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Use of Live and Robotic Assistance Animals for Psychological and Cognitive Health in Military Populations

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CERTIFICATE OF APPROVAL

Clinical Research Project

This is to certify that the Clinical Research Project of

Rachelle Marie Cross

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Abstract

This literature review addresses the use of live and robotic animal-assisted therapy for psychological and cognitive health in military populations. More specifically, this literature review aims to address the benefits and limitations of the use of live animal-assisted therapy, complementary and alternative techniques (i.e., Combat and Emotional Stress Control Dogs and social robots) for military personnel, and possible attitudinal barriers regarding active duty and veteran soldiers, while utilizing literature conducted with the civilian population to augment. A systematic review of peer-reviewed quantitative and qualitative publications and book chapters was utilized to accomplish this. Results of the literature review indicated that animal-assisted therapy and the use of complementary and alternative techniques has been found to not only improve psychological and cognitive health of military personnel but can also positively impact the individual's interpersonal functioning and quality of life. General limitations of the literature review included limited empirical studies, a reliance on qualitative information, small sample sizes, lack of standardization, and lack of detailed demographic information. General clinical implications included the lengthy process to obtain an animal, the cost, adverse effects on the individual, stress to the animal, and proper utilization of the intervention. Recommendations for future research include the completion of more empirical studies for animal-assisted therapy and complementary and alternative techniques with military personnel with a focus on the specific impact the intervention has, exploring the theory regarding the mechanisms of how animal-assisted therapy works, and the creation of a succinct policy for the use of animal-assisted therapy on military instillations.

USE OF LIVE AND ROBOTIC ASSISTANCE ANIMALS FOR PSYCHOLOGICAL AND COGNITIVE HEALTH IN MILITARY POPULATIONS

Dedication

I dedicate this work to my family and friends who have supported me during this journey. More specifically, my parents Jeffrey and Shannon, who have supported me through every step of my journey since walking through the doors of Kindergarten and allowing me the opportunity to discover my unique place in the world. Thank you for showing and teaching me the values I hold today. Secondly, to Alex, who has provided me immense support and encouragement while I chase my dreams and standing by my side every step of the way. Experiencing this journey with you has made each success more meaningful.

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CHAPTER I: USE OF ANIMALS TO AID HUMANS

The use of animals can be traced back throughout time, at least beginning in the 18th century (Geoff & Vicky, 2014; Walsh, 2009). Furthermore, animal use has been noted to occur across various cultures for spiritual guidance, agricultural needs, and companions (Walsh, 2009). Approximately 85 million homes within the United States reported owning a companion animal (McClaskey, 2019). Of pet owners, 95% of people refer to their pets as friends and 87% refer to their pets as family members (Walsh, 2009). The use of animals within the mental health field was documented within therapy sessions in 1964 by Boris Levinson, in which he used the term *pet therapy* (McClaskey, 2019). Boris Levinson noted the animal's presence was beneficial and positively impacted child development (McClaskey, 2019).

Furthermore, the use of animals within a therapeutic setting has demonstrated other benefits, including good health, psychosocial well-being, and recovery from serious conditions (Walsh, 2009). Walsh (2009) noted that interactions with an animal aid in the increase of neurochemicals that contribute to relaxation and bonding and increase one's ability to cope with chronic conditions, such as dementia. Research has also noted that interacting with an animal can influence the course and optimal functioning with psychological disorders such as depression and anxiety and can provide stress-buffering effects for the individual (Geoff & Vicky, 2014; Krause-Parello et al., 2016; Walsh, 2009). The animal, especially a canine, offers the ability to alert its owners, which has shown to help decrease symptoms associated with posttraumatic stress disorder (Krause-Parello et al., 2016).

Using animals also has been shown to have an impact on social relationships. For instance, it has been shown that there is a reduction in isolation and loneliness due to needing to walk the pet, sometimes prompting in conversation about the pet with other people (Walsh,

2009). The use of animals also facilitates social contracts, new friendships, and a sense of community. Walsh (2009) further pointed out that with societal changes, having a pet can bring a person carefree enjoyment of the moment and comfort. Walsh also noted that using an animal can help individuals meet relational needs for consistent, reliable bonds and facilitate transitions through disruptive life changes.

As for other aspects of an individual's functioning, the use of an animal provides genuine love with no standards or expectations, as well as nurturance, compassion, and support (Krause-Parello et al., 2016; Walsh, 2009). Having an animal has also been a protective factor against suicide, as it provides meaning to someone's life due to the bond with a pet (Walsh, 2009). Overall, the companionship an animal provides has shown to enhance an individual's quality of life while also bringing value, meaning, and worth to one's life (Walsh, 2009).

Regarding the limitations on the use of animals, there are several areas where there is a lack of research, such as individuals who fear animals, especially dogs, preference for one animal over the other, and the human-animal bond within varying ethnic and cultural beliefs, values, and practices (Risley-Curtiss et al., 2006; Walsh, 2009). In a study of companion animal ownership among U.S. adults aged 21 to 64, Risley-Curtiss et al. (2006) noted that Caucasians, Latinx, and those of Asian descent were more likely than African Americans to have companion animals. However, Native Americans were the most likely to own a companion animal (Risley-Curtiss et al., 2006).

Other areas that lack research with the use of animals include the effects of the animal being fearful of the human and the risks of bites, allergies, and zoonosis (i.e., an infection that is transmissible from animal to human; Geoff & Vicky, 2014; McClaskey, 2019). Another consideration is when the ownership of an animal occurs for an individual (McClaskey, 2019).

The time of animal ownership can have differing impacts across one's lifespan and is dependent on the needs of the person (McClaskey, 2019).

The use of animals within the military has existed since humankind first went to war; however, the animals' role has varied from specific responsibilities to simply companions (Chumley, 2012). In 1919, the U.S. military promoted the use of dogs as a therapeutic intervention with psychiatric patients in a hospital located in Washington, DC (Chumley, 2012). In addition, there is documented evidence that dogs have been utilized to assist wounded veterans since the 1940s (Watkins, 2012). Chumley (2012) noted that using animals offers pride, stress relief, and a sense of humility during challenging times for soldiers.

When addressing the history of military culture and the military experience, there are a few areas of great importance when addressing the impact on animal companionship. These areas are reduced help-seeking behavior, stereotypical gender role socialization, and reintegration difficulties, all of which create barriers that impact care-seeking and could result in an increase in poor mental health, homelessness, and suicide (Yarborough et al., 2017). Regarding reduced help-seeking behavior, the general fear of stigmatization promotes concerns that seeking help would either harm their career or not be an effective treatment (Danish & Antonides, 2013). The lack of help-seeking behavior is also influenced by gender role socialization, where traditional gender role norms appear to inhibit help-seeking behavior (Morin, 2017). Reintegration difficulties occur during the transition from deployment or discharge from the military to home, which includes challenges regarding participation in life roles and the return of the individual to their age-, sex-, and culturally appropriate role functions (Crocker et al., 2014). The focus areas for reintegration include relationships, employment, schooling, access to benefits, healthcare, and housing (Crocker et al., 2014).

Military personnel, both active-duty and veterans, are vulnerable to psychological difficulties resulting from combat exposure. These vulnerabilities include various psychological disorders and traumatic brain injury, reintegration difficulties, adjustment concerns, and an impact on quality of life. According to Hoge et al. (2008), "More than 1.5 million U.S. military personnel have been deployed to Iraq and Afghanistan since the start of military operations 2001" (p. 454). It is estimated that 18.5% of military personnel met the criteria for posttraumatic stress disorder (PTSD) or depression at some point, and "about 300,000 currently suffer from PTSD or major depression" (RAND Center for Military Health Policy Research, 2008, p. 2). It is estimated that in 2009, 13,000 veterans suffered from substance abuse (National Veterans Foundation, 2016). Also, both active-duty personnel and veterans abused prescription medication at rates twice as high as the civilian population (National Veterans Foundation, 2016). In addition to this, substance abuse has a comorbidity rate of about 27.8% with PTSD (Studwell, n.d.). As for anxiety, it was reported to be higher among soldiers than the civilian population at a rate of 8.2% in the military population versus 1.2% in the civilian population (Roseellini et al., 2015). In addition, anxiety disorders are often comorbid with other disorders, such as depression (33.5%), PTSD (16.4%), alcohol abuse (10.7%), and substance abuse (4.9%) within military personnel (Armed Forces Health Surveillance Branch, 2013).

When examining the cognitive health of military personnel, it is estimated that "19.5% reported experiencing a probable [traumatic brain injury] TBI during deployment" and "about 320,000 reported experiencing a diagnosed TBI during deployment" (RAND Center for Military Health Policy Research, 2008, p. 2). It should be noted that when examining a soldier's overall health, both mental health or cognitive health should never be viewed as separate areas of functioning and instead viewed simultaneously. For instance, it is estimated that "43.9% of

soldiers who reported the loss of consciousness also met the diagnostic criteria for PTSD," making the required interventions more complex (Hoge et al., 2008, p. 457).

Several psychological treatments, such as cognitive-behavioral interventions, exposure therapy, pharmaceutical interventions, and support groups, have been shown to effectively address the emotional, behavioral, cognitive, and interpersonal difficulties military personnel face (Krause-Parello et al., 2016; Taylor et al., 2013). In addition, a promising treatment modality involves using assistance animals for disorders such as PTSD, anxiety, depression, substance use, and cognitive impairments associated with TBI (Krause-Parello et al., 2016). Among the civilian population, the use of assistance animals has been shown to be effective for psychological disturbances, including depression, anxiety, PTSD, TBI, as well as impacting other factors such as coping, quality of life, social interaction, responsiveness, happiness, and recovery (Walsh, 2009). Within the United States, it is estimated that 500,000 people utilize service dogs to aid with the challenges they experience in their everyday life, with more than 4,000 dogs placed during the 2013-2014 year alone (Nikos-Rose, 2017; Trainer, 2016). The fourth most common use of service dogs is for psychiatric purposes (Nikos-Rose, 2017).

There is a growing body of research and literature reviews on the use of live and robotic assistance animals for military populations' cognitive and psychological health. Houtert et al. (2018) noted that the use of dogs within the Dutch military dates back to World War I. Initially the animal pulled carts, but over time the dog's responsibilities changed including serving as guard animals and emotional companions. The authors further noted the most common use of a dog currently is to aid a veteran diagnosed with PTSD, as the animal provides a continuous form of support and/or treatment augmentation for traditional therapy (Houtert et al., 2018). In

addition, the use of an animal reduces experienced fear for those hesitant to undergo traditional therapy (Houtert et al., 2018).

Regarding the effect the use of an animal has on an individual, Houtert et al. (2018) noted the use of an animal increases positive mood for individuals, countering negative emotions such as numbness. In a literature review completed by Krause-Parello et al. (2016), it was noted that using an animal can reduce symptoms associated with depression, anxiety, and posttraumatic stress disorder. However, in O'Haire et al.'s literature review of 10 studies (2015), the reduction in symptoms previously stated were found to be short-term improvements with the use of animal-assisted therapy. Several authors further noted that animals can be a source of emotional attachment, social connection, companionship, community integration, and mutual caregiving, which is important for those who are at high risk for depression, social isolation, and suicidal ideation (Krause-Parello et al., 2016; Kamioka et al., 2014). Animals also offer support, coping, assurance of safety, vigilance, and improved independence for those with physical disabilities (Krause-Parello et al., 2016). Research has indicated that those living with companion canines reported decreased loneliness, depression, isolation, and worries about safety, increased calmness, and veterans reported the intervention as positive (Krause-Parello et al., 2016). When examining substance use, Kamioka et al. (2014) noted that using an animal as an accessory treatment has helped reduce experiences concerning fear, discomfort, and pain.

Research has shown that interacting with animals increases the oxytocin in the brain, resulting in a decreased physiological response to traumatic memories (Krause-Parello et al., 2016). This finding is important because there is no Food and Drug Administration approved oxytocin treatment available for PTSD (Krause-Parello et al., 2016). Furthermore, research regarding the interaction with canines has also been shown to aid those of various ages and

differing stress biomarkers in similar ways such as reducing blood pressure and an individual's fight or flight responses (Krause-Parello et al., 2016). Regarding one's fight or flight response, research has shown the interaction with a canine can help an individual transition out of a state of fear or aggression and support the individual in transitioning back to a calmer state (Krause-Parello et al., 2016).

Furthermore, it was noted that the use of an animal may have both positive and negative effects, such as blocking (i.e., the animal is placed between the owner and other person or stressful situation; Houtert et al., 2018). While the use of blocking may decrease the individual's internal response, such as anxiety, it also can reinforce the individual's view that another person or situation is a threat. Thus, the individual does not challenge the stressful situation and, in turn, avoids it (Houtert et al., 2018).

Prior literature reviews on animal-assisted therapy noted limitations consisting of inadequate sample sizes to measure effect, lack of randomization, and lack of control groups. Some studies did not account for the effect a placebo has on individuals, the lack of standardized training of the animals and pairing process, the impact on animal welfare, any long-term effects, and the role of an animal in a treatment plan (Houtert et al., 2018; Krause-Parello et al., 2016). In the literature review completed by O'Haire et al. (2015), the authors pointed out the lack of consistency in the research studies reviewed regarding terminology, exploration of mechanisms of change, and information about the person providing the intervention, such as their background, training, and experience with animal-assisted interventions. O'Haire et al. (2015) also highlighted the gap in empirical research on the effects of animals for veterans.

Another limitation noted in prior literature reviews was the cost and availability of the animal. It was noted that the training for a service dog could cost up to $20,000, and the wait

time could be up to 2 years (Krause-Parello et al., 2016). Of great importance to the research on animal-assisted therapy, which has not been addressed, are the specifics regarding best practices, including the type of dog, level of training, and protocol for interaction (Krause-Parello et al., 2016). With this in mind, O'Haire et al. (2015) pointed out that an animal should be utilized as a complementary technique versus the first line of treatment, especially for trauma.

This review intends to address the benefits and limitations of using assistance animals with military personnel. This review will explore using animal-assisted therapy in the treatment of PTSD, depression, anxiety, and TBI, both as primary and secondary diagnosis(es). This review will also examine potential impacts on interpersonal functioning, quality of life, and reintegration. Limitations of current research will be highlighted including the lack of empirical studies completed, use of qualitative data, and the impact of generalizability concerns, such as the variation of participant characteristics and sample sizes.

Definitions of Terms and Concepts

A number of animal species have been utilized to aid humans; however, only canines and miniature horses are considered to be service animals under the Americans with Disability Act (ADA; U.S. Department of Justice, 2011). However, other species have served as therapy or emotional support animals, such as equines (i.e., horse), monkeys, and farm animals, including pigs (Berget & Braastad, 2011; Brennan & Nguyen, 2014; Ferruolo, 2016). For the purpose of this literature review, the use of canines and equines will be the primary focus, unless specified otherwise.

The use of animals in a specific role to aid a human is referred to with different terminology depending on the role the animal serves and related laws, such as the regulations set forth by the ADA and the Fair Housing Act. Although the responsibilities of the animal may

overlap, a *service dog* is defined as "any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including physical, sensory, psychiatric, intellectual, or other mental disability" (American Veterinary Medical Foundation [AVMF], 2018, para. 8). *Animal-assisted therapy* (e.g., therapy dogs) is defined as a goal-directed intervention in which the animal is a part of the treatment process in hopes to increase an individual's physical, social, emotional, or cognitive functioning (AVMF, 2018). Animal-assisted therapy can be provided to a group or individual in various settings (AVMF, 2018). An *emotional support animal* is defined as "an animal of any species, the use of which is supported by a qualified physician, psychiatrist, or other mental health professional based upon a disability-related need" and "does not have to be trained to perform any particular task" (AVMF, 2018, para. 10). However, therapy dogs and emotional support animals do not qualify as service animals under the ADA (AVMF, 2018).

Research has also begun to establish the effectiveness of specific types of emotional support animals such as social robots and combat and emotional stress relief dogs that can be used as complementary or alternative interventions. *Social robots* are defined as an animatronic biofeedback device designed to mimic a baby harp seal (Lane et al., 2016) and *combat and emotional stress relief dogs*, defined as "trained canines deployed for active-duty personnel that offer support for combat stress, home front issues, and sleep disorders" ("Vets helping heroes," 2018, para. 6). Therefore, due to the nature of this literature review, the term *assistance animal* will be used to reference all of the assistive roles for an animal, live or robotic, unless specifically stated otherwise.

Due to military personnel being a large population, it is separated into two subgroups: active-duty personnel and veterans. The term *active-duty personnel* is defined as a person who

works for the military full-time, whereas a *veteran* is defined as an individual who has been honorably discharged from the military and is retired. However, it should be noted that both active-duty personnel and veterans may have been exposed to combat and, thus, a combat veteran. For this literature review, a veteran is referred to as a retired soldier regardless of prior combat exposure. In addition, the use of the military reserves was not included due to the lack of research regarding this subset of the military.

The use of animal-assisted therapy and its impact on symptoms associated with PTSD, depression, anxiety, and traumatic brain injury (TBI) is explored, as well as the influence of animal-assisted therapy on interpersonal functioning, quality of life, and reintegration. Symptoms of PTSD are broadly defined as exposure to actual or threatened death, or serious injury, due to directly experiencing, witnessing, or experiencing repeated or extreme exposure to aversive detail of a traumatic event (American Psychiatric Association, 2013). In addition, the individual experiences the presence of intrusion symptoms (i.e., distressing memories or dreams, dissociates reactions, physiological reactions, or psychological distress) and avoidance symptoms (i.e., avoidance of external reminders, memories, feelings, or thoughts; American Psychiatric Association, 2013), as well as the presence of negative alterations in cognitions and mood (i.e., negative beliefs or expectations, distorted reason for the cause or consequences, detachment, lack of positive emotions, diminished interest, or inability to remember important aspects), and alterations in arousal and reactivity (i.e., irritability, hypervigilance, sleep disturbance, reckless behavior, difficulty with concentration, or increased startle response; American Psychiatric Association, 2013).

Depressive disorder is broadly defined as a depressed mood and/or loss of interest or pleasures most of the day and symptoms of insomnia/hypersomnia, psychomotor

agitation/retardation, fatigue, worthlessness, difficulty concentrating, or recurrent thoughts of death (American Psychiatric Association, 2013). Anxiety disorder is broadly defined as difficulty controlling excessive anxiety or worry and experiencing symptoms such as restlessness, fatigue, irritability, muscle tension, sleep disturbance, or difficulty concentrating (American Psychiatric Association, 2013).

Cognitive functioning involves "complex attention, executive function, learning and memory, language, perceptual-motor, and social cognition" (American Psychiatric Association, 2013, p. 299). One kind of cognitive decline occurs due to TBI. TBI is broadly defined as a major or mild cognitive decline from a previous level of performance in one or more cognitive domains previously mentioned, impairment in cognitive performance, and deficits. TBI may interfere with independence in everyday activities (American Psychiatric Association, 2013). In addition, there must be evidence of a TBI, such as impact to the head or another rapid movement that results in a loss of consciousness, posttraumatic amnesia, disorientation and confusion, or neurological signs (e.g., imaging, onset of seizures, visual field cuts; American Psychiatric Association, 2013). Cognitive decline can also include dementias such as Alzheimer's disease, which is the insidious onset or gradual progression of impairment in one or more of the cognitive domains previously mentioned (American Psychiatric Association, 2013). In addition, in dementia there is evidence of a decline in memory and learning and a steady progressive, gradual decline in cognition (American Psychiatric Association, 2013). Alzheimer's disease is only one of several progressive dementias that results in a persistent cognitive decline (American Psychiatric Association, 2013).

In addition, interpersonal functioning and quality of life are addressed in relationship to symptom reduction. *Quality of life* is viewed as a broad complex concept affected by all aspects

of an individual, including physical and psychological health, environment, social relationships, value system, expectations, goals, and so forth, as well as their perception of themselves within the world (World Health Organization, 2018). *Reintegration* is also a relevant concern when soldiers return from deployment to resume roles in their family, community, and workplace (Elnitsky et al., 2017).

Purpose of the CRP Literature Review

Animal-assisted therapy has been utilized within the civilian population for various physical and mental health reasons. While the U.S. military is a population that has received extensive research in a number of areas, the growing body of information surrounding the utilization of animal-assisted therapy with the military population has not been given much attention. Therefore, this literature review intends to address the following research questions:

1. What are the benefits and limitations of the use of live animal-assisted therapy for military personnel regarding symptom reduction and improvement in interpersonal functioning?

2. What are the benefits and limitations of complementary and alternative techniques (i.e., combat and emotional stress control dogs and social robots) for the military population regarding symptom reduction and improvement in interpersonal functioning?

3. What are the attitudinal barriers of utilizing animal-assisted therapy for active-duty and veteran soldiers?

Research Procedure

A systematic review of book chapters and peer-reviewed quantitative and qualitative publications was completed regarding the use of live and alternative animal-assisted therapy methods with the military population. In addition, peer-reviewed quantitative and qualitative publications regarding animal-assisted therapy within the civilian population were explored to

augment the literature. To accomplish this, various databases were utilized, which include ProQuest and EBSCO. The literature search was not restricted to the United States; however, a majority of the studies originated from the United States. In addition, there was no identified timeframe established regarding the research; however, there was a focus on more current information.

