to differences between the groups regarding gender (by chance, the Houston group consisted solely of women and the Tyler group consisted solely of men), how and in what way this impacted the results is not known and remains an area for future study. The WWC guidelines (Kratochwill et al., 2010) indicate that this type of differential selection can be problematic because differences between the groups may exist before the study begins. Thus, selection may be a problem. At its worst, the 2 groups in this study will have differed from the start and impact the outcomes as a result. This becomes more problematic when examining differences in scores between one group and the other. It becomes difficult to determine why these differences occurred and what that would mean. When examining the scores of both groups, variability is seen among the participants. If a selection threat is in fact present in this study, it does not appear to have a uniform effect across participants. This variability would suggest that if selection threat is present, it may be playing a small role. Even so, replication is the only way to know if selection had a negative influence on these results.

History. A history threat to internal validity occurs when an event outside of the intervention could be the cause of an observable change (Kratochwill et al., 2010). Establishing whether a history threat affected the study is difficult to determine in a simple AB design because according to the WWC guidelines by Kratochwill et al. (2010), “one need find only a single plausible alternative event about the same time as treatment” (p.9). In this study, history may be assessed by examining a period of overlap where treatment began for one group, but not the other. If a change is seen for both groups at the same time when one group is in the intervention phase and the other is not (baseline or withdrawal), this may indicate a history effect. In the current study, the first group began the treatment phase 4 weeks prior to the second group, allowing for a treatment phase overlap of 2 weeks. Visually, the data in this study does not suggest a history effect; however, with only two groups with differing start times, establishing whether a history effect has occurred is more challenging. Only the first group may be ruled out when comparing to the second group. This leaves the latter group open to a possible history effect with no other group to compare it to. This suggests that a history effect is unlikely to have occurred but it cannot be said that one did not happen absolutely. In addition, participants were asked during their follow-up interview about any other events that may have occurred during the treatment that may have affected their outcome, all participants indicated that they were not aware of anything. While this cannot rule-out the possibility of a history effect, no potential history threats were clearly identified by the participants or the researcher. Therefore, the likelihood that this threat to validity impacted the results in a notable way appears small.

Maturation. A maturation effect can occur in a given study when a natural, developmental change occurs (such as the cognitive or emotional growth in a child) which may then be mistaken as a treatment effect (Kratochwill et al., 2010). This threat is highly unlikely because this sample consists of adults within a limited time frame. The time span of this study is too brief for development to be measured.

Statistical regression. A statistical regression threat (also known as a regression toward the mean) is a potential consequence that occurs when using a statistical regression. According to Kratochwill et al., a statistical regression may result in “a psychometric occurrence that can be confused with an intervention effect” (Kratochwill et al., 2010, p. 9). This threat to internal validity is not applicable to this study because a regression analysis was not conducted. Regression toward the mean is an artifact of the statistical regression procedure (Campbell & Kenny, 1999). Since regression analysis was not used this particular threat is not relevant for this study.

Attrition. An attrition threat may occur when participants drop out of a study. The effects of participant attrition may impact the results if the loss impacts the study’s conditions (Kratochwill et al., 2010). For example, in a group therapy setting, attrition may impact the dynamics and should the other participants interpret the dropout to be due to lack of interest or perceived benefit, it may affect the experience of the remaining participants. Participant 6 was the only individual not included in the data analyses due to falling ill and missing final sessions 5 and 6. Follow-up data was also not completed; however, the participant shared positive feedback during the follow-up interview, indicating that he had a positive experience during the sessions. Although Participant 6

was not included in the formal data analysis, the limited data was analyzed and can be found in Appendix A and illustrated in Tables 20-34 and Figures 8-14. The missing attendance of this participant may have had an impact on the group; however, the extent and nature of any impact on the group is difficult to determine. If attrition impacted the study, it would probably have some sort of negative impact on the outcomes reported by the other participants. From the follow-up interviews with the participants, it was reported from Participant 6 that although he was absent for the final sessions of treatment due to illness, he perceived his experience with EAP as positive. It was also clear from the other participant disclosures that they were aware that Participant 6 was absent due to illness. While these reports don't fully rule out the effects of attrition, it would appear that the loss of one participant part way through treatment did not negatively impact the other group members. Thus, while attrition did occur in this study, it appears to have not have been overly detrimental on data collection and on those who completed treatment.

Testing. A testing threat may occur when a participant's results show an improvement in scores that was not due to an actual treatment effect, but repeat exposure to the same test. For example, if a student is given the same test to assess their cognitive abilities, the student may improve on the test due to multiple attempts and memory recall rather than a true improvement in cognitive abilities. The assessments were given to assess the participants' current state of functioning, not their performance on a given task. This minimizes testing as a potential threat to internal validity. Additionally, due to the possibility that participants may become accustomed to the items and answer items

too quickly without giving them much thought, all participants were encouraged to take their time in their responses each session. Thus, testing is an unlikely threat to internal validity.

Instrumentation. An instrumentation effect is said to occur when the conditions or manner in which a measure is given changes and could be misinterpreted as a treatment effect (Kratochwill et al., 2010). All measures were administered in a consistent manner (prior to session at the same time, in the same order, and handled solely by the researcher). In addition, the measures were self-report questionnaires, not observational ratings, so administration and scoring of batteries was the same throughout the study. As a result, it is unlikely that a threat to instrumentation or measurement occurred.

Additive and Interactive Effects of Threats to Internal Validity. This threat occurs when one threat to validity impacts another threat by adding to it and compounding the problem or by impacting another threat to internal validity in a significant way. The previously discussed threats to internal validity were largely ruled out or deemed unlikely in this study. This decreases the chance of interactive or additive effects to internal validity in this study, making it unlikely that this threat occurred.