Organizing Principles

Overall, for each diagnosis or interpersonal concern, the effectiveness of assistance animals is addressed specifically for the military population. The general effectiveness of using assistance animals within the civilian population is also addressed to augment the literature on military personnel. Limitations of the current body of research are reviewed, and future research areas are suggested. The review first provides an overview of the history of the use of animals to reduce distress, and a history of military culture and experience is explored. Second, the use of assistance animals with military personnel is reviewed, including use in addressing the mental and cognitive health of active-duty personnel and veterans. Use with of PTSD, anxiety, depression, substance use, and cognitive decline are explored. Interpersonal impacts including quality of life and reintegration difficulties are also examined. Third, complementary and alternative techniques are addressed, which include combat stress relief dogs and social robots. Fourth, attitudinal barriers for military personnel are explored. Fifth, a summary of significant findings, implications, limitations, and future research areas are explored.

CHAPTER II: LIVE ANIMAL-ASSISTED THERAPY FOR MILITARY PERSONNEL

The use of animals as a therapeutic intervention has existed since 1919 within the United States (Chumley, 2012). Since that time, various research studies have addressed the benefits and limitations of animal-assisted therapy in many domains of a soldier's life, from mental health to interpersonal factors. Therefore, as previously stated, animal-assisted therapy (i.e., therapy dogs) is defined as a type of animal-assisted intervention meeting specific criteria with a goal-directed intervention that is a part of the treatment process and can be provided to a group or individual in various settings (AVMF, 2018). Types of interventions can include general interaction with an animal, training of a service animals, or a combination of both. This chapter examines the benefits of using live animal-assisted therapy for military personnel while first examining studies conducted with the civilian population that provide a foundation for application to military personnel.

Use of Live Animal-Assisted Therapy for Psychological Disorders

To date, a significant amount of research has examined the benefits of animal-assisted therapy. However, most of the research has been focused on using animal-assisted therapy for the civilian population, with a budding body of research examining the specific impacts animal-assisted therapy have on military personnel. The section below intends to address the benefits of animal-assisted therapy within each identified mental or cognitive domain regarding both the civilian population and military personnel.

Benefits of Live Animal-Assisted Therapy for Mental and Cognitive Health with the Civilian Population

Posttraumatic Stress Disorder. In a study conducted by Lass-Hennemann et al. (2018), the reduction of stress, anxiety, and intrusive memories was assessed utilizing an animal-assisted

intervention in response to a traumatic event. The study consisted of 60 female participants, with a mean age 22 years of old, and who were students at a university in Germany. Exclusion criteria for the study included fear of dogs, allergies to animals, a traumatic experience, current psychotherapeutic treatment, Axis I diagnosis, pregnancy, smoking, and those not using monophasic oral contraceptives. Participants were also asked to refrain from physical exercise, alcohol use, and caffeinated drinks 3 hours prior to the study (Lass-Hennemann et al., 2018).

Materials and measures utilized included an 11-minute trauma film called "Irreversible," which contains a compilation of scenes depicting physical and sexual violence (Lass-Hennemann et al., 2018). This film was chosen due to its "reliability shown to induce physiological and subjective stress responses, as well as intrusive memories" (Lass-Hennemann et al., 2018, p. 3). Outcome measures used included the State-Trait Anxiety Inventory-State (STAI-S; Spielberger et al., 1983), a 20-item self-report measure that assesses changes in anxiety concerning apprehension nervousness, tension, and worry. The Positive and Negative Affect Schedule (Krohne et al., 1996) was also used, which is a self-report measure that assesses 10 positive affects (i.e., interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 negative affects (i.e., distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). As for intrusion, thought frequency, and distress, participants were asked to record their intrusion frequency, thought frequency, and distress for 4 days following exposure to the film. Intrusions were defined as "sudden, spontaneous and non-initiated memories of film scenes that might be very vivid and consist of pictures, sounds, thoughts, words, or sentence, feeling or combinations of those" (Lass-Hennemann et al., 2018, p. 3). Physiological reactions were measured six times by systolic and diastolic blood pressure (i.e., pre-, during, half-way, post-intervention after 5 minutes, 10 minutes, and 15 minutes) and a

continuous measure of the participant's heart rate until 15-minutes post-intervention. The participant's cortisol was measured via saliva sample six times (i.e., pre- and post-intervention after 15 minutes, 30 minutes, and 60 minutes). Baseline measures included the State-Trait Anxiety Inventory-Trait (STAI-T; Spielberger et al., 1983), a 20-item self-report measure assessing trait anxiety, the Beck Depression Inventory (BDI; Beck et al. 1988), which is a 21-item self-report measure that assesses depression symptoms within the last 2 weeks, and the Pet Attitude Scale (Morovati et al., 2008), an 18-item self-report measure assessing general attitude toward pets (Lass-Hennemann et al., 2018).

Participants were randomly assigned to either the "dog intervention," "dog-film intervention," or "alone group" (Lass-Hennemann et al., 2018). In the "dog intervention," the participants interacted with the dog for 15 minutes after the film, where they were allowed to feed the dog treats and pet the animal. Regarding the "dog-film intervention," the participants watched a video of someone else interacting with the dog from their perspective. In the "alone group," there was no video or actual interaction with an animal, but instead, participants were instructed to relax. Those in the "dog intervention" were previously exposed to the animal prior to the start of the film, and those in the other two groups engaged in a short interaction with the examiner prior to starting the film. All three conditions were exposed to the film, completed the previously mentioned outcome and physiological measures at the identified time intervals, and were instructed to read magazines during the saliva collection wait times (Lass-Hennemann et al., 2018).

The results of the study indicated that the group who received the "dog intervention" showed a greater decrease in state anxiety ($p < 0.001$), negative affect ($p = 0.003$), and a strong increase in positive affect ($p < 0.001$; Lass-Hennemann et al., 2018). There were no significant

differences found between the two control groups (i.e., the "dog film" and the "alone group") regarding state anxiety ($p = 0.2210$), negative affect ($p = 0.273$), and positive affect ($p = 0.336$). This result indicated that the presence of dogs can produce stress-and-anxiety-reducing effects during stressful situations (Lass-Hennemann et al., 2018). However, there was not a significant reduction in physiological responses (i.e., heart rate and blood pressure) within the "dog intervention" as compared to the two control groups (Lass-Hennemann et al., 2018). This finding was hypothesized to be due to the physical movements the participants within this group made, such as petting the animal and moving their bodies to see the animal versus staying still and relaxing (Lass-Hennemann et al., 2018).

Limitations of the study described by the authors include low generalizability to actual traumatic experiences, potential differences in posttraumatic cognitive processes (i.e., the way an individual processes a traumatic experience), the use of only female participants on oral contraceptives to minimize the influence of hormones, and assessment of only anxiety levels and positive and negative affects within a short amount of time (Lass-Hennemann et al., 2018). Further limitations include the participants being college students, lack of gender differences or females not utilizing oral contraceptives, and participants residing in another country which further impacts generalizability. Additionally, the lack of detailed demographic data, repeated measures, and varied time length for intervention exposure are other limitations of the study that could have impacted the results of the study.

Alternatively, a different study assessed the participants' recovery from trauma through their relationship with equines from a qualitative approach (Yorke et al., 2008). The study included six participants, four females and two males, whose ages ranged from 18 to 51. All participants endorsed experiencing a traumatic experience, such as physical or psychological

abuse, a brain injury, or an automobile accident, with the event occurring between 10 months to 11 years prior to the study. In addition, selected participants were chosen due to their indication that a preexisting relationship with an equine had been significantly beneficial to their trauma recovery and that they had begun riding again at least 2 months prior to participating in the study. The study also included the six equines associated with the six participants (Yorke et al., 2008).

The study consisted of two semi-structured interviews, approximately 2 hours long, that took place between the spring of 2001 and 2002 (Yorke et al., 2008). The interviews were conducted with each participant in a barn where the equine was located. Observations of the interaction between participants and the equines took place in a natural setting in order to observe the equine-human relationship and experience without disruption. The first interview consisted of a conversation about the participant's trauma and the participant's relationship with the equine, as well as 30 to 60 minutes of observation of the interaction between the participant and equine. The second interview focused on an in-depth conversation about the impact of the equine-human relationship on the participant's trauma recovery and watching video segments of the interactions from the first interview (Yorke et al., 2008).

The study results found two dimensions (i.e., emotional and task) that emerged, with corresponding subdimensions (Yorke et al., 2008). The emotional dimension included intimacy/nurturing bond and identity bond, whereas the task dimension included partnership bond and utility bond. The intimacy/nurturing and identity bonds were more personal, while the partnership and utility bonds were more practical and task-oriented. The intimacy/nurturing bond was most intense bond noted to emerge. The participants discussed the equine relationship's significance, indicating that there is less judgment compared to human relationships. The identity

bond was more focused on self-perception, emphasizing one's feelings concerning the benefits of the equine. For instance, the identity bond focused on descriptions of how the trauma impacted them, took pieces away from who they were, and how to regain those pieces using equine therapy. This bond was observed to be more prevalent in the male participants earlier in their recovery versus later (Yorke et al., 2008).

Results for the partnership bond found an emphasis on togetherness and oneness, where the focus was more on behavior versus emotion. The partnership bond also focused on mutual respect, effort, teamwork, and communication, both verbally and nonverbally. The focus of this bond was to overcome challenges remaining from the traumatic experience. As for the utility bond, the focus was on functionality of the relationship between the participant and the equine, where there were goals and something to work toward. The participants noted that this bond was similar to having a partner in the "fight for recovery" (Yorke et al., 2008, p. 24). Overall, the participants noted that the equine-human relationship provided support, nurturance, trust, mutual understanding, closeness, and healing touch (i.e., physical contact), all while assisting them to move toward recovery (Yorke et al., 2008).

The authors of the study noted that the equine-human relationship is similar to a therapeutic alliance; in fact, some of the basic tenets are similar (Yorke et al., 2008). For instance, in the therapeutic alliance, the two primary areas are the personal relationship and the collaborative relationship, into which the four subdimensions of the study fit. This correspondence echoes the therapeutic relationship as being mutual, warm, trusting, respectful, collaborative, and goal-oriented while working toward client change. Limitations of the study included the small sample size, generalizability, lack of standardized measurements, variation in time since trauma, and lack of details in the assessment of the type of trauma. However, due to

the study being qualitative, more general concerns about applicability include physical demands that may prevent others from engaging with equines, potential allergies, accessibility to equines, and general health concerns (Yorke et al., 2008).

Hardiman (2010) provided a summary of animal-assisted therapy in mental health. The author noted that by using animal-assisted therapy, a collaborative relationship of trust, acceptance, and intimacy can be developed. In addition, strength, resilience, and improved self-esteem can manifest because the individual needs to take risks, face their fears, and develop physical and emotional bonds with the animal (Hardiman, 2010). These aspects that are developed can then be translated into the individual's personal life. In a study of animal-assisted therapy with children who have experienced abuse, it was observed that when the animal was present, the individual experienced less anxiety associated with PTSD, there was an increase in safety, and the animal provided comfort (Dietz et al., 2012; Hardiman, 2010). Within individual therapy, the individual can utilize the animal as a grounding technique and project their feelings onto the animal until "I" statements can be made when processing trauma (Hardiman, 2010; O'Haire et al., 2015). Animal-assisted therapy has also been shown to be effective for children who have experienced sexual abuse, noting that the dog's presence, whether the trauma was addressed or not, decreased symptomology associated with PTSD, which included anxiety, depression, dissociation, and anger (Dietz et al., 2012).

Depression. In a study conducted by Barker et al. (2003), the ability of animal-assisted therapy to reduce fear, anxiety, and depression before electroconvulsive therapy (ECT) was assessed. The study included 35 participants, with an average age was 54.2. Of the participants, 25 were female, and 10 were male. In addition, 27 participants were White, seven were Black, and one was Hispanic. As for diagnoses, 54% were diagnosed with depressive disorders, 20%

were diagnosed with bipolar disorders, 17% were diagnosed with psychotic disorders, and 9% were diagnosed with dementia and depression. The median number of previous ECT treatments for the participants was three. Of the participants, 63% were pet owners; a majority owned dogs (55%), some owned a cat (23%), and the remaining owned both animals (18%). Participants were selected from a list of adult inpatient and outpatients scheduled to undergo ECT at a community mental health clinic and hospital. Exclusion criteria were identified as involuntarily hospitalized patients, allergies to dogs, phobias of dogs, individuals deemed unable to provide informed consent, and those who had a history of aggression toward people or animals (Barker et al., 2003).

Measurements utilized included modified Visual Analogue Sales (VAS; Crichton, 2001), which was used to collect the participant's self-reported levels of anxiety, fear, and depression (Barker et al., 2003). The scale was presented independently for each mood state, anchored with "none" and "most severe" on a 15-cm line on a page (Barker et al., 2003). The instructions were read to each participant. To assess the VAS's validity, selected nurses completed the same VAS after their interaction with the participant the morning of the study. After the study, a brief interview was conducted to obtain the participants' perceptions of the effectiveness of the animal-assisted therapy intervention. The interview included what made them feel better that day, how helpful the animal was in lessening the feelings of anxiety, fear, and depression, if they would like to spend time with the animal on subsequent days, and if they owned a pet (Barker et al., 2003).

Participants of the study were assigned on alternate days to the treatment conditions of a 15-minute animal-assisted therapy session with a dog or a comparison condition of 15 minutes reading a magazine (Barker et al., 2003). Both conditions occurred for a minimum of 15 minutes,

with a maximum of 60 minutes; however, the measures were administered after 15 minutes. Furthermore, the treatment condition consisted of the animal and the handler, where the handler was instructed to keep the conversations focused on the animal, and physical interaction was permitted for the participants but not suggested by the handler, which allowed the participants to determine the amount of interaction they desired with the animal. Four participants were assigned to be in the treatment condition on any one day. The comparison condition involved the participant reading either an entertainment or outdoor magazine (Barker et al., 2003).

The study results indicate a significant difference between the animal-assisted therapy group and the magazine comparison group in the reduction of fear 15 minutes after the start of animal-assisted therapy, as measured by the VAS (37% reduction from baseline; Barker et al., 2003). This finding was an important because "fear can contribute to noncompliance with treatment, create a negative perception, and possibly impact outcomes" (Barker et al., 2003, p. 43). However, animal-assisted therapy did not produce a significant reduction in participants' levels of anxiety (*LS M* difference = 1.20) or depression (*LS M* difference = 0.20) from pretreatment to posttreatment when compared to the comparison group. Additionally, there was no significant effect of pet ownership versus non pet ownership for anxiety ($p > 0.29$), fear ($p > 0.49$), or depression ($p > 0.26$) found. There was also no significant effect found for treatment order (i.e., animal-assisted therapy first or reading a magazine first; $p= 0.50$). Qualitative data showed that 77% of the participants reported the animal helped them feel better on the day of the visit, and 71% wanted the animal there on their next treatment day. While the VAS did not show a significant reduction in anxiety and depression, more than 50% of individuals in the treatment condition reported a reduction in fear and depression to some extent, and 75% reported a reduction in anxiety during their brief post-study interview. The study's limitations included not

being able to blind the participants to the conditions, lack of random sampling leading to a generalizability concern, and possible bias from the participants regarding the treatment condition (Barker et al., 2003). Another limitation is possibility of a confounding variable regarding when the measurements occurred (i.e., after 15 minutes, but the exposure occurred for a maximum of 60 minutes).

In another study, the effect of a companion dog regarding depression and anxiety were assessed for residents at a long-term-care facility in South Africa (LeRoux & Kemp, 2009). The study consisted of 16 participants, eight males and eight females. However, one participant discontinued participation from the animal-assisted activity group after the third session. All participants were either in wheelchairs or utilized crutches. Exclusion criteria consisted of a fear of dogs, allergies, and no informed consent, whereas inclusion criteria were a signed informed consent and no known allergies to dogs. The participants were randomly assigned to either the animal-assisted activity or control group (LeRoux & Kemp, 2009). No other demographic data were provided.

Measures utilized included the BDI, (Beck et al., 1988), a 21-item self-report measure that assesses symptoms of depression and the Beck Anxiety Inventory (BAI; Beck et al., 1993) was used, a 21-item self-report measure that addresses symptoms of anxiety (LeRoux & Kemp, 2009). Data from the participants who discontinued participation after session three were not used (LeRoux & Kemp, 2009).

Both conditions lasted 6 weeks. The animal-assisted activity group engaged in the activity with the dog for 30 minutes once per week (LeRoux & Kemp, 2009). The animal visitation occurred at the same time, on the same day, by the same dog from qualified handlers. During the visitation, the participants could interact with the dog by talking to the animal,

grooming it, and patting the dog as desired. As for the control group, the participants engaged in treatment as usual and never saw the dog until after the post-measure was completed (LeRoux & Kemp, 2009). The authors did not describe what treatment as usual consisted of.

Results of the study found no significant differences between the animal-assisted activity and the control group on the BDI or BAI (LeRoux & Kemp, 2009). However, significant differences were noted between the pre- and post-measure on the BDI mean scores (pretest M = 19.86; posttest M = 11.86) for the animal-assisted activity group, with a significant reduction in depressive symptoms. There were no significant differences found in the mean differences for the BAI scores for the animal-assisted activity group (pretest M = 14; posttest M = 10.71) or for the BDI and BAI mean scores for the control group (pretest M = 13.88; posttest M = 15.88; pretest M = 11.3; posttest M = 13.50, respectively; LeRoux & Kemp, 2009). Based on the results, the authors concluded that animal-assisted activities "can make a difference in depression levels of residents" for those individuals who are in long-term care facilities (LeRoux & Kemp, 2009, p. 25). The authors also noted qualitative data within their study, which included positive feedback from the participants about the animal-assisted activity, increased social interaction within the animal-assisted activity, and pleasant memories either created or remembered. The study's limitations included small sample size, lack of reporting other demographics aside from gender, lack of describing treatment as usual for the control group, lack of addressing the impact the two groups had on social interaction and loneliness, and generalizability concerns to those in the United States and not residing within a long-term care facility (LeRoux & Kemp, 2009). Other studies have observed that animal-assisted therapy not only aids in the reduction of depressive symptomology but also facilitates a reduction of agitation and anger (Furst, 2016; Knisely et al., 2012; Schramm et al., 2015).

Anxiety. Barker and Dawson (1998) investigated the impact animal-assisted therapy would have on psychiatric patients' anxiety levels. The study consisted of 313 participants with a mean age of 37. Slightly more females (174) participated than males (139). Additionally, 54% of the participants were Black and the remaining 144 participant's race or cultural demographics were not reported. The average length of stay at a psychiatric hospital was 10.98 years. The diagnoses of participants were divided into four categories, with 49.2% having a mood disorder (i.e., depression, bipolar, and all other mood disorders), 35.6% having a psychotic disorder (i.e., schizophrenia, schizoaffective, and all other psychotic disorders), 16.6% having a substance use disorders, and 8.6% being other (i.e., anxiety, cognitive, personality, and somatization disorders). However, only 230 of the 313 participants participated in at least one animal-assisted intervention or one recreational group and completed a pretest and posttest measure. Failure to obtain all the data was due to time conflicts with medical treatments or participant discharge. Only 50 participants completed both conditions and corresponding measures. This variation was due to the study taking place in a psychiatric hospital and uncontrollable factors occurring, such as participant discharges. Exclusion criteria consisted of canine allergies, fear of dogs, and lack of informed consent (Barker & Dawson, 1998).

The measure utilized to assess current anxiety levels was the State-Trait Anxiety Inventory (Spielberger, 1977), a brief self-report 20-item measurement (Barker & Dawson, 1998). The study consisted of a pretest and posttest measure of anxiety ratings for the same participants under two different conditions: a single animal-assisted therapy group session and a single therapeutic recreation group session. All participants underwent both conditions. The animal-assisted therapy condition consisted of group interaction with the animal and its handler, where the handler spoke about the canine and encouraged discussion. While this was occurring,

the canine freely interacted with the participants and completed basic commands. The comparison condition consisted of education about leisure, music, and art activities. Both conditions lasted for 30 minutes on consecutive days. The pretest measure was completed before the animal entered the room for the animal-assisted therapy condition (Barker & Dawson, 1998).

The study results found no differences in posttest anxiety scores between animal-assisted therapy intervention and the therapeutic recreation condition (Barker & Dawson, 1998). However, the participants diagnosed with a mood disorder, psychotic disorder, or other diagnosis who participated in the animal-assisted therapy intervention experienced a decrease in anxiety when compared to participation in the therapeutic recreation activity. The effects on mood disorders were small compared to the effects on psychotic disorders, which could be due to fewer demands in the animal condition than in the therapeutic recreation condition, thus resulting in lower anxiety scores. Overall, state anxiety showed immediate reduction after a single session of animal-assisted therapy (Barker & Dawson, 1998). The study's limitations included a small number of participants (i.e., 50) who completed both interventions and corresponding measurements, failure to assess the effects of repeated exposures, and some data suggested a lack of equivalency of animal-assisted therapy versus recreational group demands, which may confound the results. In addition, therapists were not blind to the study, which could affect how they interacted within the two different conditions and could have affected the participant's outcome measures (Barker & Dawson, 1998).