Evaluation of SCD strength. With the nine threats to internal validity seeming unlikely or minimal, the next task lies in examining the strength of the single case study design to determine whether a treatment effect can be assumed to have occurred. Continuing with the above, this examination was conducted using the WWC criteria for designs that meet evidence standards.

First, according to the WWC's criteria by Kratochwill et al. (2010): "the independent variable (i.e., the intervention) must be systematically manipulated, with the researcher determining when and how the independent variable conditions change." (p. 14) In this study, the intervention was the EAP treatment which was directly manipulated by the researcher (time of implementation was decided as well as the conditions). Thus, this study meets this evidence standard.

Second, Kratochwill et al. (2010) indicates that: "each outcome variable must be measured systematically over time by more than one assessor, and the study needs to collect inter-assessor agreement in each phase and on at least twenty percent of the data points in each condition (e.g. baseline, intervention) and the inter-assessor agreement must meet minimal thresholds." (p. 15) This criteria requirement does not appear to be applicable to this study. Unlike an observational study in which ratings may differ from one assessor to the next, this study consists of self-report measures that aim to capture the participant's own perspective of their experience. This makes inter-assessor agreement unnecessary for this study.

Third, Kratochwill et al. (2010) states that: "the study must include at least three attempts to demonstrate an intervention effect at three different points in time or with three different phase repetitions" (p. 15). This study uses an AB design with 5 participants, totaling 5 different points in time where an intervention effect could occur. In addition, participants were in separate locations resulting in 2 different groups with the Tyler cohort beginning treatment 3 weeks before the Houston cohort. At its most literal interpretation, evidence standards are not met because AB designs are excluded

from meeting criteria and this study does not meet the requirements for a multiple baseline design. Multiple baseline designs must have a minimum of 3 baseline attempts at differing start times to meet criteria. This study has 5 phase changes across the participants and the 2 cohorts began at separate times, making the spirit of multiple baseline design present and worth taking into consideration. This adds to the strength of the design and likelihood that any treatment effects in the data are representative of the participant's experience.

Finally, the WWC criteria by Kratochwill et al. (2010) states that:

To Meet Standards a multiple baseline design must have a minimum of six phases with at least 5 data points per phase. To Meet Standards with Reservations a multiple baseline design must have a minimum of six phases with at least 3 data points per phase. Any phases based on fewer than three data points cannot be used to demonstrate existence or lack of an effect. (p. 16)

This study does not qualify to Meet Standards or Meet Standards with Reservations because of having only 5 treatment phases, not 6. However, Kratochwill et al. (2010) indicates that for a phase to qualify as an "attempt" (p. 15) to demonstrate an effect, the phase must have a minimum of 3 data points. All phases of this study contain at least 3 data points, qualifying as an attempt to demonstrate an effect which this study does. This study provides 5 phases in total across participants with 6 data points during intervention, but the baseline phase consisted of only 3 data points. The test battery was administered once per week with 3 administrations prior to treatment. The shorter baseline length was decided out of sensitivity to the participant's needs for treatment

within an appropriate length of time. As a result, this study meets the criteria to demonstrate an attempt to measure an effect, but cannot rule out a threat to validity of the findings with no reservations.

Following the design-analysis, this study's internal validity does not seem to be significantly compromised. Of the 9 threats to internal validity, attrition and selection were present and may have impacted the study. Additionally, the WWC guidelines indicate that because this study is an AB design that does not meet the exact characteristics of a multiple baseline design (due to having 5 phases as opposed to the minimum of 6 and only 2 differing group start times), this makes any definitive interpretation impossible when interpreted most conservatively. This is not to say that the findings are not of worth. This study provides additional support to the literature that EAP may be of benefit to veterans with symptoms of PTSD. This study's outcomes would suggest that further, more extensive studies would be worth pursuing. Additional studies would benefit from a multiple baseline design with 5 groups of participants experiencing the start of the intervention at differing points in time. Ideally, each phase would consist of 5 data points or more. Further discussion of limitations and suggestions for further research will be discussed more extensively later in this chapter.

In sum, the analysis of internal validity does not suggest any significant signs of compromise, but it is worth being mindful of the potential impact caused by selection and attrition threats. Additionally, while this study does not appear to meet WWC guidelines in the strictest sense, this study's use of 5 participants versus the 6 needed to meet criteria as well as the spirit of a multiple baseline approach due to having the 2

differing group start times, offers support for viewing the findings as having scientific worth and being useful in guiding future research.

Summary of Findings

The results of the PCL-C show that participation in EAP resulted in a reduction in symptoms of PTSD in veterans with 4 out of 5 participants experiencing some evidence of change. More specifically, the findings indicate that 2 veterans (Participants 2 and 3) experienced statistically significant reductions in symptoms with treatment. Only Participant 2 produced a visually compelling graph that supported the statistically significant non-overlap between baseline and treatment. This means that only Participant 2 demonstrated both a statistically significant change as well as a change that was notable with visual analysis. The congruence of statistical results and visual analysis increases our confidence that a significant change occurred. It also appeared that 3 veterans (Participants 1, 3, and 4) no longer met DSM-IV criteria for PTSD by the follow-up phase. When analyzed by cohort, statistically significant non-overlap in scores on the PCL-C was found using the Tau-U weighted average for both Houston and Tyler cohorts as well as for the entire sample (Houston: Tau-U = -0.66; $p < .01$; Tyler: Tau-U = -0.47; $p = 0.01$; All: Tau-U = -0.55; $p < .01$), which suggests that on average there was statistically significant improvement in symptoms of PTSD in each group and on average across the entire sample.