Cognitive Functioning. In a study conducted by Motomura et al. (2004), the effects of animal-assisted therapy on patients with dementia were assessed using various mental state batteries in Japan. The study consisted of eight female participants with the mean age of 84.8 years old. Four of the participants were diagnosed with Alzheimer's type dementia, and the

remaining four were diagnosed with vascular dementia. Further demographic information was not provided. Additionally, all participants participated in the intervention group, as no control group was established (Motomura et al., 2004).

Measures utilized included: The Apathy Scale (Burns et al., 1990), a five-item questionnaire that evaluates activity and apathy states; The Irritability Scale (Burns et al, 1990), a five-item questionnaire that assesses irritability; the Geriatric Depression Scale (GDS; Yesavage et al., 1983), a 30-item questionnaire that examines an individual's depressive state; the Physical Self-maintenance Scale (PSMS; Lawton et al., 1969), an eight-item questionnaire that addresses one's activities of daily living; and the Mini-Mental State Examination (MMSE; Folstein et al., 1975), assessing one's orientation, attention, calculation, recall, repetition, reading, and writing (Motomura et al., 2004). All measures were completed before and after the animal-assisted therapy intervention (Motomura et al., 2004).

For the intervention, participants interacted with two dogs from the Japanese Rescue Association for an hour on each of three consecutive days (Motomura et al., 2004). Activities were comprised of three categories: communication with the dogs (i.e., introductions, commands, and petting), observation of the dog's performing activities (i.e., jumping through a ring or exercising), and full, unlimited interaction with the dogs (Motomura et al., 2004).

Results indicated no significant difference in the irritability scale, the GDS, PSMS, or MMSE before or after the intervention (Motomura et al., 2004). However, animal-assisted therapy improved apathy for individuals diagnosed with dementia (pretest $M = 19.4$, posttest $M = 14$). Qualitative data showed that 75% of the participants noted the intervention was fun and enjoyable, and 63% reported they enjoyed dogs more after attending and would like to have the activity in the future. Additionally, it was noted that animal-assisted therapy aided in increasing

socialization, activity participation, and a sense of proficiency among the participants (Motomura et al., 2004). Limitations included a very small sample size, lack of varied demographics, no control group, very brief animal interactions, a lack of comparison of the activity categories, and possible generalizability to the United States population and individuals without dementia (Motomura et al., 2004).

In another study, Gocheva et al. (2018) assessed whether participants with acquired brain injuries would exhibit higher attention span and concentration when an animal is present. The study consisted of 19 participants who were inpatients in a rehabilitation setting. All of the participants were diagnosed with an acquired brain injury: eight were classified as a traumatic injury and 11 were classified as non-traumatic. Six participants were female, 13 were male, and the mean age was 52.85. Inclusion criteria consisted of being medically stable, the ability to walk or be transported to the required location for the study, no animal phobias or allergies, no aggression toward animals, and ability to interact with the animal independently (Gocheva et al., 2018). There were no noted exclusion criteria.

Attention span and concentration were measured using a behavioral coding system software through behavior analysis based upon video recordings of the conditions (Gocheva et al., 2018). For this purpose, attention span was defined as "the duration of time the [participant] was involved with one task during the whole therapy session," whereas distraction for this purpose was defined as "how many times the [participant] was distracted during the therapy session" (Gocheva et al., 2018, p. 57). The Multidimensional Affect Rating Scale (MDBF; Steyer et al., 1997) was used to assess each participant's mood. The VAS (Crichton, 2001) was used to assess concentration (Gocheva et al., 2018).

The experimental condition consisted of speech, occupational, or physiotherapy sessions with an animal present, whereas the control conditions were the same types of therapy sessions without an animal present (Gocheva et al., 2018). Each participant participated in 24 sessions over 6 weeks, with each session lasting 30 minutes. Each participant completed the experimental and control conditions to assess individual differences in functional impairment. In the experimental group, participants could choose their animal from a rabbit, guinea pig, cat, chicken, goat, sheep, horse, and donkey. Tasks completed for the experimental group included activities applied to the animal. For instance, "cutting vegetables and feeding it to the present animal (experimental) versus cutting the vegetables to make a salad" (control; Gocheva et al., 2018, p. 57).

The study found that attention span did not differ between the experimental (M = 89.01) and control condition (M = 90.65; Gocheva et al., 2018). Concerning distraction, participants showed more distractibility in the experimental group versus the control group (experimental M = .17, control M = .09). Those who had higher functioning levels displayed fewer instances of distraction within the experimental condition than the control condition. While participants in the experimental condition showed more instances of distraction, the participants' attention span did not differ depending on whether the animal was present. Those in the experimental condition were found to have slightly higher self-reported alertness and concentration (experimental M = 16.16, control M = 15.42; experimental M = 135.34, control M = 131.02, respectively). It was also noted that animal-assisted therapy can aid in training divided attention and in the management of daily activities. Limitations of the study included a small sample size, no district differences between the experimental and control groups, the lack of blinded participants and therapists, limited internal validity due to confounding variables, differences in functional

impairments of the participants, reduced replicability of the study due to the measures utilized such as the behavioral coding algorithm, and the assessment of only immediate effects regarding the presence of an animal (Gocheva et al., 2018).

Similar findings were noted by Bono et al. (2015), where animal-assisted therapy resulted in a lower rate of impairment in daily life activities, a slowed rate of cognitive impairments, and a decrease in depressive symptomology for individuals with mild cognitive impairment. Animal-assisted therapy has also been found to decrease tension and agitated behavior associated with dementia (Bernabei et al., 2013; Hardiman, 2010; Knisely et al., 2012).

Overall, the use of animal-assisted therapy with the civilian population has been observed to be effective at reducing symptomology associated with deficits in mental health functioning. While studies are limited and show inconsistent results, animal-assisted therapy has been observed to decrease state anxiety, fear, depression, and negative affect. There have also been studies that found a reported increase positive affect, alertness, concentration, divided attention, and management of daily activities. Additionally, the use of animal-assisted therapy has been reported by individuals to help them feel better on the day of a medical procedure and increase their social interactions. With equine animal-assisted therapy, it was observed that relationship between the individual and the equine elicited less judgment compared to human relationships. It was also observed that there was an emphasis on togetherness, oneness, mutual respect, effort, teamwork, and communication. These observations were found in a variety of individuals, such as individuals with a brain-injury, those diagnosed with dementia, and individuals who have experienced a traumatic event. Based on these observations of the use of animal-assisted therapy with the civilian population, similar observations are noted to occur with the military population, which are discussed below.

Benefits of Live Animal-Assisted Therapy for Mental and Cognitive Health with Military Personnel.

Posttraumatic Stress Disorder. Several studies have focused on the benefits of animal-assisted therapy regarding the decrease of PTSD symptomology. Bergen-Cico et al. (2018) examined the effects of a dog training program aimed at PTSD symptom reduction as well as assessing the impact on perceived stress, self-compassion, self-judgment, and isolation. The study included 48 participants, 34 in the dog-owner training program, and 14 in the waitlist control group. All participants were veterans enrolled in the Dogs2Vets program at a nonclinical open recreation facility from 2014 to 2017. The participants all had symptoms of PTSD and were either self-referred or referred by their psychotherapists at the regional Veterans Affairs Medical Center. Of the participants, 84% identified as Caucasian, 8% identified as African American, and 8% identified as Hispanic. The participants' mean age was 41 for the Dogs2Vets participants and 43 for the wait list control group. However, 20% were veterans from the Vietnam War while 80% were veterans from post-9/11. The average length of separation from active-duty service was 12.9 years and ranged from 1 to 32. Additionally, 50% of the participants had served in the Army, 30% served in the Marines, 7% served in the Air Force, 7% served in the Navy, 3% served in the Army National Guard, and 3% served in the Marine National Guard (Bergen-Cico et al., 2018). The authors did not note specific inclusion or exclusion criteria for the Dogs2Vets program.

The measurements utilized included the PTSD Checklist-Military Version (PCL-M; Weathers et al., 1991), a 17-item questionnaire that assesses military-related PTSD symptoms within the past month (Bergen-Cico et al., 2018). Perceived stress was assessed with the 10-item Perceived Stress Scale (PSS; Cohen et al., 1983), which addresses how unpredictable,

uncontrollable, or overloaded the individual feels their life has been within the past month. This measurement also included items assessing additional stressors regarding dog ownership. The Self-Compassion Scale Short Form (SCS-SF; Neff, 2003) was used to assess self-compassion and corresponding subscales consisting of isolation, self-judgment, over-identification, self-kindness, common humanity, and mindfulness. SCS-SF is a 12-item scale where the individual rates relevant acts toward themselves. Additionally, qualitative feedback was obtained using open-ended questions and written responses at the 12-month follow-up (Bergen-Cico et al., 2018).

The Dogs2Vets program is a "structured dog training program that engages veterans in the training and care of a dog that they ultimately adopt, with the focus of the program being on the human-animal bond" (Bergen-Cico et al., 2018, p. 1168). The model utilized is the owner-trainer model, where the veteran selects a dog and is trained to work with the dog under the guidance of a professional trainer. Training includes caring for the dog and learning dog behavioral management and training skills weekly for 90 minutes, lasting 12 to 18 months. Once approved, public training begins, including weekly sessions working in new environments, such as a store. The waitlist control group engaged in social programs, such as volunteering and peer support programs provided by the recreation facility. The average time on the waitlist was 12 months (Bergen-Cico et al., 2018).

The study results found no significant differences between the Dogs2Vets program and the waitlist group regarding PCL-M scores (Bergen-Cico et al., 2018). There was a decrease in PTSD symptoms from baseline to follow-up for the Dogs2Vets program ($M = 4.2$), and there was an increase in PTSD symptoms for the waitlist group ($M = 5$). The effect size between the Dogs2Vets program and the waitlist group was moderate ($d = -0.28$), and participants in the

Dogs2Vets program maintained PTSD symptom reduction during 12-month the follow-up period ($p = 0.01$; Bergen-Cico et al., 2018).

As for perceived stress, there were significant reductions for the Dogs2Vets program during the follow-up period ($p = 0.02$), but none were noted for the waitlist group ($p = 0.87$; Bergen-Cico et al., 2018). The effect size between the two groups was moderate ($d = -0.60$). Overall, participants in the Dogs2Vets program showed a reduction in perceived stress ($p \leq 0.001$), and dog ownership did not have a negative effect on their perceived stress. Regarding self-compassion, participants in the Dogs2Vets program showed increases in self-compassion in the follow-up period ($p = 0.02$), but none were noted for the waitlist group ($p = 0.91$). There was a moderate effect size between the two groups ($d = 0.37$). There were significant improvements found for self-judgment within the Dogs2Vets program ($p = 0.01$), but not the waitlist group ($p = 0.55$) and the effect size between the two groups was large ($d = -0.90$), indicating a significant decrease in self-judgment. Last, there was a reduction in isolation among the Dogs2Vets participants in the program ($p = 0.02$), but not the waitlist group ($p = .018$). The effect size was moderate ($d = -0.64$; Bergen-Cico et al., 2018).

The qualitative data results showed five themes regarding the types of benefits reported from the Dogs2Vets program (Bergen-Cico et al., 2018). Bergen-Cico et al. (2018) reported the benefits from highest to lowest prevalence: “decreased isolation (47%), improved mental health and emotional well-being (44%), a renewed sense of purpose, including the opportunity to apply service skills (35%), PTSD symptom management (12%), and increased physical activity (6%)” (p. 1172). Limitations of the study included small sample size, limited generalizability due to the participants being predominantly Caucasian male military veterans, the wide range of ages and time since deployment ended for the participants, lack of measurements to assess changes

associated with the training component of the Dogs2Vets program, and the use of a self-report PTSD measurement versus a clinical interview to measure change as a result of the Dogs2Vets program, as well as baseline endorsement of symptomology severity (Bergen-Cico et al., 2018). However, strengths include a long follow-up period and the use of assessments to examine both decreased symptoms and increased benefits.

Another recent study assessed the effects of animal-assisted therapy on PTSD symptomology, depression, quality of life, and social and employment functioning in active-duty personnel and veterans diagnosed with PTSD (O'Haire & Rodriguez, 2018). Participants for the study were recruited from November 2015 to February 2016 from a national sample of individuals who applied for and were approved to receive a trained PTSD service dog from an approved provider. The study consisted of 141 participants, 66 of whom were in the waitlist group, and 75 of whom were the service-dog group. The average age was 37.1 years and the sample was predominantly male (78%). The most common service branch was the Army (66%), with deployments to Iraq and Afghanistan (63.8% and 42.6%, respectively). Inclusion criteria consisted of military service post-9/11, clinically confirmed diagnosis of PTSD, honorable discharge or current honorable service, no substance abuse, no conviction of any crime against animals, and no more than two pets within their personal home (O'Haire & Rodriguez, 2018).

Measurements utilized included the PTSD Checklist (PCL; Weathers et al., 1993), a 17-item measurement assessing PTSD symptom severity, and clusters consisting of reexperiencing, avoidance, and arousal (O'Haire & Rodriguez, 2018). Depression was assessed with the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2003), a nine-item tool, and the Patient-Reported Outcomes Measurement Information System (PROMIS; Cella et al., 2010), an eight-item scale assessing depression and physical, mental, and social well-being. As for quality of life, the

Veteran's RAND 12-item Health Survey (Iqbal et al., 2007) was used to assess health-related quality of life. Psychological well-being was assessment with several scales, including the Satisfaction With Life Scale (SWLS; Diener et al., 1985) is a five-item instrument that measures judgments of satisfaction with one's life, the Bradburn Scale of Psychological Wellbeing (BSPW; Bradburn, 1969) is a five-item scale that looks at positive well-being, and the Connor-Davidson Resilience Scale (Connor et al., 2003) is a 23-item scale that examines resilience, the capacity to change, and the ability to cope with adversity. Social functioning was assessed with three PROMIS (Cella et al., 2010) scales, including the ability to participate in social activities, social isolation, and companionship. Last, work functioning was assessed with a work questionnaire, the Work Productivity and Activity Impairment Questionnaire: General Health (WPAI; Reilly et al., 1993), which is a six-item questionnaire that assesses how health problems impact the individual's ability to work, perform regular activities, absenteeism, impairment at work, and overall activity impairment due to health. During the waitlist period, the measurements were administered at baseline, immediately before the participant received the service dog, 3 weeks after the service dog was received, and at follow-up when the dog was home with the participant (O'Haire & Rodriguez, 2018).

Participants within the service-dog group had been provided their service dog and had been paired with the dog for roughly 1 month to 4 years (O'Haire & Rodriguez, 2018). Within this group, the participants attended a 3-week training class, during which the participants were taught how to live with, care for, and maintain training with their dog. The training class size ranged from six to eight participants. They all lived onsite within dormitories and attended daily onsite activities that included working with their service dog both in private and within the public. Those in the waitlist group submitted an application for a service dog and had been on the

waitlist for approximately 2 months to 2.4 years. As for usual care, participants had unrestricted access to their usual care throughout the study. During this time, each participant was "allowed to continue to receive intervention services such as seek advice from medical professionals as they normally would" (O'Haire & Rodriguez, 2018, p. 180). Both groups received usual care, regardless of being in the waitlist or service-dog groups (O'Haire & Rodriguez, 2018).

The study found no differences on the PCL or in their usual care between the two groups at baseline (O'Haire & Rodriguez, 2018). There were significant reductions in PTSD symptoms on the PCL for the service-dog group during the waitlist and at the end of the waitlist (i.e., transition to home), including large effect sizes ($d = -21.36$ and -11.54, respectively). Furthermore, participants within the service-dog group were found to have lower PTSD symptomology than the waitlist group during an assessment at a single point in time, as evidenced by scores on the PCL, with a medium effect size ($d = -0.66$; O'Haire & Rodriguez, 2018).

In addition, those within the service-dog group showed lowered depression, with a large effect size on the PROMIS Depression and a medium effect size on the PHQ-9 ($d = -0.91$ and -0.74, respectively; O'Haire & Rodriguez, 2018). Quality of life had a medium effect size for the service-dog group on the VR-12 mental, BSPW, SWLS, and Connor-Davidson Resilience Scale ($d = 0.66$, 0.81, 0.59, and 0.55, respectively). As for social functioning, there was higher reported participation in social activities, lower social isolation, and higher perceived companionship within the service-dog group ($d = 0.70$, -0.63, and 0.52, respectively). Regarding work performance, there was lower absenteeism because of health and lower rates of activity impairment ($d = -0.89$ and -0.27); however, there was no significant reduction in one's level of impairment overall while at work or because of health ($d = -.69$ and -0.29, respectively).

Overall, participants within the service-dog group had improvement levels that were 20% or more above those in the waitlist group. The study's limitations included unknown treatments received for treatment as usual, both conditions receiving treatment as usual, lack of randomization to groups, unknown time frame for the follow-up, limited generalizability as all participants were interested in receiving animal-assisted therapy, and the use of solely self-report outcome measures (O'Haire & Rodriguez, 2018). Strengths include clinically confirmed initial diagnosis of PTSD and the use of multiple measurements.

Additional research has shown that animal-assisted therapy may help with the treatment of veterans with PTSD, including reduction of stress symptoms and perceived stress (Kloep, Hunter, & Kertz, 2017; O'Haire & Rodriquez, 2018; Pollock et al., 2017; Rothbaum, 2013; Stumbo & Yarborough, 2019). Observations from treatment programs further suggest that animal-assisted therapy can decrease arousal and hypervigilance symptoms, nightmares, social estrangement, negative emotions, flashbacks, emotional numbing, and avoidant behavior, while also encouraging the individual to stay present in the moment and increase positive emotions (Hoisington et al., 2018; Owen et al., 2016; O'Haire & Rodriguez, 2018; Yarborough et al., 2017; Yarborough et al., 2018; Yount et al., 2012).

The use of animal-assisted therapy specifically for PTSD has been observed to be beneficial in several ways. The dog can "call" for help on a modified phone when the individual is experiencing risks of suicide (Taylor et al., 2013, p. 605). The use of animal-assisted therapy can also "provide an alternative to the pressure to connect to people as the veteran learns how to control their PTSD symptoms and can regain their confidence and sense of safety" (Furst, 2015, p. 452). This sense of confidence and safety is achieved by alerting the individual to strangers in the home and when strangers are approaching, by serving as a tactile stimulation distraction

when experiencing a sensory overload, to provide guidance home when an individual experiences dissociation, and to help the individual feel "grounded" by providing physical contact or pressure against the body and provide a calming effect when the individual experiences night terrors, as the dog can wake the individual (Furst, 2015, 2016; Taylor et al., 2013; Yarborough et al., 2017). This effect is noted to also occur when the dog nudges the individual as a way to remain in the present and interrupt episodes of re-experiencing (Yarborough et al., 2018). The use of animal-assisted therapy can also help reduce episodes of anger or panic through tactile distractions, such as licking, searching rooms before the individual enters, and walking behind the individual to give the sense of "watching their back" (Taylor et al., 2013, p. 605).

Furthermore, when addressing both active-duty personnel and veterans, there have been benefits noted by the Warrior Canine Connection, which is a non-profit organization that enlists active-duty soldiers with PTSD and/or traumatic brain injuries to aid in the training of service dogs for veterans (Yount et al., 2013). The goal of Warrior Canine Connection is to "facilitate a purposeful and meaningful occupational intervention that builds skillsets for functional independence" from a strengths-based program design (Soine, 2013; Yount et al., 2013, p. 293). The training philosophy is based on promoting positive methods to shape behaviors and patience (Yount et al., 2013). In addition, the training centers on addressing three symptom clusters of PTSD: reexperiencing, avoidance/numbing, and increased arousal while maintaining "here and now perspective" (Soine, 2013, p. 18; Yount et al., 2013). For reexperiencing, the focus is on the canine's point of view of the present to teach the canine "teachable moments" (Yount et al., 2013).

Observations from this program suggest several benefits of training dogs to assist others. For the active-duty soldier, “the presence of the [canine] during a stressful situation or encounter changes the context of the arousal event and anchors the trainer in the present” due to needing to address the canine’s needs over the trainer’s (Yount et al., 2013, p. 293). This anchoring allows the active-duty soldier or veteran to be reminded that they are no longer in a dangerous situation (Yount et al., 2013). As for avoidance and numbing, the active-duty soldier is to teach the canine that the world is a safe place. As a result, the active-duty soldier learns the same lesson (Yount et al., 2013). In turn, this helps the veteran stay present and grounded in the moment, instead of experiencing rumination of the past traumatic experience (Yount et al., 2013). Regarding hyperarousal, the canine is bred to be sensitive to human emotions and needs; therefore, the canine is more in tune with the active-duty soldier’s and veteran’s internal emotional state (Yount et al., 2013). Due to this canine training, the individual must challenge themselves to overcome their tendency for startle reactions within the environment and around other individuals (Yount et al., 2013).

Anecdotal reports of improvement for both active-duty soldiers and veterans have noted increased patience, impulse control, emotional regulation, ability to display affect, and sleep (Yount et al., 2013). Other observed benefits have included an increased sense of purpose, sense of belongingness and acceptance, calmness, and enhanced assertiveness skills, parenting skills, family dynamics, and in-the-moment thinking (Yount et al., 2013). Further anecdotal reports cited a decrease in startle responses and stress levels (Yount et al., 2013).

Regarding equine animal-assisted therapy and PTSD symptomology, the individual learns how to become more aware of their body due to the nonverbal communication equines possess (MacLean, 2011). Furthermore, the individual also becomes aware of their own body

language and expression of emotions, especially as it is related to PTSD symptoms. In addition, the individual learns how to be assertive without experiencing aggression (MacLean, 2011). Anecdotal research discussed the individual as feeling grounded and present in the moment and more mellow and cheerful (Altschuler, 2018; MacLean, 2011). Observations have also illustrated that individuals found it easier to relate to the animal due to the natural tendency for the equine to experience hypervigilance itself (MacLean, 2011).

Depression. Several studies have examined the impact of animal-assisted therapy on depressive symptoms, with or without concurrent PTSD symptoms. Kloep et al. (2017) examined the effects of animal-assisted therapy combined with a 3-week human resilience and life skills training program on PTSD symptomology, depression, anger, and anxiety. The study consisted of 13 veterans, four females and nine males, with previous PTSD diagnoses from The Able Veteran (TAV) program, a non-profit organization. Participants were enrolled at two different times as two separate cohorts, one with seven and the other with five participants. The ages for the cohort of seven ranged from 27 to 70 years old and the ages of the cohort of five participants ranged from 23 to 53 years old. All participants were Caucasian of non-Hispanic origin, enlisted in the military or veterans, receiving treatment via medication, and participating in the TAV program. All but one participant had been deployed overseas. All participants had a previous diagnosis of PTSD; however, the male participants' diagnoses were secondary to combat, and three of the females' diagnoses were secondary to military sexual trauma (MST). In addition, all were veterans of different wars, including Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), Desert Storm, Vietnam, and a combination of OIF/OEF. Participants were not excluded due to co-occurring diagnoses (Kloep et al., 2017).

Measurements utilized included the Posttraumatic Stress Disorder Checklist (PCL; Weathers et al., 1993), the Post-deployment Social Support Scale (Vogt et al., 2008), a 15-item self-report measure that assesses the individual perception of social support after deployment in the armed forces; the Quick Inventory of Depressive Symptomology (Rush et al., 2003), a 20-item self-report measure that assesses depressive symptomology; the Quality of Life Scale (Burchhardt et al., 1989), a 16-item self-report measure that assesses individual perceptions of the quality of their life; and the Dimensions of Anger Reactions-5 (DAR-5; Forbes et al., 2014), a five-item self-report measure that assesses anger related to anger expression, how anger impact interpersonal interactions, and anger reactions following traumatic reactions (Kloep et al., 2017). Participants completed the measurements one month prior to the study, the first day of the study, at the end of each week, 1 month after the study, and 6 months after the study (Kloep et al., 2017).

For the study, each participant was paired with a trained dog based on their needs (Kloep et al., 2017). Prior training of the dog included alerts for increased arousal, anxiety, nightmares, and people approaching the participant. The trauma resilience and skill training consisted of teaching the participants how to work through life challenges, recognize signals, and positively participate in social interactions. In addition, the participants were taught skills in dog care and handling, how to use dog skillsets, how to accompany the dog in public settings, and how to manage stressful situations with the dog in public. The training also included exposure exercises, in which the participant, with the dog, had to effectively remain in the present moment while managing feelings of anxiety, fear, and panic. Finally, the training also included psychoeducation coupled with supportive group interactions that included daily journaling and didactics on

helpful skills. Topics for helpful skills included sleep hygiene, mindfulness, and controlling anger (Kloep et al., 2017).

Results of the study found that at pretreatment, the participants met the criteria for a PTSD diagnosis based upon the PCL and had moderate depression. There were no differences found between PTSD symptoms from one month prior to beginning the study (PCL $M = 63.25$ and 65.4, respectively; Kloep et al., 2017). Additionally, participants had lower PTSD symptomology at posttreatment and at follow-up when compared with their pretreatment scores ($M = 30.0$ and 32.4, respectively). All participants were found to have a significant change at the 6-month follow-up, and 91.7% were noted to have a statistically significant change in PTSD symptoms (Kloep et al., 2017).

Lower depression scores were also found at post-treatment and follow-up compared to the beginning of the study (pretest $M = 15.3$, posttest $M = 5.7$, and follow-up $M = 5.3$; Kloep et al., 2017). Furthermore, 66.7% of participants were noted to have a significant decrease in depression symptoms, and 91.7% had a statistically significant change in depression symptoms at the 6-month follow-up. As for anger, there was a noted decrease at posttreatment ($M = 3.6$) and an increase for perceived quality of life ($M = 80.1$) and perceived social support ($M = 47.4$) at the 6-month follow-up. The decrease in anger and increase in perceived quality of life and social support were noted to have large effect sizes ($d = 1.7$, 1.6 and 1.3, respectively). Limitations of the study included small sample size, generalizability concerns to military personnel not enrolled in the TAV program or military personnel with PTSD not due to combat or MST trauma, no control group, possible excessive repeated measures effect, lack of random assignment, inability to rule out the impact of further treatment at the 6-month follow-up,

inability to compare types of trauma (i.e., combat and MST) due to the sample of participants, and the possibility of social desirability responding by participants (Kloep et al., 2017).

Research has further noted the benefits of animal-assisted therapy with live animals across various domains of functioning. Regarding depression, O'Haire and Rodriguez (2018) pointed out that animal-assisted therapy showed a reduction of depressive symptomology for 75 individuals receiving services through the K9s For Warriors service dog program when compared to 66 individuals receiving usual care. Furthermore, O'Haire and Rodriguez (2018) noted that participants who utilized animal-assisted therapy dogs reported a perceived higher level of improvement than those who only participated in usual care, nearly 20% or more on average.

As previously discussed, Bergen-Cico et al. (2018) found that animal-assisted therapy reduced symptoms of PTSD. Additional findings noted increases in self-compassion. The increase in self-compassion was found to decrease symptoms of depression and decrease the sense of loneliness in individuals participating in the Dogs2Vets program (Bergen-Cico et al., 2018; Owen et al., 2016; Pollock et al., 2017). Bergen-Cico et al. (2018) noted that an increase in self-compassion is important due to the individual recognizing, "suffering, failure, and perceived inadequacies are part of the human condition" and is a part of the process of increasing one's empathy, nonjudgmental viewpoint, and acceptance (p. 1173). Furthermore, animal-assisted therapy was shown to decrease isolation over time, and the animal's presence was associated with a general decrease in sadness for the individual (Bergen-Cico et al., 2018). Benefits for depressive symptomology in military personnel have also been noted in other research studies involving different live animal species. For instance, on a commentary by Westlund (2014) equine assisted-animal therapy has been shown to decrease depression symptoms.

Anxiety. In a study conducted by Ferruolo (2016), the use of equine animal-assisted therapy was assessed regarding not only the treatment of depression and anxiety, but also regarding increasing one's self-confidence, self-esteem, self-concept, and overall well-being. The study included eight male participants, who were unemployed, homeless, and receiving treatment at a Veterans Affairs facility. As for branch of service, three were in the Navy, two were in the Army, and two were in the Marines, with all having more than 3 years of service (Ferruolo, 2016). Five participants were high school graduates, and two had post-high-school education (Ferruolo, 2016). In addition, it was noted that most of the participants were White, but no further information was provided (Ferruolo, 2016). One participant did not complete the demographic data survey (Ferruolo, 2016).

The study consisted of either a 2-day or a 1-day program (Ferruolo, 2016). The 2-day program occurred on consecutive days and had four segments of psychoeducation totaling 70 minutes, nine segments of experiential equine activities totaling 285 minutes, eight segments of group processing totaling 315 minutes, with personal reflection built in through the entirety of the program. The 1-day program had one segment of psychoeducation totaling 20 minutes, four segments of experiential equine activities totaling 160 minutes, four segments of group processing totaling 165 minutes, and continuous personal reflection. The 1-day program was provided for those who could not attend the 2-day program, allowing examination of the difference between the programs. Other therapeutic frameworks were utilized within both programs in conjunction with the planned program, including cognitive-behavioral therapy, motivational interviewing, person-centered therapy, and mindfulness. During the experiential equine activities, the equine was used as a metaphor for problems in life, where the participant would reflect on their way of being and interacting in the world. Their reflections were processed

individually and in the group. The measure used was a self-report evaluation constructed by the authors that was completed at the end of the program. The participants rated their perceptions of the facilitators, the retreat, the value placed on the program, and differences between the 1-day and 2-day programs. The participants also rated whether the program helped alleviate symptoms of depression and anxiety and helped with social skills, and they also identified themes that emerged from their self-reflections (Ferruolo, 2016).

The study found that all participants believed the program was excellent, found the experience valuable, and that participation lessened their self-reported depression and anxiety (Ferruolo, 2016). There was no difference observed between the 1-day and 2-day programs; however, all the participants in the 1-day program found the pace to be excellent, while 80% reported the pace of the 2-day program was excellent (Ferruolo, 2016).

Themes that emerged within the study included "learning about self," a "spiritual connection," "trust," and "respect" (Ferruolo, 2016, p. 56). Of participants in the 1-day program, 100% reported learning about the self while 80% of participants in the 2-day program did. In addition, 33.3% of participants in the 1-day program and 40% of participants in the 2-day program reported a spiritual connection, increased trust, and increased respect. There were no significant differences observed between the 1-day or 2-day programs regarding the reduction in depression and anxiety symptoms. Anecdotal reports found that the participants noted how to work together as a team, view their difficulties in a positive light, interact with others, transfer trust to other areas of one's life, and embody mutual respect. Limitations of the study included a very small sample size, lack of detailed demographic information, generalizability concerns to military personal other than male or have less psychosocial stressors (i.e., homelessness and jobless), selection bias, lack of validated empirical measures, solely self-report or observational

data, researcher bias, and threats to internal validity due to the participants being familiar with the process of psychotherapy, wanting to be seen as favorable by the researchers, or not answering correctly due to fear of stigmatization (Ferruolo, 2016).

Research has further shown that animal-assisted therapy has facilitated a reduction in fear and anxiety due to the presence of the animal (Altschuler, 2018; Chumley, 2012; Hoisington et al., 2018; Pollock et al., 2017). Reported benefits of animal-assisted therapy have included reducing panic attacks and severe migraines (Altschuler, 2018; Yarborough et al., 2018).

According to Warrior Canine Connection, as previously addressed, it was noted that the use of animal-assisted can therapy lower stress levels (Soine, 2013; Yount et al., 2012). These lower stress levels were evidenced by regulated breathing, slowed heart rate, and relaxed muscles for active-duty trainers and veterans (Soine, 2013). Equine assisted-animal therapy has also been shown to decrease symptoms of anxiety (Altschuler, 2018; Ferruolo, 2016).

Cognitive Functioning. Reported benefits for animal-assisted therapy regarding cognitive functioning in military personnel include aiding those with memory disabilities by prompting the individual to take their medication (Furst, 2016), as well as providing balance to the individual when walking or by helping when rising and sitting (Furst, 2016). This enhancement of movement was also a noted benefit of equine animal-assisted therapy, which has been shown to improve balance for individuals with traumatic brain injuries (Pollock et al., 2017). As previously noted, the Warrior Canine Connection program helps to aid in symptoms associated with mild traumatic brain injuries for active-duty soldiers as trainers and for veterans who receive the service animal (Soine, 2013; Yount et al., 2013).

Use of Live Animal-Assisted Therapy in Relation to Interpersonal Functioning, Quality of Life, and Symptom Reduction

An area of further interest is how animal-assisted therapy impacts an individual's interpersonal functioning and quality of life, as well as how these domains impact the individual's overall symptom reduction. Therefore, the section below intends to examine the observed and anecdotal benefits for animal-assisted therapy of both interpersonal functioning and quality of life in relation to symptom reduction for both the civilian population and military personnel.

Benefits of Live Animal-Assisted Therapy on Interpersonal Functioning and Quality of Life with the Civilian Population.

Interpersonal Functioning and Quality of Life. Research has reported that animal-assisted therapy with elderly individuals with dementia led to an increase in meaningful relationships and an increase in the frequency and quality of social interaction; however, in this study the increase in frequency of social interactions did not remain over time (Bernabei et al., 2013). Furthermore, for individuals with dementia, two studies have noted an increase in social interaction when the animal was present (Hardiman, 2010; Sung et al., 2014). Based upon a review completed by Nimer and Lundahl (2007), it was noted that animal-assisted therapy aided in an increase in perceived medical well-being and behavioral functioning for individuals on the Autism spectrum.

Benefits of Live Animal-Assisted Therapy on Interpersonal Functioning and Quality of Life with Military Personnel.

Interpersonal Functioning. In several studies of animal-assisted therapy with military personnel, animal-assisted therapy has been shown to increase active and passive social

communication with others after being able to learn and engage in interactions with the animal (Owen et al., 2016). The increase in active and passive social communication was observed to involve several factors, such as the animals acting as a social facilitator to initiate conversations, the animal aiding in community participation of events, and an increase in confidence with social interactions (Bergen-Cico et al., 2018; Owen et al., 2016; Pollock et al., 2017; Yarborough et al., 2018). Observations also showed that animal-assisted therapy can aid in lowering social isolation, reduce embarrassment, increase feelings of companionship, and lead to improved coping skills in military personnel, which can improve psychiatric symptomology (O'Haire & Rodriguez, 2018; Pollock et al., 2017; Stumbo & Yarborough, 2019; Yarborough et al., 2017). While animal-assisted therapy has been observed to have positive effects on interpersonal functioning for veterans with service dogs versus veterans without service dogs, Stumbo and Yarborough (2019) noted that individuals have reported that the animal can be emotionally and physically demanding and create unwanted public attention. Pet ownership can also result in unexpected costs of owning the animal.

As for the direct impact on psychiatric symptomology for the individual, it has been observed that having the dog present can bridge social interactions, which can lead to a reduction of psychiatric symptomology experienced (Bergen-Cico et al., 2018; Pollock et al., 2017). The animal can act as a buffer between the individual and others and can alert the individual that someone is approaching, which is a noted benefit for those experiencing symptomology of PTSD (Yarborough et al., 2017, 2018). Furthermore, Yarborough et al. (2018) reported that individuals reported a physical and emotional connection with the dog that also helped to facilitate a reconnection with other humans due to feeling less avoidant, distant, and emotionally numb.

Regarding participation in individual therapy, animal-assisted therapy led to an increase in participation for military personnel if the individual knew the dog would be present (Krause-Parello et al., 2018). For active-duty personnel, Warrior Canine Connection has also noted that animal-assisted therapy aids in the decrease of self-isolation and an increase in socialization for the active-duty soldier, as is required for the training program (Soine, 2013). The training program requires substantial interactions with the community in order to address the three primary clusters of PTSD symptomology addressed earlier (Soine, 2013). Anecdotal research of animal-assisted therapy with equines illustrated an increase in patience, relaxation, and trust (MacLean, 2011; Westlund, 2014). More effective communication styles were also observed and reported by veterans who utilized animal-assisted therapy due the bond created between the veteran and the animal, which positively impacted family dynamics and learning how to be assertive without feeling guilty or being aggressive (MacLean, 2011; Yount et al., 2012).

Quality of Life. In a study conducted by Beck et al. (2012), mood states, stress levels, resilience, fatigue, and daily function were assessed to determine if they would be impacted by using an occupational therapy life skills program in conjunction with animal-assisted therapy. Participants for the study included 24 individuals, 17 males and 7 females, with 12 participants randomly assigned per group (Beck et al., 2012). Nine participants were in the reserves, while 15 were active-duty, and all participants had experienced at least one deployment (Beck et al., 2012). Inclusion criteria included being older than 18, an ability to read and speak English, and being a current servicemember assigned to the Warrior Transition Unit which is a component of the Wounded Warrior program that aids in the rehabilitation of servicemembers who have experienced “polytraumatic injuries with combined diagnoses including traumatic brain injury, posttraumatic stress, depressions, burns, and limb amputations” (Beck et al., 2012, p. 38).

Exclusion criteria included pregnancy, dog allergies, open wounds, previous or current participation in the Cognitive Behavioral Education Strategies program due to competing interventions, concurrent participation in the Army Center for Enhanced Performance due to the possible interference of services provided, concurrent participation in equine therapy, and daily interactions with personal dogs (Beck et al., 2012).

The measurements utilized for the study included the Profile of Mood States (McNair et al., 1971), a 65-item measure assessing six dimensions of mood, including tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment (Beck et al., 2012). Perception of stress within the last month was assessed with the PSS (Cohen et al., 1983), a 10-item measure, the Connor-Davidson Resilience Scale (Connor et al., 2003), a 25-item self-report measure assessing resilience, and the Fatigue Scale (Portney et al., 2009), an 11-point numerical measure assessing fatigue from 0 to 10 (Beck et al., 2012). Quality of life measures included the Functional Status Questionnaire (FSQ; Jette et al., 1986), a 28-item self-report measure assessing physical, psychological, social, and role functions within the subscales of basic living activities (ADL), instrumental ADL, psychological function, work performance, social activity, and quality of interaction (Beck et al., 2012). The second quality of life measure was the Occupational Self-Assessment (Baron et al., 2003), a 21-item self-report measure examining the perceived level of competence and values about one's participation in everyday activities and the importance of the activity (Beck et al., 2012).

All participants engaged in the occupational therapy life skills classes, consisting of stress management, communication/anger management, and healthy living for a total of three to six classes (Beck et al., 2012). The experimental group received 30 minutes of animal-assisted therapy after each class on a 1:1 basis with both the animal and its handler (Beck et al., 2012).

The animal-assisted therapy consisted of using basic dog obedience commands and engagement in activities of the participant's choice, such as walking, sitting, or petting the dog (Beck et al., 2012).

The study found no difference over 8 weeks regarding mood state, stress levels, resilience, fatigue, and daily functioning with or without animal-assisted therapy (Beck et al., 2012). There was a significant difference found for the experimental group on three of the subscales of the FSQ, including psychological function ($p < .05$), work performance ($p < .000$), and quality of interaction ($p < .001$; Beck et al., 2012). Quality of interaction was significant across all time measurements, whereas psychological function did not show any significant difference across time and work performance showed a significant difference between baseline and the follow-up (Beck et al., 2012). Based on the results, the authors noted that the environment could have contributed to the decrease in the effect of psychological function. The use of animal-assisted therapy was also noted to increase resilience, work performance, and mood, while decreasing stress (Beck et al., 2012). Additionally, animal-assisted therapy provided short-term psychological benefits such as the ones previously mentioned, but the psychological benefits from animal-assisted therapy dissipated over time (Beck et al., 2012). The study also found anecdotal evidence that the participants reported feeling calmer and more at ease after animal-assisted therapy, increased their social conversations, and reported enjoyment of the treatment and looking forward to the next (Beck et al., 2012). The study's limitations included small sample size, treatment sessions varied in number and were limited to only three or six sessions, and the use of only self-report measures (Beck et al., 2012). A strength of the study was the utilization of multiple outcome measures.

Authors have noted that animal-assisted therapy for military personnel has been shown to increase confidence in one's safety, self-esteem, self-compassion, self-judgment, sense of purpose due to having to take care of the animal, and overall sense of empowerment regarding their treatment outcome (Bergen-Cico et al., 2018; Furst, 2015, 2016; Hoisington et al., 2018; Pollock et al., 2017; Taylor et al., 2013). Animal-assisted therapy for military personnel has also been found to increase an individual's mental quality of life, as indicated by psychological well-being, life satisfaction, and resilience (O'Haire & Rodriguez, 2018; Stumbo & Yarborough, 2019). Through the use of animal-assisted therapy, individuals were found to increase both recreational activities and general activities of daily living (Owen et al., 2016). Anecdotal research from the Warrior Canine Connection shared that their participants "credit the program with turning their lives around, improving their relationships with their spouses/partners/children, and enabling them to resume fulfilling lives" (Soine, 2013, p. 20). Furthermore, a review completed by O'Haire et al. (2015) noted improvements in self-efficacy due to increased resilience and enhanced coping with stressful life events due to the animal's presence for veterans who have experienced combat trauma.

Additionally, there have been reported improvements in sleep, physical activity, protection from suicidal behavior, and decreased reliance on medications (Yarborough et al., 2018; Yount et al., 2012). The use of animal-assisted therapy has also been observed to lower stress levels, as evidenced by regulated breathing, slowed heart rate, and relaxed muscles (Soine, 2013). Regarding therapeutic interventions, animal-assisted therapy has been noted to make individual therapy appear to be less threatening and less judgmental, and thus facilitate more in-depth conversations (Furst, 2015).