All participants continued to exceed the cut-off score of 33 on the PCL-C, suggesting that following the 6 sessions of EAP, participants continued to experience substantial symptoms of PTSD despite notable decreases with treatment. In sum, it

appears that 4 out of 5 participants or 80% experienced reductions in their symptoms of PTSD with 2 out of 5 or 40% demonstrating statistically significant reductions in symptoms and 3 out of 5 or 60% no longer meeting diagnostic criteria by follow-up. These findings offer support for EAP as a potentially effective form of treatment. Not only does the statistical analysis suggest change, but it was notable that the majority of the veterans no longer met diagnostic criteria for PTSD by the conclusion of this study. Additional evidence is needed to gain greater insight in to the potential effectiveness of EAP to treat veterans with PTSD, but these results offer support for continued research.

Results on change in social functioning as measured by the SPSR and SPDSA PROMIS social health measures indicated that the two Houston participants experienced a statistically significant improvement. This was confirmed with visual analysis, although the declining trend in Participant 2's SPDSA scores in the intervention phase was concerning because it suggests that the treatment benefits may have been deteriorating after treatment ended. In terms of baseline to intervention phase comparisons, the results suggest that they experienced an increased satisfaction in their ability to perform tasks of daily living and engage in social activities such as interacting with friends or participating in leisurely activities with treatment. No statistically significant improvements were found on the PROMIS APSRA measure for any of the participants when analyzed at the individual level suggesting that participants did not experience any change in their perceived ability to participate in social activities. The Tyler cohort did not produce any indications of significant change on the PROMIS social health measures at a statistical, visual, or clinically meaningful level. When

analyzed at the cohort level, there was statistically significant improvement in social functioning only for the Houston cohort (SPSR: Tau-U = 0.60; $p < .01$; SPDSA: Tau-U = 0.45; $p = 0.03$; APSRA: Tau-U = 0.42; $p = 0.05$). In sum, with only 2 of the 5 participants experiencing statistically significant change on 2 of the 3 social measures and keeping in mind the significant limitations of this study, these results do not provide much support for the effectiveness of EAP on social functioning difficulties.

It is unknown what factors influenced change on the PROMIS social health measures for the Houston group only; however, it is worth noting that the Houston participants met during the study and began socializing outside of the sessions while the Tyler group was somewhat of a pre-existing group that engaged with one another prior to the study. The extent to which the additional social interactions outside of the study may have impacted their results is unknown. It is also worth reiterating that the cohorts differed in gender with the Houston group consisting of women and the Tyler group consisting of men. Further research is needed to rule out extraneous variables which may have affected these findings and to determine potential gender differences in treatment response.

Following a review of the available literature, it was hypothesized that EAP may have an impact on social functioning difficulties. The current results suggest the improvements were modest and limited to only the two participants in the Houston cohort. These mixed results do not support previous findings that show an improvement in social functioning due to EAP. The current results cannot clearly suggest whether or not EAP is an effective form of treatment that improves social functioning.

The slight level changes suggesting small improvement on the Houston cohort's PROMIS social health measures may be better recognized in a study with longer baseline and treatment phases. This would increase power to detect smaller results. Such a study could lead to a greater understanding of the role of social variables in treating PTSD. Additionally, it may be beneficial to further explore alternative measures to gather data on social functioning. The PROMIS scales are a new development by the National Institutes of Health and while promising, extensive research on its validity has yet to be completed. Further research is recommended as veteran's support systems serve as a protective factor in the development of PTSD and social functioning often becomes an issue with those who develop the disorder (Friedman, 2006; Laffaye, Cavella, Drescher, & Rosen, 2008). Considering the importance of social systems and the role social functioning plays in veterans with PTSD, as well as the available literature on EAP that suggests a benefit in interpersonal functioning, further research is recommended. Especially research to determine the impact of EAP in addressing social functioning difficulties.

Based on the current literature, it was also hypothesized that EAP may impact interpersonal difficulties; however because of the administration error of the OQ45-IR, the findings were not interpretable with confidence. Data was analyzed as a means of gathering some insight into a potential impact with limitations in mind, and it appeared that only Participant 1 demonstrated statistically significant change with treatment and it was not sustained during follow-up. Furthermore, visual analysis was unable to support

this finding. Ultimately, however, interpersonal relations were not adequately assessed despite the initial intent of the study.

Results on the first VPANAS analysis found that all participants experienced an average increase in positive mood following the each session compared to before the session began. Similarly, 4 out of 5 participants experienced a decrease in negative mood on average following each session compared to before each session began. In other words, participants would leave each session feeling more positive and less negative than they had when they arrived. Disclosures on behalf of available participants further suggest that they were aware of the mood change as they could openly recognize a shift in feeling more positive and less negative when leaving each session. Initially, it was hypothesized that participants would experience a change in positive and negative affect with EAP treatment. While the findings suggest that participants experienced an increase in positive affect and decrease in negative affect when comparing affect following each session, no significant improvement in affect was seen in response to treatment in a lasting way.

Although these results are based on a small pilot study and are thus not generalizable to the greater veteran population with PTSD. It is worth exploring how these results may compare to other, empirically validated treatment approaches for treating veterans with PTSD. Research indicates that of veterans with PTSD, 41% no longer met DSM-IV criteria with Cognitive Behavioral Therapy (CBT) (Schnurr et al., 2007) and 40% no longer met criteria with 50% experiencing reliable change (change not due to chance) with Cognitive Processing Therapy (CPT) (Monson et al., 2006).

Additional research using a multidimensional meta-analysis examining treatment outcomes of PTSD consisting mostly of CBT, EMDR, and exposure based treatment found that 67% of participants no longer met criteria for PTSD post-treatment and 54% experienced clinically meaningful improvement by the end of the study (Bradley et al., 2005). While additional research is needed on the effectiveness of EAP with the veteran population, the comparable rates of participant symptom reduction of PTSD compared to other highly utilized, empirically supported therapeutic approaches offers a promising start.

Limitations. This study has several limitations. First, the size of the sample was small, making these findings non-generalizable to the veteran population with PTSD. Second, this study was largely based on convenience due to limited resources and dependence on volunteers. For example, the facilitators of each group were volunteering their time outside of their own clinical practice and this resulted in a need for increased flexibility in regards to who would be present to facilitate each session. This required a larger pool of facilitators to allow for schedule flexibility. Ideally, a completely consistent treatment team would be used to help increase the controlled aspects of this study and reduce any confounding variables. Similarly, the Tyler participants, consisting of the male participants, were more akin to a convenience group in that the participants knew one another prior to the intervention, engaged with one another regularly outside of the study, and some shared the same housing. In essence, they were a pre-existing group that were educated on the study and decided to participate together.

Another limitation of this study was the length of treatment. Sessions were limited in number partly due to this study's dependence on volunteers and limited funding. Although the results of this study demonstrate that a significant improvement in symptoms of PTSD can be seen in as few as 6 sessions, it is unknown if this is an adequate length of time to obtain maximum benefit. Without additional sessions, this study is limited in its ability to assess the effectiveness of EAP. For comparison, the U. S. Department of Veterans Affairs (2010) indicates in their Clinical Practice Guidelines to treat PTSD that exposure therapies last approximately 8-15 sessions depending on the treatment protocol. This demonstrates that exposure therapy can last more than twice as long as the number of sessions in this study to produce sufficient change. Additional research on the length of EAP therapy would be important to determine if more sessions would improve outcomes. This would allow a more direct comparison to more widely used, empirically supported approaches to treat PTSD.

Lastly, it was noted approximately midway through administration of the OQ-45 Interpersonal Relations subscale that the form had been reproduced on a 4-point Likert scale as opposed to the originally intended 5-point Likert scale as designed by the developers. Thus, the results regarding interpersonal relations should be interpreted with caution. All other measures were administered as intended with no missing item responses on completed questionnaires.

Clinical Implications

Results from this preliminary small sample study do not allow for generalizability with the veteran population with PTSD; however, clinical implications

may be tentatively drawn. This study demonstrated some statistically significant findings that suggest EAP may be effective in reducing symptoms of PTSD. From a clinical perspective, a minimum of a 5 point change on the PCL-C suggests “reliable change” or change not due to chance. A minimum 10 point change suggests “clinically significant change” meaning that the individual’s score has gone from a dysfunctional, problematic range, to one more akin to the functional population (Jacobson, Follette, & Revenstorf, 1984). To be clear, for change to be deemed clinically significant, this does not mean that an individual needs to be functioning at a normal level by the end of treatment. In the case of the PCL-C, a 10 point change demonstrates a clinically notable shift toward the level of a fully functioning individual. Clinically reliable changes in symptoms of PTSD were found for Participants 1 and 3 and clinically significant change was found for Participants 2 and 4 on their PCL-C scores by follow-up. This suggests that EAP demonstrated clinically meaningful change for 4 out of the 5 veteran participants which coincides with the statistically significant change with treatment and a reduction in diagnostic criteria for PTSD.

The clinically reliable and statistically significant change in symptoms of PTSD seen in 6 sessions of EAP suggests that significant benefit can be achieved within a limited amount of sessions. It appears that this approach is able to produce change within a brief amount of time. Given its group format, the EAP approach has the potential to impact a larger number of veterans than individual face-to-face approaches. However, it is also worth re-emphasizing that while statistically significant and clinically significant change was seen in as little as 6 sessions, this may not be a sufficient amount of sessions

to demonstrate the greatest treatment effect. Future studies are needed to determine the benefit of longer treatment phases since none of the participants reached a normal range of functioning per the PCL-C in this study.

Due to the unique use of horses in this therapy approach this form of treatment may be more acceptable for some veterans. The unconventional approach of using horses in treatment may lessen mental health stigma as a barrier to treatment. In addition to potentially attracting veterans to an alternative form of therapy, EAP may also prove clinically relevant in its potential ability to maintain high retention rates (Beck, 1986).

This study has also demonstrated an immediate increase in positive affect and a decrease in negative affect post-session. The combination of potential positive effects on retention rates due to the post-session elevation of mood may assist in treatment compliance. Replication of this finding is needed as well as further exploration into how this may impact treatment adherence and compliance.

Suggestions for Future Research

This study's findings are promising for using EAP in the treatment of veterans with PTSD and are encouraging for further research with this population. A study consisting of a larger sample size, a longer treatment period than this study's 6 sessions, and a more extensive follow-up would be a logical next step to improve on the limitations of the current study. This may also help future researchers evaluate more definitively the degree to which the current study's findings generalize.

With the well documented stigma toward mental health treatment among the veteran population (Sayer et al., 2009), it is possible that EAP would be more acceptable

than traditional therapy; however, this would need to be confirmed with additional research. It would be beneficial to know veteran's preconceptions of EAP prior to starting treatment and examine how this may differ from preconceptions when seeking more traditional forms of psychotherapy or medication. Should EAP appear to be a more approachable form of seeking treatment, this may assist in getting veterans the support they need by offering exposure to mental health services.

It was also notable that in the participant interviews that occurred after the completion of treatment, some veterans alluded to an increase in confidence when facing aversion or obstacles in their lives as a result of EAP. This study did not include empirical measures to further investigate these feelings of confidence. The available literature suggests that EAP may improve one's sense of confidence; however, the limited quantitative data has been unable to support this (Bachi, et al., 2011; Ewing et al, 2007). Further research on the impact of EAP on self-confidence and one's internal locus of control is needed to resolve these conflicting findings. This therapy may help veterans feel more in control in their lives and help increase their perceived ability to impact their life in a positive way.