Animal-assisted therapy using equines was observed to increase the veterans's self-awareness and knowledge of the self by engaging in a self-reflective process (Ferruolo, 2016). As previously discussed, the veterans also reported an increased sense of spiritual connection, trust, and respect (Ferruolo, 2016). Anecdotal observations have also an increase in one's sense of self and capabilities and an overall sense of peace (Altschuler, 2018; MacLean, 2011; Westlund, 2014). Equine animal-assisted therapy has also been observed to improve social functioning and occupational functioning in veterans who have experienced combat trauma where medications and counseling did not alleviate the psychiatric symptomology they were experiencing (Altschuler, 2018).

CHAPTER III: USE OF COMPLEMENTARY AND ALTERNATIVE TECHNIQUES INCLUDING COMBAT AND EMOTIONAL STRESS CONTROL DOGS AND ROBOTIC ANIMATRONICS FOR MILITARY PERSONNEL

When looking further into animal-assisted therapy among military personnel, new interest and research are emerging from the use of complementary and alternative interventions to providing support, such as combat and emotional stress control dogs and robotic animatronics (i.e., social robot). As previously noted, a combat and emotional stress relief dog is defined as "trained canines deployed for active-duty personnel that offer support for combat stress, home front issues, and sleep disorders" (Vets Helping Heroes, 2018, para. 6), whereas a social robot is defined as an animatronic biofeedback device designed to mimic a baby harp seal (Lane et al., 2016). This chapter intends to address the benefits of using combat and emotional stress control dogs and robotic animatronics (i.e., social robot) as complementary and alternative techniques of providing support for the military populations.

Use of Combat and Emotional Stress Control Dogs with Active-Duty Military Personnel

Regarding combat and emotional stress control dogs, the goal is split between the services provided by the primary handler (i.e., Army occupational therapists) and the recipient. The services include animal-assisted activities via combat and emotional stress control dogs, where the goal is to provide opportunities for motivational, educational, recreational, and/or therapeutic benefits for active-duty military personnel to enhance the quality of life (Fike et al., 2012; Smith-Forbes et al., 2014). The second service provided is animal-assisted therapy via combat and emotional stress control dogs, where the goal is to promote improvement in human physical, social, emotional, and/or cognitive functioning for active-duty personnel (Fike et al., 2012; Smith-Forbes et al., 2014). Despite the type of service provided, it is always a goal-oriented intervention (Smith-Forbes et al., 2014).

In addition, the focus of the combat and emotional stress control dogs is to prevent, identify, and manage adverse combat and operational stress reactions through using the prevention or restoration programs (Fike et al., 2012). In addition, the use of this method has been documented as complementary and alternative medicine techniques to positively impact the soldier's "capacity to regulate the brain and body's response to social and environmental challenges by reducing stress" (Yount et al., 2013, p. 292). Furthermore, combat and emotional stress control dogs can be utilized individually or in a group setting. Overtime it was noted that the soldiers become accustomed to seeing the animals (Fike et al., 2012).

Regarding the previously mentioned programs, the prevention program is conducted by a mobile team who visit active-duty soldiers at their base of operations, where the goal of the prevention program is to educate the military personnel of the services offered and to provide basic education on managing combat and operational stress reactions (Fike et al., 2012). Combat and operational stress reactions are the "expected, predicable, intellectual, physical, emotional, and/or behavioral reaction of service members who have been exposed to stressful events in combat or military operation other than war" (Smith-Forbes et al., 2014, p. 279). The stress reaction can be adaptive or maladaptive. In addition, the prevention team's role is to aid during times of crisis by meeting military personnel in their area of operations and providing the services previously mentioned, as well as "help-in-place" counseling (Smith-Forbes et al., 2014).

For the prevention program to be successful, strong relationships with the soldiers are needed to create an atmosphere where the solders feel comfortable seeking services (Fike et al., 2012). The first use of combat and emotional stress control dogs was within the prevention programs. The dog's presence made the therapist appear more approachable, especially for those who were reluctant to present for treatment (Fike et al., 2012; Rothbaum, 2013), which allowed

the soldier to be “more likely to share their concerns, fears, and goals,” while lowering their guard for a moment (Fike et al., 2012, p. 53). Once a soldier is comfortable with the therapist, the soldier transfers into the restoration program (Fike et al., 2012).

The purpose of the restoration programs is to teach basic coping skills to successfully complete a successful deployment and ability to return to duty (Fike et al., 2012; Smith-Forbes et al., 2014). The length of restoration programs is 3 to 7 days and comprises both group and individual therapy voluntarily (Fike et al., 2012; Smith-Forbes et al., 2014). The authors noted that by the time the soldiers arrive at the program, they are already exhibiting combat and operational stress reactions, typically due to multiple stressors, such as relationship issues or work exhaustion (Fike et al., 2012; Smith-Forbes et al., 2014). For those in the restoration program, the dogs are primarily utilized during group therapy to assist with areas such as self-esteem, anger management, communication skills, resiliency, depression/grief, anxiety, PTSD, sleep hygiene, relaxation, and relationship maintenance (Fike et al., 2012; Smith-Forbes et al., 2014).

It was noted that the first pair of combat and emotional stress relief dogs were “deployed to Iraq in December 2007, accompanying the 85th Medical Detachment Combat and Operational Stress Control unit” (Fike et al., 2012, p. 51). Since 2012, six dogs have been deployed to Iraq and Afghanistan. With the use of combat and emotional stress relief dogs to deliver therapeutic services, the primary handlers have reported an increase in requests for visits and briefs, which helped make the dogs more effective members of their team (Fike et al., 2012).

However, no empirical scientific studies have addressed the benefits of deployed combat and emotional stress dogs to date. The lack of studies could be due to the difficulty in completing

such a study while overseas and/or due to this type of intervention being considered fairly new. The data that has been conveyed thus far has been relayed through anecdotal reports.

Use of Combat and Emotional Stress Control Dogs for Psychological Disorders

As previously discussed, research has demonstrated benefits for both mental and cognitive health regarding the use of live animal-assisted therapy. Similar findings have been noted using combat and emotional stress control dogs with active-duty personnel, for not only the soldier receiving services, but also for the handler of the combat and emotional stress control dog. The section below intends to address the benefits of combat and emotional stress dogs per identified mental or cognitive domains in military personnel.

Benefits of Combat and Emotional Stress Control Dogs for Mental and Cognitive Health. The benefits of combat and emotional stress dogs have been noted in several areas of mental health.

Posttraumatic Stress Disorder. Research regarding the impact of specific interventions on PTSD symptomology has been well documented; however, there is limited research on the benefits of combat and emotional stress control dogs and PTSD. However, it has been observed that a combat and emotional stress control dog can aid in symptom reduction by increasing the soldier's physical activity, social engagement, and a reduction in avoidance behaviors (Rothbaum, 2013), as well as help soldiers who feel numb to their feelings by instilling positive emotions (Yount et al., 2013). The presence of a combat and emotional stress control dogs can change the context of an arousing event by reminding the military personnel they are no longer in danger due to the low arousal state a combat and emotional stress control dog has (Yount et al., 2013). A decrease in PTSD symptomology is important because the decrease in symptomology allows military personnel to remain in the military and increases their acceptance

of treatment, their response to treatment in all major areas of functioning, and an overall reduction in long-term impairments (Rothbaum, 2013).

Depression and Anxiety. Regarding depression, the use of combat and emotional stress dogs can positively affect an individual's mood state and simultaneously reduce stress levels based on observation (Chumley, 2012). As for anxiety symptomology, most of the symptom reduction is captured within the symptom reduction of PTSD. However, Fike et al. (2012) pointed out that there can be further anxiety reduction in an individual because the combat and emotional stress dog could attend individual therapy sessions to further assist anxiety reduction.

Use of Combat and Emotional Stress Control Dogs in Relation to Interpersonal Functioning, Quality of Life, and Symptom Reduction

An important area to explore is the impact combat and emotional stress dogs can have on military personnel's interpersonal functioning and quality of life as these domains of functioning have a direct impact on an individual's ability to complete their job responsibilities and/or maintain an adaptive personal life outside of the military. Therefore, the section below intends to address the benefits of combat and emotional stress dogs for interpersonal functioning and quality of life, as well as both domains' relationship with symptom reduction for military personnel.

Benefits of Combat and Emotional Stress Control Dogs on Interpersonal Functioning and Quality of Life. The benefits of combat and emotional stress dogs have been noted to occur in both interpersonal functioning and quality of life for active-duty personnel.

Interpersonal Functioning. The use of combat and emotional stress dogs has been noted to benefit military personnel's interpersonal functioning. Chumley (2012) noted that the use of combat and emotional stress dogs has been perceived to break down social barriers. Krol (2012)

noted a benefit in the facilitation of social interactions among military personnel. In addition, the dog's use may help individuals who isolate themselves and provide the individual the opportunity to experience positive interactions with members of their community (Krol, 2012; Yount et al., 2013).

Yount et al. (2013) also noted that the use of combat and emotional stress dogs has shown to demonstrate the ability to reverse the effects of harmful conditioning as the result of social interactions, which can result in an increase in positive interaction with other military personnel. As for the handlers, it was noted that training the combat and emotional stress dogs requires the individual to focus on their social competence by becoming more involved with the community, in caring for the dogs and in training the dog to respond that people are not dangerous (Yount et al., 2013). Another important benefit reported is the impact the dog's use can have on an individual regarding an increase in one's positive emotions (Yount et al., 2013). Yount et al. (2013) reported that the increase in positive emotions can directly improve the individual's family dynamic, including parenting style.

Quality of Life. As for an individual's quality of life, combat and emotional stress dogs have been observed to enhance an active-duty soldier's quality of life, as this is the primary goal of such an intervention (Smith-Forbes et al., 2014). During an 18-month tour in Iraq, the combat and emotional stress dogs accompanied their handlers and provided goal-directed interventions focusing on motivation, education, therapeutic skills, and recreation (Smith-Forbes et al., 2014). Anecdotal reports further showed that when the combat and emotional stress dogs were present, more soldiers approached to seek services, resulting in conversations of loss and a stronger bond among soldiers, which was noted to be the "strongest proof of success" (Fike et al., 2012, p. 54; Smith-Forbes et al., 2014).

In addition, Fike et al. (2012) stated:

> One of the most difficult coping aspects of deployment to a war zone is the fact that service members are away from family and loved ones during difficult and highly stressful times. The presence of a therapy dog in this situation offers [the] service members the ability to express and receive affection in an appropriate manner. (p. 54)

From this perspective, the dog's use can increase job satisfaction and resilience levels among the military personnel (Chumley, 2012). Individuals may be more apt to see value in their mission, while also enabling communication with other individuals, utilization of healthy coping skills, a feeling of the ability to reclaim one's life, and the use of a positive outlet to vent and cope with stressors (Gregg, 2012; Krol, 2012).

Furthermore, observations have suggested that combat and emotional stress dogs help to establish closer community bonds due to the presence of the dog breaking up the "monotony of the deployment environment and offering simple pleasures that are normally experienced back home" (Fike et al., 2012, p. 54). Some authors have also observed that the dog's use was a morale booster and provided motivation for military personnel (Fike et al., 2012). As for the handlers of the combat and emotional stress dogs, the training dogs have been seen as improving their overall sense of well-being simply due to interaction and comfort (Yount et al., 2013). It was also noted that combat and emotional stress dogs can aid in the recovery process for individuals who have experienced injuries, as the dog's presence can lift their spirits during recovery (Owen et al., 2016). However, one concern to keep in mind is the possible stress the combat and emotional stress dogs can promote in the handler and/or veterinary personnel, as there is often a lack trained personnel and facilities when serious canine trauma occurs to the animal (Baker et al., 2009).

Use of Robotic Animatronics (i.e., Paro Social Robot)

Robotic animatronics such as the Paro Social Robot is another complementary and alternative intervention that can be utilized when traditional live animal-assisted therapy is not feasible. When addressing robotic animatronics, they typically have a core of commonalities: they imitate real life, whether human or animal; they model behaviors seen in real life; they provide communication, verbally, nonverbally, or both; and they are perceived as part of the living or imaginary world (Lane et al., 2016). The use of robotic animatronics is seen as a non-pharmacological intervention alternative when traditional live animal-assisted therapy is not possible (Sung et al., 2014). There have also been studies consisting of pet-type robots, such as AIBO; however, for the purpose of this review, the focus remained on robotic therapy animatronics, such as Paro (Sung et al., 2014).

To date, most of the robotic animatronic research has been centered around the Paro social robot that was created in 2003 by Takanori Shibata as a partnership between the Japanese government and the National Institute of Advanced Industrial Science and Technology to aid in the retirement of the Baby Boomer generation and the need of care in the future (Birks et al., 2016; Lane et al., 2016). Paro's development intends to provide "psychological, physiological, and social benefits similar to a live companion animal," while also being a low-maintenance alternative to traditional animal-assisted therapy (Okita, 2013). Furthermore, Paro has been classified as a class II medical device within the United States and has been approved by the U.S. Food and Drug Administration since 2009 (Lane et al., 2016; Okita, 2013).

In a general sense, Paro is a socially responsive robot that reacts to how it is treated (Birks et al., 2016). More specifically, Paro is an animatronic biofeedback device equipped with four primary senses: sight, hearing, balance, and tactile sensation (Lane et al., 2016). In addition,

Paro possesses two behavior generation systems, including both proactive and reactive behaviors, meaning initiating and responding (Lane et al., 2016). The proactive behavioral system "adjust dynamically, based on the internal state of Paro, making its behaviors difficult to predict," and the reactive behavioral system includes an ability to respond to behavioral conditions (i.e., tendency to obtain positive reinforcement) and an orienting response (i.e., respond to directional sounds; Lane et al., 2016). Paro is also designed with internal drives, including a sleep-wake cycle (Lane et al., 2016). At this time, Paro resembles the form of a harp seal and is considered to be more effective than other animatronics, such as a cat or dog, due to an individual's lack of a preconceived notion of how a seal should interact and, therefore, a higher likelihood of accepting the robot with fewer problems (Birks et al., 2016; Sung et al., 2014). In addition, Paro was designed to be soft to evoke a feeling of warmth (Sung et al., 2014). In general, "Paro is intended to provide older adults with meaningful, positive social and emotional stimulation" and improve both the social networks of older adults and physiological indicators of stress (Lane et al., 2016, p. 293).

While Paro has primarily been seen as a positive intervention, there have been some noted limitations. For instance, Paro is an expensive treatment modality to obtain, and it has a learning curve for both the staff and the individual when using this therapeutic tool (Birks et al., 2016; Sung et al., 2014). Furthermore, there is often a lack of understanding regarding the value and capacity of Paro by staff members (Birks et al., 2016). Regarding the perception of Paro's use with cognitively impaired individuals, it has been noted that individuals have stated its use may be experienced as humiliating and demeaning (Birks et al., 2016).

Use of Paro Social Robot for Psychological Disorders

Most of the research surrounding Paro or other similar biofeedback devices has been centered around elderly civilians, particularly those with dementia or a disability. However, research has also been conducted on Paro's use with pediatric individuals and those diagnosed on the autism spectrum (Lane et al., 2016). For this review, the focus remained on Paro's use for both the adult civilian population and military personnel. Therefore, the section below intends to address the Paro social robot's benefits per identified mental or cognitive domain regarding both the civilian population and military personnel.

Benefits of Paro Social Robot on Mental and Cognitive Health with the Civilian Population. The benefits of the Paro social robot have been noted in several areas of mental health with the civilian population.

Depression. Within the civilian population, the use of Paro has been shown to be effective in decreasing depressive symptomology within various individuals. Currently, most of the research is centered on residents at long-term care facilities, those diagnosed with dementia, or both. Research has indicated that with Paro's use, older adults within a residential care facility laughed more and displayed softened and brighten facial expressions after interacting with Paro (Sung et al., 2014). In addition, it was noted that those suffering from dementia were observed to display an increase in their emotional well-being and a decrease in their depression after the individual had an interaction with Paro (Okita, 2013). Overall, qualitative and pilot studies have noted that Paro positively impacted an individual's mood and promoted a decrease in isolative and withdrawal behavior (Birks et al., 2016; Sung et al., 2014). The reduction in depression was noticed to occur in both individual and group settings (Birks et al., 2016; Lane et al., 2016).

Anxiety. In a study conducted by Okita (2013), Paro's effectiveness at reducing anxiety was examined as a social change agent regarding pain and emotional anxiety in pediatric patients and their parents via interactions with Paro, the use of modeling, and the development of coping skills. (Okita, 2013). The study participants included 18 pediatric patients, aged 6-16, and 18 parents (Okita, 2013). Participants were patients at a children's hospital diagnosed with different pathological symptoms and were under the care of the hospital's management team. The patients and parents were all female due to research indicating females experience stronger medical fear (Okita, 2013).

The study consisted of two conditions, "alone" and "together with a parent" (Okita, 2013). The child and parent were paired to form 18 groups and were randomly assigned to one condition. In the alone group, the patient was introduced to Paro and instructed how to use it, whereas the parent was separate, completing other tasks to minimize engagement with the patient (Okita, 2013). Within the "together with a parent" condition, the parent was instructed to sit nearby while instructions regarding Paro were given to the patient. During this condition, both the patient and parent interacted with Paro. In both conditions, the examiner returned after 30 minutes (Okita, 2013).

Pretest and posttest assessments were completed before the condition began and 30 minutes after the condition (Okita, 2013). One assessment utilized was the Wong-Baker FACES Pain Rating Scale (FACES Pain Rating Scale; Wong et al., 1995), and both the patient and parent completed different variations of the form. For the patient, a checkmark was placed above the facial expression that best described their pain. Alternatively, the parent completed a form that indicated their level of empathetic pain based upon witnessing their child and also completed a form that addressed their perceptions of their child's pain. The second assessment utilized was

an anxiety questionnaire developed by the authors that addressed six positive emotional traits and five negative emotional traits. The author noted that to determine differences between the patient and the parent, the anxiety questionnaire was overlapped with the State-Trait Anxiety Inventory for Children (Spielberger, 1973) and the State-Trait Anxiety Inventory for Adults (Spielberger, 1983). Only children 9 and over and parents completed the anxiety questionnaire due to trouble reading the items and the ability to relate to the items for younger children (Okita, 2013).

The study results showed decreased pain within the "together with parent" condition with a decline from the mean of 4.89 at the pretest to a mean of 2.78 at the posttest for the patient (Okita, 2013). There was no difference in pain level for patients in the "alone" condition. For parents, there was a significant difference in the pain rating for both conditions. More specifically, in the "alone" condition, there was a mean of 4.33 in the pretest with a mean of 3.44 in the posttest, and in the "together with parent" condition, there was a mean of 3.67 in the pretest and a mean of 1.56 in the posttest. This data indicated that when the patient and parent engaged with Paro, there was a reduction in pain ratings, meaning both the parent's pain rating and the patient's pain ratings decreased. These results may be impacted by modeling or other factors such as the presence of the parent that could have impacted the patient's pain ratings (Okita, 2013).

As for the parent's rating of pain and the parent's perception of the child's pain, there were no differences on the pretest, but there was a significant difference on the posttest concerning the patient's rating of pain and the parent's perception of the child's pain, which showed that the parent was able to acknowledge the child's pain accurately (Okita, 2013). Within the "together with parent" condition, parents acknowledged their child's pain accurately, with the

patient's perception ($M = 2.78$) and parent's perception ($M = 2.56$) showing no difference. However, in the "alone" condition, there was a significant difference between perceptions, with the patient's ($M = 5.22$) ratings higher than the ($M = 3.44$) parent's ratings, meaning the parent underestimated the child's pain (Okita, 2013).

Regarding emotional anxiety, there was no difference from pretest to posttest for patients in the "alone" condition; however, for patients in the "together with parent" condition, there was no difference in positive emotional traits, but there was a decrease in negative emotional traits (pretest $M = 2.67$; posttest $M = 1.64$; Okita, 2013). As for parents in the "alone" condition, there was no difference in positive emotional traits, but there was a decrease in negative emotional traits (pretest $M = 2.73$; posttest $M = 1.87$). In the "together with parent" conditions, there was an increase in positive emotional traits and a decrease in negative emotional traits (pretest $M = 2.33$; posttest $M = 2.83$; pretest $M = 2.73$; posttest $M = 1.43$, respectively; Okita, 2013).

Furthermore, with emotional anxiety, it was found within the "alone" condition that there was a negative correlation between the patient and the parent for positive and negative emotional traits ($r = -0.616$ for the positive emotional trait; $r = -0.670$ for the negative emotional trait), meaning as the parent's negative emotions decreased, the patient's positive emotions increased (Okita, 2013). As for the "together with parent" condition, there was a positive correlation between the patient and the parent for negative emotional traits ($r = 0.579$; Okita, 2013). More specifically, when the patient's negative emotions decreased, so did the parent's (Okita, 2013).