Much additional research needs to be done to better understand the impact of EAP on treatment outcomes; however, one area that may be worth exploring with greater intentionality would be the impact of EAP on retention rates. The available literature on AAT indicates that attrition rates with AAT are lower than what is often reported for conventional therapy sessions (Beck, Seraydarian, & Hunter, 1986). This study's VPANAS findings indicate an immediate improvement in affect after each

session. If found to be a common occurrence for most participants of EAP, then future studies could investigate how to capitalize on this phenomenon in terms of decreasing client drop out.

The research base lacks longitudinal studies as well as randomized clinical trials which would aid in methodological triangulation regarding treatment effects. As suggested by Selby and Smith-Osbourne (2013), future research would also benefit from comparison groups receiving more traditional, empirically validated approaches such as cognitive behavioral therapy. For future research, it may also be helpful to explore other instruments that measure social functioning. This study used the PROMIS scales which are still relatively new and lacks extensive research on its validity the way other more established scales might.

Suggestions to address gaps in the literature. Gaps in the literature that need to be addressed regarding the process of EAP, center around the lack of a solid theoretical framework. Attachment theory has been discussed as the underlying theory for animal assisted approaches; however, in its current state, the theory is inconsistent and under developed. The use of attachment theory seems to make assumptions about the similarity between human to human relationships and human to animal relationships. In addition, working with horses differs from interactions with smaller, more common domestic animals, which makes the use of attachment theory appear as an unlikely viable theoretical foundation. Much remains unknown about the process of EAP, although there seems to be an emphasis placed on the horse's hypersensitivity to emotion and its ability to "mirror" or pick-up on the internal process of the participant. It is interesting that the

literature does not make note of the horse's response to the EAP facilitator's emotional state in session given that the horse is exposed to both the client and the facilitator. With the horse's reported ability to detect signs of distress or emotional incongruence in participants, the literature fails to address complications when the horse is in close proximity to both the facilitators and the participants. This causes a lack of clarity on whose internal process the horse is responding to. Linda Kohanov broached the topic in her extensive work with EAP. In regards to horse sensitivity, Kohanov notes that it can be troublesome for counselors with unresolved issues due to the fact that horses do not differentiate between the emotion state of clients versus facilitators. She shares, "in working with a local adolescent center, I found two of the counselors so stressed and emotionally chaotic that I finally had to discourage them from assisting in or even observing our equine activities. The horses treated these women like patients, yet it was inappropriate for me to interpret this feedback in the group. Their presence created a disruptive undercurrent that I was powerless to address" (Kohanov, 2003, p. 64). As illustrated by Kohanov, at a minimum, the literature could benefit from additional research on the impact of counselor emotionality and its potential impact on EAP sessions, but first and foremost, the much larger issue of a lack of theoretical framework needs to be addressed.

Conclusion

In sum, the findings of this small sample pilot study do not provide conclusive results regarding the effectiveness of EAP. However, it does provide some indication that EAP following the EAGALA model may be a potentially effective form of

treatment for veterans with PTSD. This study demonstrated that 4 out of 5 participants experienced a reduction in symptoms of PTSD in the form of a statistically significant treatment effect between baseline and intervention phases on the PCL-C and/or no longer met DMS-IV diagnostic criteria for PTSD by follow-up. Two participants demonstrated reliable change by follow-up (a change of 5 or more points) and 2 participants demonstrated clinically significant change in their PCL-C scores (a change of 10 or more points) by follow-up. In other words, not only did the participants demonstrate a significant change from a statistical perspective, but from a clinical lens, it also appeared that participants experienced an improvement in their PTSD symptoms. However, despite the perceived improvement in symptoms of PTSD, it is worth noting that all participants continued to exceed the cut-off score of 33 on the PCL-C, suggesting that after the 6 sessions of EAP, participants continued to experience substantial symptoms.

This study was unable to draw a clear conclusion as to whether EAP would be effective in addressing social functioning as measured by the PROMIS social health measures. Only two of the five participants improved in their social functioning. This study also was not able to support previous qualitative and anecdotal reports that suggest EAP to be beneficial in improving interpersonal functioning (Brandt, 2004; Irwin, 2001). Finally, when comparing pre-session to post session affect, all participants experienced an average increase in positive affect and 4 out of 5 participants experienced an average decrease in negative affect. This implies that veterans with PTSD who partake of EAP

treatment may experience improvement in their PTSD symptoms as well as short term increases in positive affect and short term decreases in negative affect at each session.

With such a substantial impact on symptoms of PTSD and the enthusiasm expressed by the veterans, continued research on EAP's effectiveness with the veteran population is strongly recommended. While the sample was small and the study preliminary in nature, the percentage of participants who experienced a decrease in severity of their PTSD symptoms was comparable to more extensively researched and implemented treatments such as cognitive and exposure based therapies (Bradley et al., 2005; Monson et al., 2006; Schnurr et al., 2007).

These findings support the need for continued research to better understand the effectiveness of EAP with veterans with PTSD. It is worth making a final note of the difficulties that ensue when attempting to measure an approach such as EAP which may be more challenging to control and define due to the unpredictability that may arise when working with animals and the unknowns of the human-animal dynamic. As research progresses in hopes of assisting future veterans with PTSD, the following closing reflections on behalf of EAP specialist Linda Kohanov and AAT specialist Aubrey Fine (2001) are offered. Kohanov (2001) noted:

I can't remember how many times I watched some theory perfected through painstaking research bite the dust as the horses refused to fit into it. As time went on, my experience with these talented creatures inspired me to explore the most adventurous scientific and philosophical interpretations of reality. Even so, the more I learned, the less confidence I had in the ability of any single theory to

embrace the potential of the horse-human connection. And so I became comfortable collaborating with mystery. (p.206)

Similarly, Fine (2010) shares the limitations in examining a loving relationship through his work with animal assisted therapy. He writes:

It is inevitable that science will provide us with clearer explanations of why and how, but perhaps we may never be able to capture clearly the healing power that comes from a loving relationship- either between humans or between humans and other species. The words of the brilliant Albert Einstein echo clearly as we march to our future. Although understanding helps us persevere, we should also respect that ‘not everything that can be counted counts, and not everything that counts can be counted.’ (p.12)

It is possible that as the field of EAP progresses with continued research and further empirical support, it may also succeed in maintaining a sense of mysterious, immeasurable worth beyond our scientific comprehension.