Overall, the author noted that Paro aided in reducing pain and emotional anxiety when the patient and parent were together and emphasized the positive impact modeling may have on coping skill development for pain and emotional anxiety for the patient (Okita, 2013). The study's limitations included the lack of gender difference for the patients and parents, small

sample size, limited interaction time (i.e., only one session), no follow-up, and the study was limited to pain management (Okita, 2013). Additionally, other reasons why the "together with parent" condition may have been soothing for the patient was not evaluated or not clearly articulated.

In a study involving family members, Birks et al. (2016)found that Paro had an indirect effect on the reduction of worry and distress of family members. It was reported that the family felt more at ease knowing their loved ones would receive Paro's interaction if they were unable to visit (Birks et al., 2016). As for a direct effect on the individual, there was limited evidence for reducing physiological stress (Lane et al., 2016). However, with those diagnosed with dementia, there was a possible decrease in their stress levels after an interaction with Paro (Okita, 2013).

Cognitive Functioning. Sung et al. (2014) examined Paro's effects on individuals' communication and social skills in older adults in a one-group pretest and posttest design. The study included 12 participants and was completed at a residential care facility in Taiwan (Sung et al., 2014). The participants' average age was 77, males comprised 75% while females comprised of 25%, half had no formal education, and the majority spoke Taiwanese. In addition, none of the participants had prior contact with robotic animals. Inclusion criteria consisted of being 65 years of age or older, the ability to engage in a simple activity and follow simple directions, an ability to understand Taiwanese or Chinese, no severe hearing impairment, no signs of acute pain or symptoms, and the presence of difficulties engaging in social interactions, such as level of smiling, number of interruptive behaviors, and length of concentration (Sung et al., 2014).

Paro's use lasted for 30 minutes twice per week for 4 weeks with an assigned trained nurse present within a group setting. During each session, the facilitator introduced Paro, and then participants introduced themselves and interacted with Paro (Sung et al., 2014). Two

outcome measurements were utilized for the study. One measurement used was assessing communication and interaction skills (ACIS; Forsyth et al., 1999), a 20-item systematic observational tool that assesses a person's capacity to express themselves and interact with others. The second assessment used was an activity participation scale that was created by the authors, which is a six-item tool that assesses participation, behavior, concentration, interaction with others, interaction with the target object, interruptive behaviors, level of smiling, and level of enjoyment. Participants were assessed with the measurements to obtain a baseline and then again 4 weeks later at the end of the study (Sung et al., 2014).

The study results showed improved communication and interaction skills, with a mean of 59.81 at baseline and an increase to 73.58 at Week 4 on the ACIS (Sung et al., 2014). In addition, results showed an increase in activity participation from 8.55 at baseline to 11.50 at Week 4 on the APS. The authors also noted that the study participants looked forward to their interaction with Paro and asked when the next session with Paro would be. Participants were more willing to come out of their room when Paro was present (Sung et al., 2014).

Noted limitations included small sample size, the study's design being a one-group pretest and posttest design, the lack of nonparametric statistics, limited exposure to Paro due to the group setting, and generalizability of the study to the United States (Sung et al., 2014). The authors also noted the possibility of the Hawthorne effect due to participants having an awareness of their participation in the study. The extraneous variables that were noted included the impact staff may have had on individuals (Sung et al., 2014).

Another study noted that the use of Paro elicited not only more of a response from those diagnosed with dementia, but the effect was also noticed with those diagnosed with advanced

stages of dementia (Birks et al., 2016). In addition, this study also noted that Paro's use appeared to reduce agitation for those diagnosed with dementia (Birks et al., 2016).

Benefits of Paro Social Robot on Mental and Cognitive Health with Military Personnel. The benefits of the Paro social robot have been noted in several areas of mental health with the military population.

Posttraumatic Stress Disorder. Paro has not been found to be useful when utilized with a veteran experiencing acute distress or in the middle of a catastrophic reaction (Lane et al., 2016). Therefore, Paro would likely be more useful for an individual who is "relatively calm and not exhibiting behavioral problems or negative mood states" (Lane et al., 2016, p. 296). It appears that Paro would be more useful for those experiencing chronic issues versus acute distress (Lane et al., 2016).

Depression and Anxiety. As for reducing depressive and anxiety symptomology for military personnel, Lane et al. (2016), observed that there was a reduction in sadness and isolative behavior in geriatric veterans following exposure to Paro. It was also observed that there was an increase in "bright affect" following exposure to Paro (Lane et al., 2016, p. 296). This effect in reducing depression was noted to occur following the exposure to Paro in both individual and group settings (Lane et al., 2016). As for anxiety, Lane et al. (2016) observed a reduction in anxiety in geriatric veterans following exposure to Paro.

Cognitive Functioning. As stated as above, Paro has been shown to enhance cognitive functioning in elderly dementia patients and decrease behavioral and psychological symptoms associated with dementia (Lane et al., 2016). In a study conducted by Lane et al. (2016), the use of Paro was examined within the geropsychiatric veteran population at a long-term care facility to assess the impact Paro had on an individual's affective and behavioral states. The study

consisted of 23 individual observations who were observed repeatedly. The average age of the participants was 80 years old, with a range of 58 to 97. All the participants were male, and the majority identified as Caucasian. Participants were either diagnosed with dementia or was not diagnosed with dementia (Lane et al., 2016).

The data used for the study were collected at the Department of Veterans Affairs Palo Alto Health Care System's Community Living Center, which is a long-term care, geropsychiatric facility consisting of five neighborhoods (i.e., dementia units; Lane et al., 2016). Data collection took place between March 2012 and September 2013. Staff were tasked with observing and tabulating veterans' behavioral observations across three periods, consisting of pretreatment, active treatment, and posttreatment. Pretreatment consisted of observations 1 hour before the introduction of Paro. Active treatment consisted of observations of veterans actively utilizing Paro for at least 5 minutes, and posttreatment consisted of observations 1 to 2 hours after Paro was removed. Observations recorded included both mood and behavioral indicators tracked via paper tracking forms. It is important to note that the tracking forms were updated months into the data collection process to improve consistency across time. However, this change allowed for interrater reliability to be addressed, which was calculated by staff completing observations on parallel forms by using both the tracking forms (i.e., the original and updated), while also calculating reliability coefficients (Lane et al., 2016).

The effectiveness of Paro was indexed by changes in observations of positive and negative mood and behavioral states (Lane et al., 2016). Negative mood and behavioral states included anxiety, sadness, yelling behavior, isolative behavior, reports of pain, and observations of wandering/pacing behavior. Positive behavioral and mood states included calmness, bright affect, restful sleep behavior, and conversing behavior (Lane et al., 2016).

The raters observed a decrease in negative behavioral states in the participants, such as "anxiety, sadness, yelling behavior, reports of pain, wandering, and pacing behavior" when the sample groups were compared pretreatment and posttreatment ($Z = 4.927$; Lane et al., 2016, p. 296). It was also observed by the raters that there was an increase in positive behavioral states, such as "calmness, bright affect, sleep behavior, and conversing behavior" when the sample groups were compared pretreatment and posttreatment ($Z = 4.200$; Lane et al., 2016, p. 296). Additionally, the presence of pre-Paro versus post-Paro was significantly associated with an increase in positive behaviors ($p < .05$) and the presence of pre-Paro versus post-Paro was significantly associated with a reduction in negative behaviors ($p < .05$). Therefore, the data suggested that Paro reduced negative behavior and mood states and increased positive behavior and mood states (Lane et al., 2016).

Limitations of the study included a lack of randomization, no use of a control group within the research design, a lack of an ability to differentiate the effects of staff attention versus Paro, the lack of the study being blind, and the small sample size that primarily consisted of a convenience sample (Lane et al., 2016). In addition, there was no use of empirical assessments, and time limits were loosely defined, meaning if a veteran used Paro for at least 5 minutes then the observation was recorded. It was also noted that some tracking forms had missing data, which was corrected by inserting sample averages, which may have impacted the overall validity of the measurements. The authors of the study also noted that there a learning curve for the staff regarding the use of Paro which could have impacted the rate of observations (Lane et al., 2016). Future research should attempt to increase staff acceptance of Paro and routinely utilize Paro prior to beginning observations.

Use of Paro Social Robot in Relation to Interpersonal Functioning, Quality of Life, and Symptom Reduction

Paro's use has been noted to positively impact both an individual's interpersonal functioning and quality of life. However, to date, most of the research has been centered around the civilian population, with limited research on Paro's military personnel use. Therefore, the section below intends to address the Paro social robot's benefits for interpersonal functioning and quality of life, as well as how both domains impact an individual's symptom reduction for both the civilian population and military personnel.

Benefits of Paro Social Robot on Interpersonal Functioning and Quality of Life with the Civilian Population. The benefits of the Paro social robot have been noted to occur in both interpersonal functioning and quality of life for the civilian population.

Interpersonal Functioning. In the study conducted by Sung et al. (2014) previously noted, it was found that there was a significant increase in activity participation, social skills, communication, and interaction skills among older adults at a residential care facility following 30-minute sessions with Paro, twice a week for 4 weeks. Paro possesses unique mechanisms and a high level of potential for interaction with individuals, resulting in the ability for an individual can learn its functions and build a relationship with Paro gradually (Sung et al., 2014). Similar results were noted to occur by Birks et al., where emotional bonds were observed to develop between individuals with dementia and Paro (Birks et al., 2016). Paro became an object that an individual could express affection toward and "welcome back as an old friend" (Birks et al., 2016, p. 3).

Anecdotal reports by Birks et al. (2016) noted that with Paro's assistance, an individual with dementia who was unable to speak could facilitate expressions of affection between

themselves and their significant other by placing their hands together on top of Paro. There was also an observed increase in positive behavioral interactions between individuals (Birks et al., 2016). For instance, individuals who were typically disruptive and loud became more relaxed and content when Paro was around, as evidenced by a shift in behavior (Birks et al., 2016). As for observed social benefits, Paro was found to deepen the relationship between the individual and therapist due to aiding in the facilitation of deeper and more meaningful communication (Birks et al., 2016).

In addition, within the study previously noted conducted by Okita (2013) with pediatric patients and their families, it was found that Paro was used as a "social agent to generate perspective taking through a shared common experience, which appears to have enhanced the parent's ability to empathize with the child" (p. 440). Therefore, Paro possesses the capability to potentially serve as an effective tool for socialization (Okita, 2013).

In a group setting, Paro has been observed to foster social connection within individuals by instilling group cooperation and communication to complete an assigned task at hand (Birks et al., 2016). These social benefits have been noted to positively impact family relationships as well (Birks et al., 2016).

Quality of Life. Based on anecdotal research, it is hypothesized that Paro reduces loneliness by establishing a direct relationship with an individual, which can then help to facilitate better social connections with other people (Birks et al., 2016). Furthermore, individuals experiencing isolation or withdrawal reportedly experienced a reduced sense of being alone due to verbalizing the internal world they were experiencing to Paro (Birks et al., 2016). In addition, in the study conducted by Sung et al. (2014), it was found that long-term residential care individuals not only looked forward to their interactions with Paro and were more willing to

come out of their rooms, but there was also an increase in activity participation. Paro also became a conversational topic among the residents (Sung et al., 2014).

According to Birks et al. (2016), Paro elicited a positive response that included physical touch, verbal communication, and expressed affection, which translated to increased quality of life and reduced distress in residents, per anecdotal reports. Paro was also noted to provide happiness and comfort at the end of life for individuals and to reduce pain (Birks et al., 2016; Okita, 2013).

Benefits of Paro Social Robot on Interpersonal Functioning and Quality of Life with Military Personnel. The benefits of the Paro social robot have been noted to occur in both interpersonal functioning and quality of life for the military population.

Interpersonal Functioning and Quality of Life. As for interpersonal difficulties in military personnel, Paro has been shown to increase meaningful social interactions and reduce yelling behavior, thus further increasing conversing behavior between individuals (Lane et al., 2016). These behavioral changes were noted to occur within an inpatient setting. Regarding quality of life, there is limited research regarding Paro and its impact on an individual's quality of life. Lane et al. (2016) noted that there is some evidence that Paro reduces loneliness and increases verbal and physical engagement within individuals in a VA long-term care facility. In the same study previously noted conducted by Lane et al. (2016), it was also observed that there was a reduction in pain and an increase in sleep behavior, which in turn, had a positive impact on the individual's quality of life.

CHAPTER IV: ATTITUDINAL BARRIERS FOR ACTIVE-DUTY AND VETERAN SOLDIERS

There are some factors to keep in mind regarding the likelihood of military personnel seeking therapeutic services, such as the individual's help-seeking behavior, gender role socialization, and reintegration difficulties. Therefore, this chapter intends to address these attitudinal barriers previously mentioned that may impact active-duty and veteran soldiers' willingness to partake in therapeutic services, as well as discussing how animal-assisted therapy has improved the attitudinal barriers mentioned.

Help-Seeking Behavior

General Perspective in the Military

In general, an attitudinal barrier of help-seeking within military culture is the general fear of stigmatization that seeking help would either harm their career or not be an effective treatment (Danish & Antonides, 2013). Furthermore, within the military culture, there has been a long-standing history discouraging the need for help, especially if there is a potential for the concern to interfere with the active-duty soldier's ability to be redeployed (Danish & Antonides, 2013). Due to this mindset, this notion unintentionally instills that seeking help is a sign of weakness and that the military person will be viewed as a burden or liability (Pease et al., 2016).

As a result, veterans are at increased risk for substance use, criminal activity and physical health problems, as well as higher rates of unemployment, homelessness, and suicide (Furst, 2016). In 2010, it was estimated that there were roughly 100,000 homeless veterans, and in 2012 it was estimated that veterans accounted for 20% of all suicides within the United States (Furst, 2016). Furthermore, mental health symptoms are underreported, and if treatment is sought, there is typically a high dropout rate (Weiss et al., 2011). In 2013, 38-45% of active-duty soldiers

exhibited an interest in receiving help; however, only 23-40% sought help (Danish & Antonides, 2013). Regarding veterans eligible for services within the U.S. Department of Veterans Affairs, roughly 40% sought treatment (Danish & Antonides, 2013).

Therefore, the attitudes towards help-seeking behavior and the stigma attached to it are important factors to address due to the impact on an individual's mental health and potential recovery. Within the military culture, there are three facets of stigma regarding mental health: public stigma (i.e., general public's perception), self-stigma (i.e., individual's perception of themself), and structural stigma (i.e., institutional policies and procedures that restrict job opportunities; Sammons, 2005). The accompanying thoughts and concerns that arise within these three facets vary from person to person, but there are some commonalities.

Commonalities include the fear of labels, limited confidentiality, negative repercussions from superiors, lack of trust in mental health staff, perception of therapy being too emotion-focused, fear of losing their weapon, and fear of being removed from their assignment (Lunasco et al., 2010). Additionally, the stigmas promote the belief one's career would be negatively impacted or that one would be treated differently (Lunasco et al., 2010). Regarding reintegration postdeployment, individuals also report feeling uncomfortable reporting their experienced symptomology during the routine postdeployment screening (Danish & Antonides, 2013). Thus, it is important to keep in mind that the stigma related to help-seeking behaviors can negatively affect an individual, which can be more devastating and last longer than the illness itself (Danish & Antonides, 2013).

The types of concerns previously mentioned were also noted to occur by Hoge et al. (2014), where the objective of their study was to determine the percentage of soldiers in need of PTSD treatment after returning from deployment, the number of soldiers who were receiving

adequate care, reasons for treatment dropout, and negative attitudes toward mental health treatment. Data were obtained from two different sources: a population-based Army cohort and a cross-sectional unit-based survey. The population-based Army cohort consisted of 45,462 active-duty Army soldiers who returned from Afghanistan between January 1, 2010, and December 31, 2010, and completed the Post-Deployment Health Assessment (PDHA). The PDHA is a brief self-assessment that includes a PTSD screening, followed by a health care encounter that determines the need for further assessment. In the study, there was a focus on individuals who received a PTSD diagnosis within 90 days of completing the PDHA (Hoge et al., 2014). The purpose of this sample of participants was to aid in the determination of the number of soldiers receiving minimally adequate care (i.e., the number of treatment encounters) after receiving the diagnosis of PTSD (Hoge et al., 2014).

Participants within the population cohort included 42,005 males and 3,457 females (Hoge et al., 2014). Enlistment ranks included junior enlisted (E1-E4; 21,157 participants), noncommissioned officers (E5-E9; 18,114 participants), and 6,191 officers. In addition, the ages ranged from 18 to over 40, with the highest number of participants being 18-24 years of age (Hoge et al., 2014).

The unit-based cohort included 2,420 soldiers from an infantry brigade surveyed in July 2011, 4 to 5 months after returning from Afghanistan (Hoge et al., 2014). This sample's purpose was to gather data on health care utilization overall and distinguish those who screened positive for PTSD. The purpose of this sample was to aid in the identification of how many high-risk infantry soldiers reported receiving mental health services, the number of visits, and reasons for dropout (Hoge et al., 2014).

Participants within the infantry cohort included 2,231 males and 155 females (Hoge et al., 2014). Enlistment ranks included e1 to e4 (1,361), e5 to e9 (776), and 247 officers. In addition, the ages ranged from 18 to over 40, with the highest number of participants being 18-24 years of age (Hoge et al., 2014).

Measures utilized were again separated by sub-sample. For the population cohort, all health care utilization was measured during the data collection year though the electronic military Defense Medical Surveillance System, which includes diagnosis and visits anywhere within and outside the United States (Hoge et al., 2014). As for the infantry cohort, PTSD symptoms were measured with a 17-item PTSD Checklist (Blanchard et al., 1996). Health care utilization was measured with a series of questions that asked whether the soldier had received services for stress, or emotional, alcohol, or family problems in the past 6 months from a service care provider, total visits in the past 6 months, and if they were currently in treatment. The 6-month period was chosen to account for the 4 to 5 months post-deployment and the final 1 to 2 months of deployment. The soldiers within the infantry cohort were also asked whether they stopped or dropped out of treatment prematurely. If so, they were asked a series of questions regarding their reasons (Hoge et al., 2014).

A PTSD sub-cohort was defined as those who received a PTSD diagnosis from any health care encounter within 90 days of the PDHA (Hoge et al., 2014). Within the population cohort, 2,230 met the criteria for PTSD. Regarding the infantry cohort, 299 met the criteria for PTSD. Minimally adequate care for PTSD within the population cohort was defined as receiving eight or more health care encounters within a 12-month follow-up period intended to address PTSD. However, minimally adequate care for the infantry cohort was defined as four or more visits within the past 6 months (Hoge et al., 2014).

Results of the study showed that within the population cohort of 45,462 participants, 10.3% were referred for further evaluation; of these, 75% completed the follow-up within 90 days, and 33.2% had a mental health encounter through another source (Hoge et al., 2014). Of the PTSD subgroup within the population cohort consisting of 2,230 participants, 88% were followed for 12 months, while the remaining 12% left military service before the year ended. For the population cohort, the number of visits per participant was 22% for one visit, 59% received four or more visits, and 41% received eight or more visits within 12 months, focusing on PTSD interventions (Hoge et al., 2014).

Results of the study showed that within the infantry cohort of 2,420 participants, 21% reported receiving services for stress, or emotional, alcohol, or family problems, 6% reported receiving psychiatric medication, and 17% had one visit with a mental health provider within 6 months (Hoge et al., 2014). Of the PTSD subgroup within the infantry cohort consisting of 229 participants, 48% reported receiving services within the past 6 months, in which 22% had one visit and 52% had four or more visits with a mental health service provider within the past 6 months. Those who were prescribed psychiatric medication had more visits than soldiers who were not prescribed medication. The satisfaction with care was noted to be moderate and was a little higher for those currently receiving treatment compared to those who had PTSD but were not in treatment (79% and 67%, respectively; Hoge et al., 2014).

Furthermore, within the infantry cohort, of the 507 participants who noted they were receiving care and the 106 who not only were receiving care, but also had the diagnosis of PTSD, a significant proportion reported they stopped or dropped out of treatment before completion (11% and 24%, respectively; Hoge et al., 2014). For these individuals, common reasons for termination or drop out was due to perceptions of self-efficacy, lack of time, lack of

appointment availability, work interference, stigma, confidentiality concerns, belief treatment was ineffective, and negative perceptions of the interaction with the clinician (Hoge et al., 2014).

Limitations of the study included a reliance on administrative data for the population cohort and self-report data for a cross-sectional survey (Hoge et al., 2014). In addition, it was noted by the authors that they did not address the potential benefits of brief or stepped-care interventions. Another limitation noted was the possibility that the survey used did not identify all who dropped out of treatment. However, despite the limitations noted, Hoge et al. (2014) emphasized, "overall reach of mental health services for deployment-related PTSD remains low to moderate," despite extensive screenings and increases in utilization of treatment services (p. 1103).