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APPENDIX A

TABLES AND FIGURES OF PARTICIPANT 6 RESULTS

Table 20. PCL – C IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>P</i> | 85% C.I. |
|---------|--------|---------|----------|---------------|
| B vs. I | 0.6667 | -0.5556 | 0.2752 | -1.289<>0.178 |

Note. B = baseline; I= intervention

Table 21. PCL-C mean and standard deviation for participant 6

| | M | SD |
|--------------|------|-----|
| Baseline | 58.3 | 4.7 |
| Intervention | 53.0 | 2.6 |

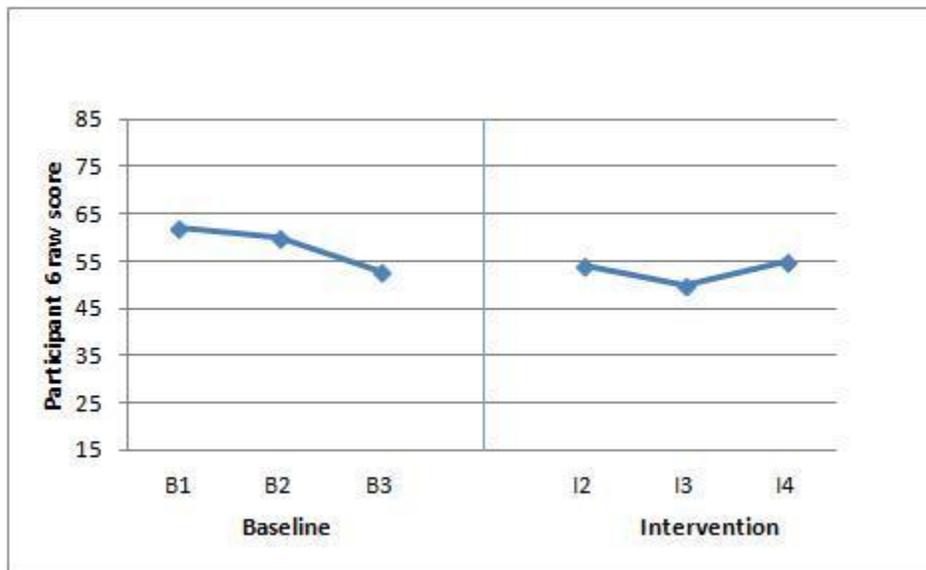


Figure 8. PCL-C participant 6 raw scores

Table 22. PROMIS SPSR IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|--------|---------|----------|----------------|
| B vs. I | 0.6667 | -0.5556 | 0.2752 | -1.289 < 0.178 |

Note. B = baseline; I = intervention

Table 23. PROMIS SPSR mean and standard deviation for participant 6

| | M | SD |
|--------------|------|-----|
| Baseline | 36.3 | 1.7 |
| Intervention | 34.8 | 1.3 |

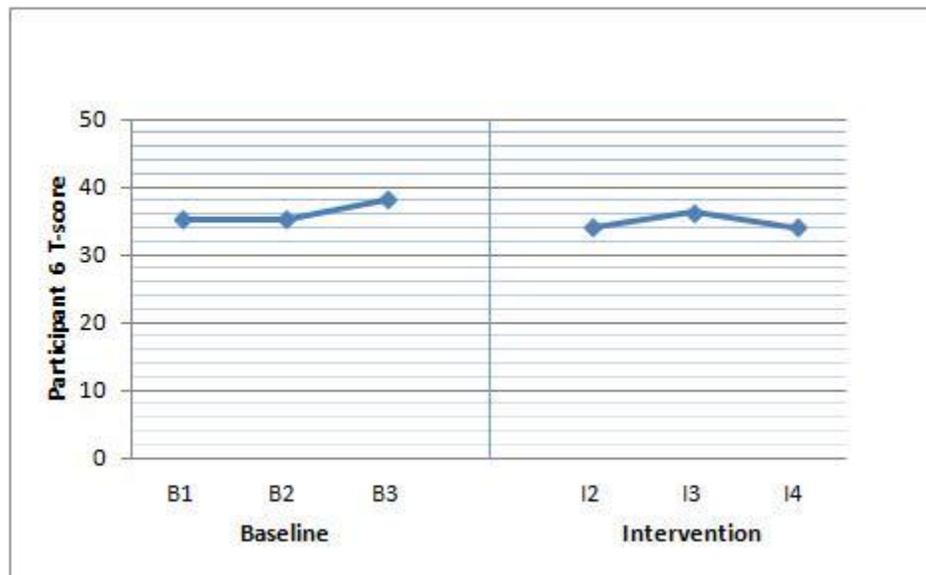


Figure 9. PROMIS SPSR participant 6 T-scores

Table 24. PROMIS SPDSA IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|--------|--------|----------|---------------|
| B vs. I | 0.6667 | 0.6667 | 0.1904 | -0.067 <> 1.4 |

Note. B = baseline; I= intervention

Table 25. PROMIS SPDSA mean and standard deviation for participant 6

| | M | SD |
|--------------|------|-----|
| Baseline | 36.6 | 2.0 |
| Intervention | 38.6 | 2.0 |

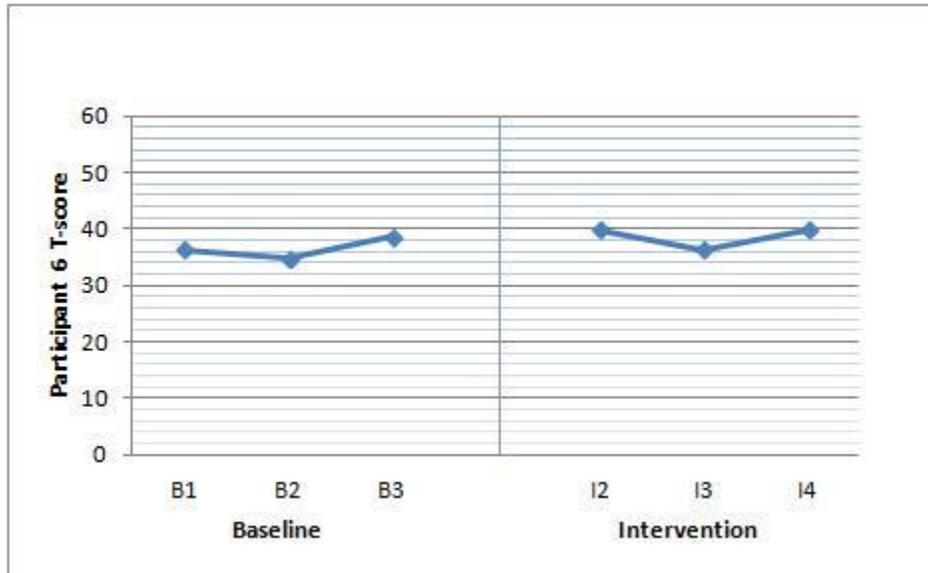


Figure 10. PROMIS SPDSA participant 6 T-scores

Table 26. PROMIS APSRA IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|------|---------|----------|-----------------|
| B vs. I | 0.33 | -0.1111 | 0.8273 | -0.844 <> 0.622 |

Note. B = baseline; I= intervention

Table 27. PROMIS APSRA mean and standard deviation for participant 6

| | M | SD |
|--------------|------|-----|
| Baseline | 40.8 | 5.9 |
| Intervention | 39.5 | 4.2 |

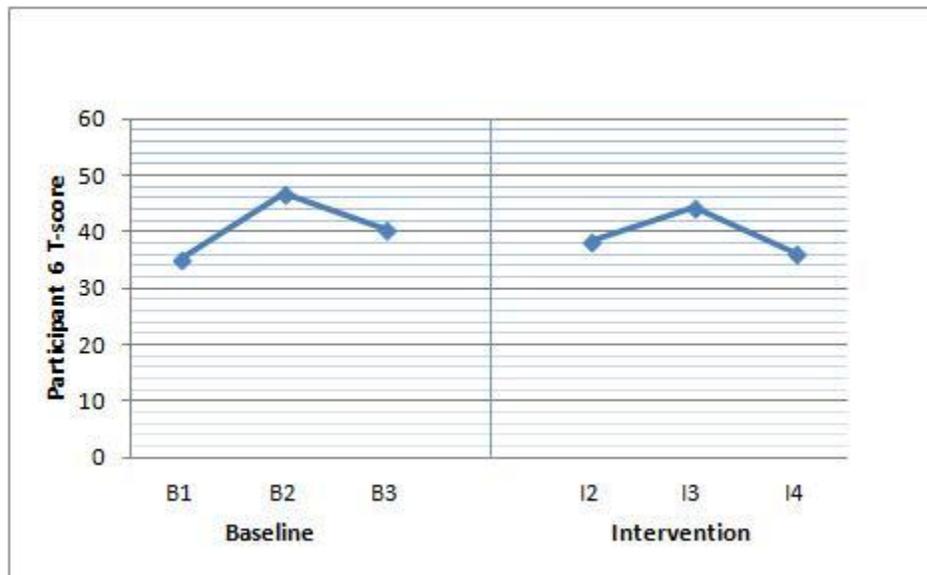


Figure 11. PROMIS APSRA participant 6 T-scores

Table 28. OQ45-IR IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|-----|-------|----------|---------------|
| B vs. I | 0 | 0 | 1 | -0.733<>0.733 |

Note. B = baseline; I= intervention

Table 29. OQ45-IR mean and standard deviation for participant 6

| | M | SD |
|--------------|------|-----|
| Baseline | 12.3 | 1.2 |
| Intervention | 12.3 | 1.2 |