Impact of Animal-Assisted Therapy on Help-Seeking Behaviors

A major barrier to help-seeking is the stigma attached to mental illness; however, with animal-assisted therapy, there is a lack of concern regarding confidentiality due to the animal not being able to speak, and the animal instills a sense of a nonjudgmental atmosphere (Furst, 2016). Additionally, animal-assisted therapy helps to protect the veteran from the risk of "criticism, rejection, evaluation, punishment, inattention, judgment, unsolicited advice," which is feared as part of traditional therapy (Furst, 2015, p. 452). The dog inherently provides a nonjudgmental outlet, which allows the individual to vent their thoughts and emotions (Taylor et al., 2013). Another benefit of animal-assisted therapy is that the animal does not inherently carry a stigmatizing connotation (Taylor et al., 2013). However, the animal can be viewed by some who are utilizing animal-assisted therapy as a barrier due to the anticipated stigma of other people being aware of their mental health simply due to the presence of the dog (Yarborough et al.,

2018). This barrier can impact the individual's community involvement (Yarborough et al., 2018).

For active-duty personnel, seeing a therapeutic service provider with a dog in hand increased the soldier's likelihood of approaching them first to inquire why the animal was present. This approach subsequently led to conversations of home, loss of a pet, and eventually, loss of a fellow soldier (Smith-Forbes et al., 2014). Furthermore, it was noted that the dog's presence made the therapist seem more approachable and assisted with the flow of the conversation (Fike et al., 2012). Regarding the combat and emotional stress control dogs, when the handler was walking around the base of operations as a part of the prevention program, active-duty personnel were more likely than not to approach the therapist and share their concerns, fears, and goals (Fike et al., 2012). It was further reported that some active-duty personnel who reported being stressed out often smiled at the presence of an animal-assisted therapy dog (Fike et al., 2012). The use of the combat and emotional stress dogs was reported to aid in "fighting the negative stigma associated with seeking behavioral healthcare" and helped decrease the tension and ambivalence individuals experience when seeking care (Gregg, 2012, p. 55; Krol, 2012). The dog's presence further aided in normalizing the setting of being deployed (Gregg, 2012).

Gender Role Socialization

General Perspective in the Military

Another attitudinal barrier to address is gender role socialization within the military culture. This barrier is important to note due to its impact on an individual's help-seeking behavior, where gender role norms appear to inhibit such behaviors (Morin, 2017). As a result of gender role socialization, masculine gender norms are heightened within the military culture,

such as self-resilience, emotional control, and increased independence (Morin, 2017). The stigma related to help-seeking behaviors are noted to be a primary barrier to receiving treatment by males (Morin, 2017). It was also noted by observation that the perception of stigma by an individual is more impactful than their desire to enact help-seeking behaviors (Morin, 2017). This observation is of great importance because it is estimated that roughly 85% of active-duty military personnel are male (Morin, 2017).

Furthermore, within the military culture, it has been noted that seeking help indicates a sign of weakness (Furst, 2015). More specifically, the individual is to be viewed as strong and self-reliant; therefore, the individual "can tough it out" (Furst, 2015, p. 456). This perspective is likely promoted is due to the emphasis on being tough and concentrating solely on the mission to "ensure combat readiness" (Furst, 2015, p. 456). These heightened male gender norms and stigma are both components that impact an individual's decision whether to seek therapeutic services (Furst, 2015). A decrease in engaging in help-seeking behaviors was also observed to occur with female military personnel, who were observed to engage in the stereotypical male behaviors as previously mentioned (Gibbons et al., 2012). However, it is hypothesized that female military personnel may be less likely to endorse mental health symptomology, such as PTSD, due to their familiarity with mental health screening instruments and military implications (Gibbons et al., 2012).

Impact of Animal-Assisted Therapy on Gender Role Socialization

Research on the impact that animal-assisted therapy has on gender role socialization is limited, primarily because gender role socialization is reflected in reduced help-seeking behaviors. As previously pointed out within the military culture, "displaying empathy, compassion, patience, and affection toward others [is] socially undesirable in the military"

(Carper et al., 2016, p. 200). If this type of behavior is shown, which is seen as stereotypically feminine, it can result in ridicule or being accused that one has "gone soft" (Carper et al., 2016, p. 200). However, Carper et al. (2016) noted that the behaviors previously mentioned and/or thoughts translate differently to one's relationship with canines. In fact, the display of empathy, compassion, patience, and affection is seen as socially acceptable. Therefore, a canine's presence can allow the individual to experience emotional connectedness while decreasing emotional numbing, especially during interventions that require disclosure and/or emotional identification. It was noted that the experience of emotional connectedness is likely due to the canine's indirect way of loosening the ideology (i.e., stereotyped male norms) around emotional experience and expression (Carper et al., 2016).

Reintegration Difficulties

General Perspective in the Military

The last attitudinal barrier of interest was reintegration difficulties experienced by military personnel. The concept of reintegration difficulties focuses on the transition from deployment or discharge from the military to the individual's home, including participation in life roles and the individual's return to their age-, sex-, and culturally appropriate role functions (Crocker et al., 2014). The foci for reintegration include relationships, employment, schooling, access to benefits, healthcare, and housing (Crocker et al., 2014). For active-duty personnel, difficulties of reintegration into their family, community, or workplace could be due to the predeployment mindset of survival (Danish & Antonides, 2013). As for veterans, the difficulties of reintegration could be due to the difficult transition from the military's collectivistic nature to society's individualist nature, which can elicit feelings of being separated (Pease et al., 2016).

Furthermore, reintegration requires an "unlearning process" to readjust to their surroundings (Danish & Antonides, 2013, p. 552). If the soldier experiences difficulties in this adjustment period, they may pull away, which exacerbates their symptomology. Pulling away or an increase in symptoms could lead to feelings of being misunderstood, isolated, and experiencing a lack of meaning in one's life (Danish & Antonides, 2013), as well as feelings of no longer "fitting in" (Pease et al., 2016, p. 83). One could also experience identity confusion resulting in the lack of successful reintegration (Danish & Antonides, 2013). From a biological perspective, the biological change from an intense state, such as hyperarousal, to a relaxed state can elicit distress (Danish & Antonides, 2013). This perspective could be viewed from the lens that when one moves from job responsibilities that elicit intense responses to more neutral job responsibilities, it could elicit distress in the individual due to the transition.

The reintegration concerns previously noted are also consistent with a study completed by Sayer et al. (2010) in which the objective was to describe the prevalence and types of community reintegration problems experienced among Iraq-Afghanistan combat veterans and to identify interests in interventions or information to facilitate a smoother transition. The authors identified another objective of the study: to explore associations between probable PTSD, reintegration concerns, and treatment interest (Sayer et al., 2010).

The data collection period was from April to July 2008 and included 754 individuals based on the completion and return of the distributed surveys (Sayer et al., 2010). Of the participants, 411 were female, and 343 were male. The ages ranged from 22 to 62 years, 51% were White non-Hispanic, 24% were African American or Black, 13% were Hispanic or Latino, 3% were Asian, 3% were American Indian or Pacific Islander, and 5% were mixed-race or ethnicity. In addition, 47% were active-duty, 53% were National Guard or Reserves, and

participants consisted of 74% Army, 11% Navy, 7% Air Force, and 7% Marines. As for enlistment ranks, 36% were junior enlisted (E1-E4), 52% were noncommissioned officers (E5-E9), and 10% were officers. Participants were also receiving services through the U.S. Department of Veterans Affairs within the last year (Sayer et al., 2010). Participants' confirmed diagnoses according to Veterans Affairs records included PTSD (27%), anxiety (7%), depression (24%), substance use (7%), psychosis (1%), and TBI (4%; Sayer et al., 2010).

The measurements utilized included a questionnaire developed by the authors of the study that assessed veterans' characteristics, physical and mental health, perceived community reintegration problems, treatment interests, and preferences (Sayer et al., 2010). One of the items on the study questionnaire assessed overall difficulty in readjusting to civilian life over the past 30 days, and 16 items assessed specific problems such as social relations, productivity, community participation, perceived meaning of life, self-care, and leisure activities in the last 30 days. In addition, nine yes/no items were used to assess problems experienced since returning home, including harmful behaviors, divorce or separation, legal problems, job loss, problems accessing health care, and loss of spirituality or religious life. Interest in services was assessed by the individual check-marking items of possible services on a list of 12. As for physical health, mental health, PTSD, and alcohol usage, the Short-Form Health Survey (SF-12v2; Ware et al., 2007) was used, which is a 12-item self-report measuring physical and mental health, the Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003) was used to assess for trauma, and the Two-Item Conjoint Screen (TICS; Brown et al., 2001) was used to assess for alcohol usage. All the measures previously mentioned are used by the U.S. Department of Veterans Affairs and the Department of Defense (Sayer et al., 2010).

The study results indicated that 41% of the participants had a diagnosis of PTSD and 38% had a substance use disorder (Sayer et al., 2010). The SF-12v2 indicated that combat veterans had a "poorer general medical and mental health than the U.S. population," and only 58% received disability benefits for PTSD (Sayer et al., 2010, p. 593). As for reintegration concerns, 40% who used the U.S. Department of Veterans Affairs services reported having some extreme difficulty readjusting to civilian life within the last 30 days. This difficulty further translated to other domains of functioning, including difficulty confiding in others and getting along with spouses, children, and friends, as well as a reported 25-41% difficulty with productivity, such as keeping a job and completing tasks. An area of concern is the reported participation in harmful behaviors, such as increased alcohol and drug use (31%) and problems controlling one's anger (57%; Sayer et al., 2010).

Regarding treatment interests, the results showed that 96% of the participants reported interests in services related to community reintegration problems, with a focus on schooling, employment, and job training (Sayer et al., 2010). As for readjustment and treatment interests, those with probable PTSD had worse SF-12vs summary scores than those without probable PTSD ($p < .001$) and these scores were associated with problems with substance use. It was also found that those with probable PTSD were more likely to report overall general problems with homecoming. Additionally, those with probable PTSD were found to express more interest in more types of services for community integration than those without PTSD ($p < .001$). Eighty-three percent were interested in face-to-face individual therapy, and 71% were interested in medications (Sayer et al., 2010). Results for participants diagnosed with the other probable diagnoses (i.e., anxiety, depression, substance use, psychosis, and TBI) were not reported.

Limitations of the study included the use of a questionnaire as a screener for probable PTSD versus a "gold-standard diagnostic interview," lack of information obtained whether the PTSD was attributable to combat or a different personal traumatic experience, and the lack of assessing areas such as suicidal ideation and depression (Sayer et al., 2010, p. 596). Other areas that were not explored included differences in community reintegration problems based on other psychiatric disorders other than probable PTSD, no psychiatric disorder, and/or medical concerns. Additionally, the authors noted that it is not known whether the participants' treatment interest translates into treatment-seeking, if the services are effective, the training or experience U.S. Department of Veterans Affairs health care providers have, and if evidence-based treatments for PTSD would improve functional and readjustment concerns (Sayer et al., 2010).

Impact of Animal-Assisted Therapy on Reintegration Difficulties

The use of animal-assisted therapy has shown to have a positive impact on individuals' reintegration efforts. For instance, it has been noted that dog's training helped bridge the transition from military life to civilian life and created a renewed sense of purpose and responsibility in military personnel (Pollock et al., 2017). Regarding active-duty personnel, it was proposed that animals, such as dogs, are seen as safer sources of interaction due to the experience of interpersonal trauma while deployed overseas (Hoisington et al., 2018). As such, there is a hope that the renewed trust between the individual and the animal could then be translated to humans (Hoisington et al., 2018).

Furthermore, as previously noted in Chapter Three, the use of a combat and emotional stress dogs aids active-duty personnel in adjusting not only to the life of deployment but also aids in bringing some familiarity of one's personal home to deployment (Fike et al., 2012). As for veterans, Furst (2016) stated that the use of the animals (i.e., dogs) can allow the individual to

become more confident when adjusting to civilian life. In addition, the use of the animal can help the veteran learn to manage life after their military service has ended (Furst, 2015).

CHAPTER V: DISCUSSION

Summary of Findings

The aim of this review was to examine the use of animal-assisted therapy within the military population, including both the benefits and limitations of using live animal-assisted therapy and complementary and alternative techniques to aid in symptom reduction for mental and cognitive health. An additional aim of this review was to explore how the use of live animal-assisted therapy and complementary and alternative techniques can aid in improvement of interpersonal functioning and quality of life for military personnel. A review of the use of live animal-assisted therapy and complementary and alternative techniques with the civilian population was completed to establish a foundation of benefits and limitations that could augment the use of this intervention with the military population. In addition, the aim of this review was to also examine possible attitudinal barriers that the military population may experience when utilizing live animal-assisted therapy and/or complementary and alternative techniques.

Benefits of Animal-Assisted Therapy and Complementary and Alternative Techniques for Mental and Cognitive Health

The use of animal-assisted therapy and complementary and alternative techniques for mental and cognitive health has been observed to be beneficial for not only the civilian population, but also for military personnel.

Posttraumatic Stress Disorder. Animal-assisted therapy has been found to reduce symptoms associated with PTSD within the civilian population, such as lowering subjectively experienced anxiety, negative affect, and increasing positive affect within individuals (Hardiman, 2010; Lass-Hennemann et al., 2018; Yorke et al., 2008). Similar benefits have been

observed in military personnel including the reduction of symptoms associated with PTSD through the use of animal-assisted therapy. For veterans utilizing animal-assisted therapy within the Dogs2Vets program, there was a decrease in PTSD symptoms (Weathers et al., 1991), a decrease in perceived stress, a decrease in isolation, an increase in self-compassion, and an increase in self-judgement at the 12-month follow-up period when compared to the baseline scores (Bergen-Cico et al., 2018). Veterans who participated in the Dogs2Vets program also reported benefits that positively impacted their life, such as a decrease in isolative behavior, improved mental health and emotional well-being, a renewed sense of purpose which included an increase in the management of PTSD symptoms, improved physical health, and the opportunity to apply military service skills (Bergen-Cico et al., 2018). Furthermore, the use of animal-assisted therapy has been observed to reduce symptoms of PTSD, such as reducing hypervigilance, re-experiencing, avoidance, and numbing, acting as a tactile stimulation distraction, waking the individual when night terrors are experienced, and increasing the individual's impulse control, patience, emotional regulation, the display of effect, and sleep (Furst, 2015, 2016; Taylor et al., 2013; Yarborough et al., 2017; Yount et al., 2013). Overall, the use of animal-assisted therapy appears to be effective at decreasing symptomology associated with PTSD for both veterans and active-duty soldiers. Symptoms that appear to be the most directly impacted include avoidance behaviors and those that cause marked alterations in arousal or reactivity, as well as observations of some impact in intrusion symptoms. Based upon the data and observations obtained thus far, the use of animal-assisted therapy to aid in symptom reduction due to PTSD appears to be a worthwhile intervention to utilize as a treatment intervention.

As for complementary and alternative interventions, the use of combat and emotional stress control dogs and Paro the social robot have been observed to be beneficial for the military population regarding PTSD symptom reduction. For the combat and emotional stress control dogs, military personnel reported an increase in physical activity and social engagement, and a reduction in avoidance behaviors (Rothbaum, 2013), as well as helping soldiers who feel numb to their feelings by instilling positive emotions (Yount et al., 2013). The use of combat and emotional stress control dogs can also help to reduce the arousal state in military personnel, which can help the individual realize they are no longer in danger (Yount et al., 2013). As for Paro, it was found that its use was the most beneficial when the military personnel is experiencing chronic distress versus acute distress (Lane et al., 2016). While the use of combat and emotional stress control dogs and Paro has been observed to offer some benefits for the treatment of PTSD, there still needs to be more research completed to show a consistent symptoms reduction when these interventions are utilized. However, as of right now, both the combat and emotional stress control dogs and Paro appear to be worthwhile treatment interventions worth further exploration as they may elicit the same success as animal-assisted therapy.

Depression. Animal-assisted therapy has been observed to be beneficial in the reduction of depressive symptoms for both the civilian and military populations. Regarding the civilian population, animal-assisted therapy was beneficial at reducing fear and depression symptoms, while also increasing observed social interactions (Barker et al., 2003; LeRoux & Kemp, 2009). As for the military population, the use of animal-assisted therapy aided in lowered depression scores at the 6-month follow up period (Kloep et al., 2017), as well as higher rates of self-compassion and a decrease in the sense of loneliness and isolative behaviors (Bergen-Cico et al.,

2018; Furst, 2016). High self-compassion is an important benefit for military personnel because it helps to create the awareness that failure and perceived inadequacies are a part of the human experience, which simultaneously increases empathy for the self. The use of animal-assisted therapy to aid in the reduction of depressive symptoms for military personnel appears to have some promising results based upon the data and observations gathered thus far, especially as it is related to a sense of purpose and empathy for the self. However, at this time, more empirical studies are needed to further assess the effectiveness of animal-assisted therapy in relation to depression symptom reduction.

As for complementary and alternative interventions (i.e., combat and emotional stress control dogs and Paro the social robot), there has been observed benefits to occur for both the civilian and military populations. Combat and emotional stress control dogs have been observed to simultaneously aid in the impact on military individual's mood states and stress levels (Chumley, 2012). As for the use of Paro with the civilian population, there have been some observations of reduced depressive symptomology, including the reduction of isolative behavior and withdrawal behavior, as well as an increase in mood, emotional well-being, laughter, softened affects, and brightened facial expressions after the use of Paro (Birks et al., 2016; Okita, 2013; Sung et al., 2014). Regarding the military population, Paro has been beneficial at reducing depressive symptoms for veterans, which included a reduction in sadness and isolative behavior and an increase in affect (Lane et al., 2016). Again, the use of complementary and alternative interventions to aid in depression symptom reduction needs further empirical research examining the effectiveness of both combat and emotional stress control dogs and Paro with the military population. However, currently, it appears that both approaches offer promising benefits in decreasing negative mood states, stress levels, and avoidance behaviors in relation to depression.

Anxiety. Animal-assisted therapy has been noted to be beneficial for the reduction of state anxiety, primarily for those diagnosed with a mood disorder or psychotic disorder (Baker & Dawson, 1998). As for military personnel, animal-assisted therapy has been observed to lower stress levels, relax muscles, regulate breathing, lower heart rates, reduce panic attacks, and reduce the frequency of migraines (Alschuler 2018; Ferruolo, 2016; Soine, 2013; Yarborough et al., 2018). Animal-assisted therapy with military personnel has also been reported to increase trust, respect, and knowledge about the self (Ferruolo, 2016). Overall, animal-assisted therapy appears to be beneficial targeting the somatic symptoms associated with anxiety; however, the outcome data completed thus far is limited and would require further research examining the effectiveness of animal-assisted therapy solely on anxiety reduction.

The use of complementary and alternative techniques for the civilian and military populations has also shown to have some benefits for anxiety reduction. For instance, the use of combat and emotional stress control dogs can be useful in the reduction of anxiety for military personnel attending individual therapy (Fike et al., 2012). As for the use of Paro with the civilian population, there has been some emotional anxiety reduction noted to occur regarding changes in pain after the use of Paro, as well as the reduction of worry and distress for family members if they knew their loved would have interactions with Paro when they were unable to visit (Birks et al., 2016; Okita, 2013). Within the military population, the use of Paro has been observed to aid in the reduction of anxiety for veterans (Lane et al., 2016). The use of complementary and alternative techniques for the military population in relation to anxiety reduction is extremely limited to date and most of the data gathered thus far is observational and simplistic in nature. Therefore, more quantitative research is needed examining the effects of both combat and

emotional stress control dogs and Paro in relation to anxiety symptoms reduction. There is hope of the possibility of somatic symptom reduction as seen with the use of animal-assisted therapy.

Cognitive Functioning. The use of animal-assisted therapy has been noted to be effective for increasing cognitive functioning for the civilian population, such as a decrease in apathy (i.e., motivation), and enhancement of participation, socialization, a sense of proficiency, self-reported alertness and concentration, and management of daily activities (Gocheva et al., 2018; Motomura et al., 2004). Other benefits for increased cognitive functioning include a slowed rate of cognitive impairment, decreased tension, and decreased agitated behavior (Bernabei et al., 2013; Bono et al., 2015; Hardiman, 2010; Knisely et al., 2012). Regarding military personnel, some benefits in cognitive functioning with the use of animal-assisted therapy have been reported, such as aiding those with memory disabilities by prompting the military personnel to take their medications and providing balance or support for movement (Furst, 2016). The use of animal-assisted therapy with the civilian population has shown to produce beneficial results in cognitive functioning improvements; however, the similar benefits have not yet been observed within the military population due to limited empirical research. Based upon the research completed thus far within the military population, animal-assisted therapy appears to be beneficial for assistance with ambulatory needs and to serve as a reminder, such as with taking medication. Therefore, the use of animal-assisted therapy would be beneficial for those who require more medical needs.

As for complementary and alternative techniques, Paro has shown to be effective in enhancing communication and social skills, aiding in an individual's willingness to come out of their room, eliciting more responses from an individual, and decreasing agitation (Birks et al., 2016; Sung et al., 2014). As for military personnel, Paro has been suggested to enhance cognitive

functioning by reducing negative behavior and mood states and increasing positive behavior and mood states (Lane et al., 2016). To date, there is no research on the use of combat and emotional stress control dogs in relation to cognitive functioning, therefore, research is needed in this area. On the other hand, Paro has potential to be an intervention choice as it has been noted to aid in the reduction of negative mood and behavior states. However, more outcome studies are needed to further examine the use of Paro with the military population in relation to cognitive functioning.