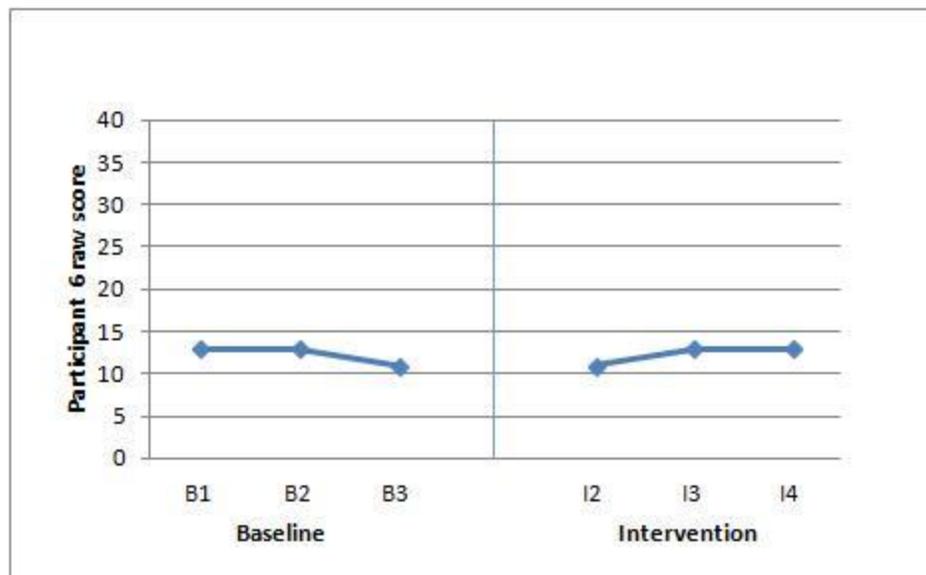


Figure 12. OQ45-IR participant 6 raw scores

Table 30. VPANAS pre vs. post session mean comparison

| | Average increase(+)/decrease(-) | |
|-------------|---------------------------------|-----------------|
| Participant | Positive Affect | Negative Affect |
| 6 | 1.25 | -1.11 |

Table 31. VPANAS positive affect IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|------|--------|----------|-------------|
| B vs. I | 0.67 | 0.3333 | 0.5127 | -0.4<>1.067 |

Note. B = baseline; I= intervention

Table 32. VPANAS positive affect mean and standard deviation for participant 6

| | M | SD |
|--------------|-----|-----|
| Baseline | 2.3 | 3.4 |
| Intervention | 5.0 | 0.6 |

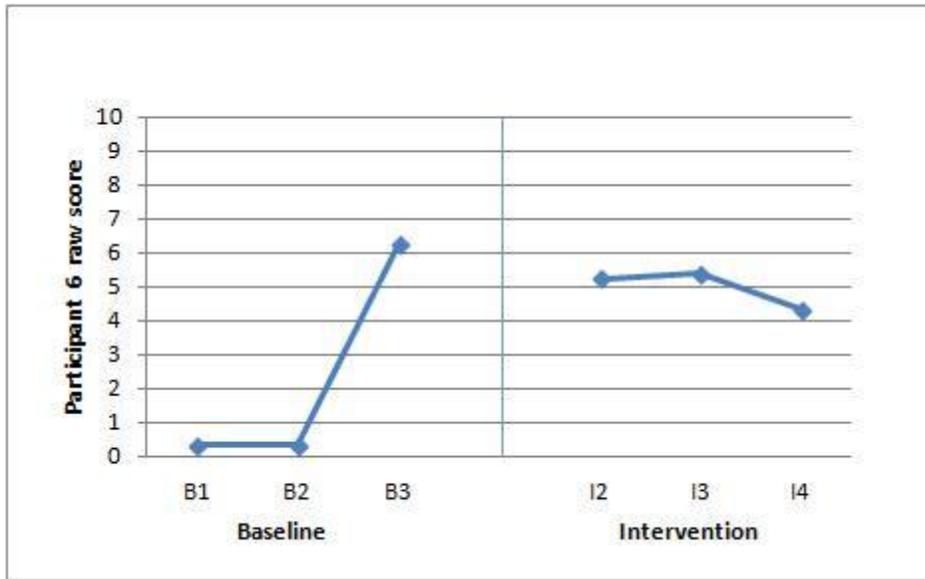


Figure 13. VPANAS Positive Affect participant 6 raw scores

Table 33. VPANAS negative affect IRD and Tau-U results for participant 6

| | IRD | Tau-U | <i>p</i> | 85% C.I. |
|---------|-----|-------|----------|----------------|
| B vs. I | 1 | 1 | 0.0495 | 0.267 <> 1.733 |

Note. B = baseline; I= intervention

Table 34. VPANAS negative affect mean and standard deviation for participant 6

| | M | SD |
|--------------|-----|-----|
| Baseline | 2.4 | 0.8 |
| Intervention | 3.8 | 0.3 |

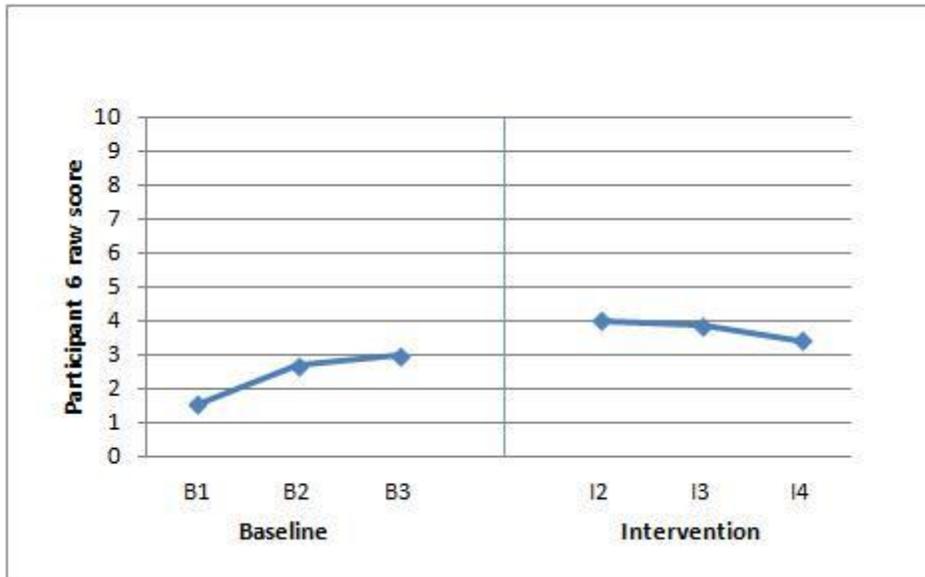


Figure 14. VPANAS Negative Affect participant 6 raw scores