Benefits of Animal-Assisted Therapy and Complementary and Alternative Techniques for Interpersonal Functioning and Quality of Life

The use of animal-assisted therapy and complementary and alternative techniques for interpersonal functioning and quality of life has been observed to be beneficial for the civilian population and the military population.

Interpersonal Functioning. There are some reported benefits of interpersonal functioning due to animal-assisted therapy within the civilian population, such as an increase in the frequency of social interactions and the development of more meaningful relationships (Bernabei et al., 2013). Regarding the impact animal-assisted therapy can have on interpersonal functioning for military personnel, it has been observed that there is an increase in active and passive social communication for the individual, which could be due to several factors including the animal's presence initiating conversations, an increase in confidence during conversations, an increase in feelings of companionship, or a decrease in social isolation (Bergen-Cico et al., 2018; O'Haire & Rodriguez, 2018; Owen et al., 2016; Pollock et al., 2017; Stumbo & Yarborough, 2019; Yarborough et al., 2017, 2018). Veterans utilizing animal-assisted therapy also reported a physical and emotional connection with the dog, which helped to facilitate reconnections with

other humans due to a reduction in avoidance behaviors and reduction in feelings of being emotionally numb (Yarborough et al., 2018; Yount et al., 2012). Overall, the use of animal-assisted therapy appears to have a positive impact on an individual's interpersonal functioning. The positive impact is noted to occur not only externally, by an increase in communication and decrease in isolative behaviors, but also internally, by creating an emotional connection and reducing the sensation of feeling emotionally numb. The use of animal-assisted therapy could be utilized as a starting intervention to aid in building a therapeutic alliance and as a 'buy in' to the therapeutic process due the animal's ability to connect to the individual on a different level that does not seem forced.

Regarding the use of complementary and alternative techniques, the use of combat and emotional stress dogs has been observed to be beneficial by breaking down social barriers, facilitating social communication, increasing positive emotions, and decreasing isolation among military personnel (Chumley, 2012; Krol, 2012; Yount et al., 2012). As for the use of Paro with the civilian population, there was an increase in emotional bonds developed and positive behavioral interactions, and an increase in activity participation observed, which included an increase in laughter, more general activity, and softened facial expressions (Birks et al., 2016; Sung et al., 2014). Within a group setting, Paro was observed to instill group cooperation and communication between individuals (Birks et al., 2016). As for the use of Paro with military personnel, Paro was observed to increase meaningful social interactions and reduce yelling behaviors (Lane et al., 2016). The use of complementary and alternative techniques needs further research to examine its effectives of interpersonal functioning. As of right now, the outcome data for the military population is nearly non-existent or the data is observational in nature. However,

there is hope that the combat and emotional stress control dogs and/or Paro would mirror the effects animal-assisted therapy has on interpersonal functioning.

Quality of Life. The impact animal-assisted therapy has on an individual's quality of life is less evident; however, a noted benefit for the civilian population is in an increase in perceived medical well-being and behavioral functioning for the individual. On the other hand, there are additional noted benefits of animal-assisted therapy regarding quality of life for the military population, such as an increase in psychological function, work performance, quality of interaction, resilience, mood, and a decrease in experienced stress (Beck et al., 2012). The use of animal-assisted therapy with military personnel has also been observed to increase the individual's mental quality of life, life satisfaction, engagement in activities of daily living, sleep hygiene, and physical activity (O'Haire & Rodriquez, 2018; Owen et al., 2016; Stumbo & Yarborough, 2019; Yarborough et al., 2018; Yount et al., 2012). Furthermore, the use of animal-assisted therapy has been reported by military personnel to make the engagement in individual therapy appear to be less threatening and judgmental, thus facilitating more in-depth conversations between the military personnel and therapist (Fust, 2015). Animal-assisted therapy appears to have an overall positive effect on an individual's quality of life, ranging from work performance to mental quality of life to one's experience of individual therapy. However, like most specific domains examined within this literature review, the empirical data completed thus far is limited and could benefit from additional research. Overall though, it appears that regardless of the original intention for the use of animal-assisted therapy, individuals may simultaneously experience improvements in their quality of life. This is beneficial to note because it highlights that animal-assisted therapy can serve a multifunction purpose (i.e., symptom reduction and quality of life improvement).

As for complementary and alternative techniques, the use of combat and emotional stress dogs has been observed to increase the frequency that military personnel seek therapeutic services and have conversations of experienced loss, and enhance job satisfaction, resilience levels, communication, and the utilization of healthy coping skills as well as the development of stronger individual and community bonds (Chumley, 2012; Fike et al., 2012; Gregg, 2012; Krol, 2012). Regarding the use of Paro with the civilian population, there has been an observed reduction in loneliness, pain, isolation, withdrawal, and an increase in social connections, quality of life, and happiness (Birks et al., 2016; Okita, 2013). As for the use of Paro with military personnel, there are some observations that Paro can reduce loneliness and pain, while increasing sleep, and verbal and physical engagement in individuals (Lane et al., 2016). The use of complementary and alternative techniques has also been shown to have some positive effects on quality of life for military personnel, similar to that of animal-assisted therapy. However, further research is needed as the information gathered thus far is observational or limited.

The possible benefits of animal-assisted therapy and complementary and alternative techniques may be better understood through applying various theoretical lens' of personality development and therapeutic change. In particular, the qualitative and quantitative heuristic findings referenced in Table 1, appear to lend themselves to consideration of existential psychotherapy, attachment theory, and interpersonal psychotherapy models. Application of these theoretical orientations may not only shed light on a better understanding as to why therapeutic benefits of animal-assisted therapy occur, but also may suggest which kinds of interventions are the most effective. A brief synopsis of these respective theories follows. Soren Kierkegaard, often referred to as 'the father of existential thinking,' began to establish existential psychotherapy, which in a general sense is the development of greater awareness and

understanding of the self and the world through meaning making (Deurzen & Adams, 2016, p.12). Existential psychotherapy is comprised of four dimensions of existence, including the physical dimensions (i.e., how one relates to the environment and world around them), the social dimension (i.e., how one relates to others and how they interact with the world), the personal dimension (i.e., the relationship with oneself, including one's inner world encompassing views about one's character, past experience, and future possibilities), and the spiritual dimension (i.e., how one relates to the unknown and how one makes sense of their existence; Deurzen & Adams, 2016).

Table 1

Benefits of Animal-Assisted Therapy, Combat and Emotional Stress Control Dogs, and Paro

	Quantitative Benefits	Qualitative Benefits
	Decreased/Reduced	
Behavior	Isolation Absenteeism Negative Behavior	Avoidance/Isolation Loneliness Yelling Severe migraines Pain Hypervigilance Re-experiencing Panic attacks
Affect	Depression/Sadness Anger Negative Mood Perceived stress	Depression Anxiety Fear Emotional numbing
	Increased/Improved	
Behavior	Social Participation Positive Behavior Work functioning	Patience Impulse control Sleep Calmness Communication In-the-moment thinking Physical activity/health Therapeutic services sought

	Quantitative Benefits	Qualitative Benefits
	Increased/Improved	
Affect	Positive Mood Positive affect	Emotion regulation Ability to display affect Emotional well-being Positive emotions
Self-Interpersonal Dynamic	Quality of life/Satisfaction Self-judgement Self-compassion Quality Social Support Self-efficacy Companionship Psychological functioning Resilience	Learning about the self Spiritual connection Safety and respect Confidence Sense of purpose Sense of belongingness Companionship Family dynamics Community involvement/bonds Self-esteem/judgement

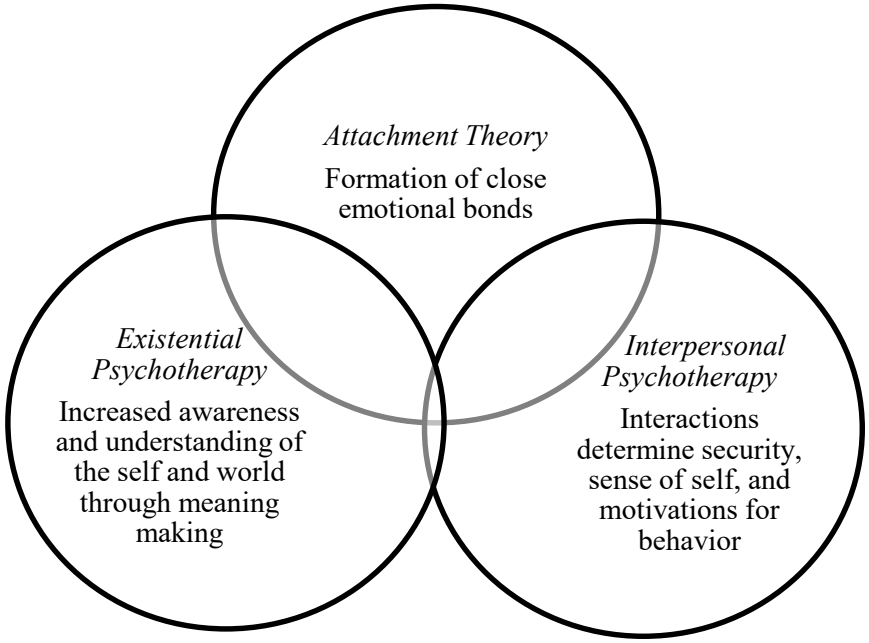
Note. Quantitative benefits are derived from quantitative research. Qualitative benefits are derived from qualitative research.

Attachment theory, developed by John Bowlby, "refers to a person's characteristic ways of relating in intimate caregiving and receiving relationships with attachment figures" and involves not only the person's confidence in the availability of the attachment to explore the world (i.e., secure base), but also the ability to seek support, protection, and comfort when distressed (i.e., safe haven; Levy, Ellison, Scott, & Bernecker, 2011, p. 193). Regarding attachment theory in relation to psychotherapy, there are five tasks that occur, which include: establishing a secure base (i.e., eliciting trust, care, and support), exploring past attachment experiences (i.e., reflecting on past and current relationships), exploring the therapeutic relationship (i.e., how the therapeutic relationship relates to outside relationships), linking past experiences to present ones (i.e., encouraging awareness how current relationships relate to past relationships), and revising an individual's internal working model (i.e., helping an individual feel, think, and act in a new way; Levy, 2013).

Interpersonal psychotherapy, developed by Harry Sullivan, "emphasizes the importance of various developmental stages," including infancy, childhood, the juvenile era, preadolescence, early adolescence, late adolescence, and adulthood, where healthy human development is determined by an individual's "ability to establish intimacy with another person" (Feist & Feist, 2008, p. 213). More so, interpersonal psychotherapy is the "belief that people's interactions with other people determine their sense of security, sense of self, and the dynamisms that motivate an individual's behaviors" (American Psychological Association, n.d., para. 1). The therapeutic goals of interpersonal psychotherapy involve correction of distorted perceptions of other people, diminishing anxiety, learning to verify ideas through consensual validations, and achieving effective interpersonal relationships (American Psychological Association, n.d.). Potential overlap of these areas of thought are illustrated in Figure 1.

Figure 1

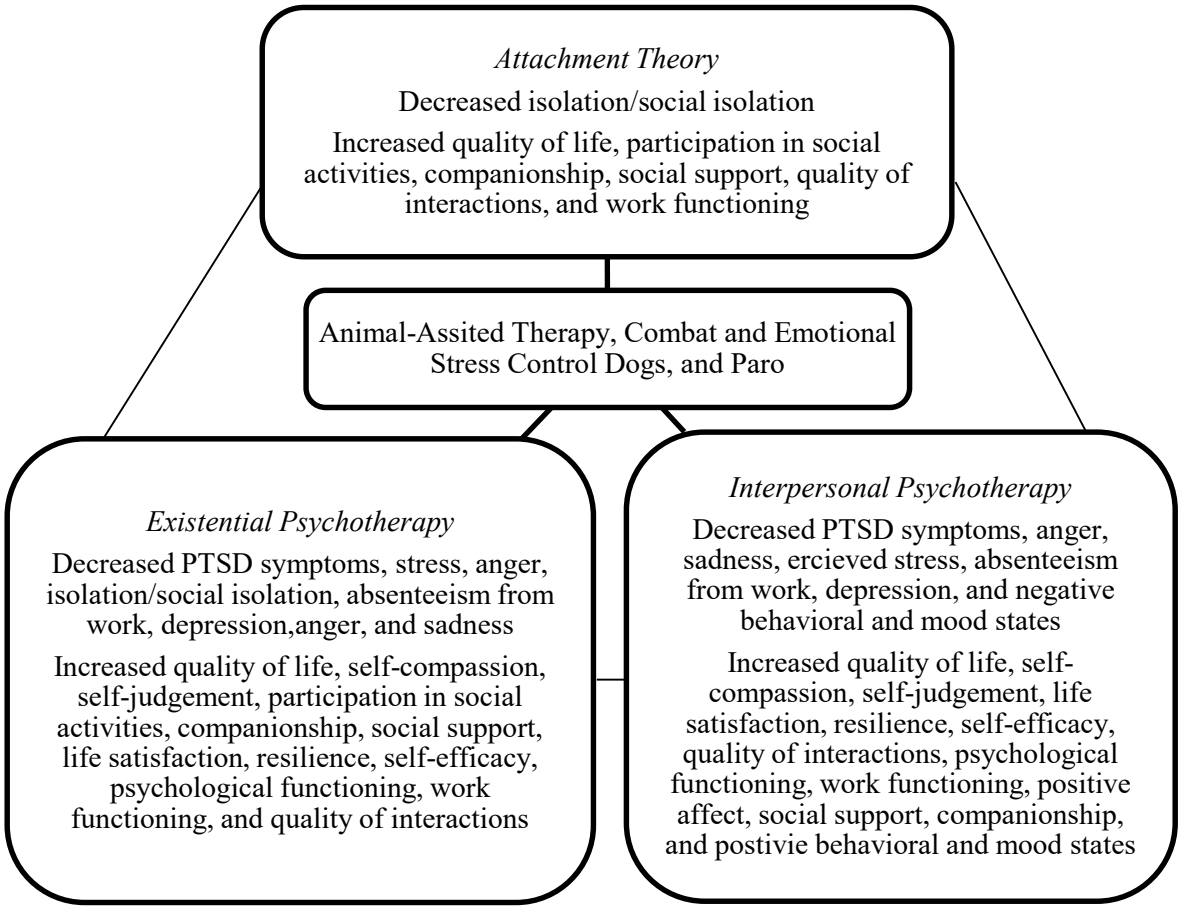
Similarities and differences regarding Existential Psychotherapy, Attachment Theory, and Interpersonal Psychotherapy



Animal-assisted therapy and complementary and alternative techniques may produce therapeutic outcomes through reducing hyperarousal associated with PTSD through a repair of damaged attachment, creating positive emotions interpersonally numbed through combat training and trauma, or belief in something larger than oneself of a benevolent nature. However, it is unknown which benefits, whether quantitative or qualitative, are more salient than others to create therapeutic outcomes and to what extent. By utilizing the aforementioned theories in conjunction with animal-assisted therapy or a complementary and alternative technique, the therapeutic outcomes that are noted to occur may be better understood both from a conceptual and pragmatic treatment perspective and is illustrated in Figure 2. For instance, existential theory when used in conjunction with animal assisted therapy, may help create meaning making and enhance a sense of purposed caretaking via the human-animal relationship. Such a pairing may shed light on the conceptual nature of such therapeutic change. Therefore, the use of the theories previously mentioned may be reasonable to explore in future studies in terms of the treatment effectiveness of select interventions. As such, use of animal-assisted therapy and a paired theoretical orientation may be elevated into evidence-based treatments (EBT).

Figure 2

Quantitative benefits of Animal-Assisted Therapy, Combat and Emotional Stress Control Dogs, and Paro with military personnel in relation to Existential Psychotherapy, Attachment Theory, and Interpersonal Psychotherapy



Limitations of Live Animal-Assisted Therapy and Complementary and Alternative Techniques

Overall, the quantitative research that evaluates the benefits of live animal-assisted therapy and complementary and alternative techniques with both the civilian and military population is limited in quantity, and sometimes quality. As for the civilian population, there were several consistent limitations of the studies reviewed, which included small sample sizes

and generalizability concerns, ranging from too specific inclusion criteria (i.e., type of traumatic experiences, only female participants on oral contraceptives, and specific diagnosis[es]), participants being from a different country, and a lack of varied demographics. In addition, some studies lacked standardization, such as time length for exposure to the intervention, time length since the experienced traumatic event, lack of random sampling, lack of control groups or no distinct difference between the experimental or control group, lack of blinded participants, and brief interactions times ranging from one session individually to a group setting with no specific time established, all of which could have impacted the results. In addition, other limitations include a lack of a follow-ups and a lack of consideration of extraneous variables such as the impact staff can have on participants, Lastly, regarding the civilian population, there were no studies that examined the effects of live animal-assisted therapy or complementary and alternative techniques on interpersonal functioning or quality of life explicitly.

The use of live animal-assisted therapy and complementary and alternative interventions with the military population yielded similar limitations as previously discussed with the civilian population, such as small sample sizes, limited generalizability due to the participants being predominantly Caucasian male military personnel, having varied psychosocial stressors (i.e., homelessness and jobless), or the inability to compare the types of trauma, such as combat trauma or military sexual trauma. Other noted limitations with military personnel include the sole use of self-report outcome measures as noted in several studies, lack of control groups in some studies, lack of specification of treatments received, minimal time limit of exposure, or the lack of the specific number of treatment as usual sessions. Additional concerns include the impact of repeated outcome measures, lack of randomization to groups, and the lack of empirically sound outcome assessments utilized. As for interpersonal functioning and quality of life, there were

very few studies that examined the effects in the use of live animal-assisted therapy with the military population exclusively, with little to no empirical studies found that address the impact of the combat and emotional stress dogs and Paro the social robot on interpersonal functioning and quality of life exclusively. Furthermore, regarding complementary and alternative interventions with the military population, most of the studies centered around qualitative results. Currently, there are no empirical scientific studies have addressed the benefits of combat and emotional stress dogs and limited empirical studies that examined the use of Paro with the military population.

Clinical Implications of Animal-Assisted Therapy and Complementary and Alternative Techniques with Military Personnel

The use of animal-assisted therapy with the military population appears to be effective at decreasing symptomology associated with PTSD, especially avoidance behaviors and those that cause marked alterations in arousal or reactivity, for both veterans and active-duty soldiers. There also appears to be some positive reduction in experienced intrusion symptoms. Similar reductions were noted to occur for depression and somatic symptoms associated with anxiety. Regarding cognitive functioning, animal-assisted therapy appears to be beneficial for assistance with ambulatory needs and to serve as a reminder, such as with taking medication, and would therefore be beneficial for those with medical needs. As for interpersonal functioning, the use of animal-assisted therapy appears to have a positive impact not only externally, by an increase in communication and decrease in isolative behaviors, but also internally, by creating an emotional connection and reducing the sensation of feeling emotionally numb. The use of animal-assisted therapy can be utilized to build or enhance the therapeutic alliance or increase treatment adherence. Quality of life also appears to be positively impacted by animal-assisted therapy.

Overall, it appears that regardless of the original intention for the use of animal-assisted therapy, it can serve as a multifunction purpose due to its ability to simultaneously impact other domains of functioning, such as symptom reduction and quality of life improvement.

However, there are a few challenges and contraindications to be aware of as well, such as the process to obtain the animal (i.e., canine), which is a lengthy process that can involve referrals, applications, screenings, and trainings between the individual and animal once the animal is available for placement. Additionally, there is the possible cost to receive the animal, as well as the costs to maintain the livelihood of the animal, which could negatively impact the individual due to financial stress. The costs to maintain the animal can include food, veterinary visits, and so forth. There is also the possibility the use of animal-assisted therapy could have adverse effects on the individual, such as the animal not alleviating their symptoms as they hoped the animal would, the animal creating more stress due to increased responsibility, or even increased yet unwanted attention from the public to due to other people noticing the animal. The factors previously mentioned are all ones that need to be addressed at length with the individual seeking to engage in animal-assisted therapy prior to the start of the application process to further evaluate if this intervention is the best choice for them.

Regarding the use of combat and emotional stress control dogs, there appears to be some benefits observed regarding PTSD, depression, and anxiety symptom reduction, such as decreased negative mood and behavioral states. An increase in interpersonal functioning and quality of life was also observed with active-duty personnel while deployment overseas. The increase in interpersonal functioning and quality of life was noted to increase treatment participation and communication amongst the individuals and community.

However, there are a few caveats to keep in mind such as the possible stress the combat and emotional stress control dogs can prompt in the handler and/or veterinary personnel, as there is often a lack of trained personnel and facilities available for the animal when canine trauma occurs (Baker et al., 2009). Aims to prevent or prepare for the stress previously mentioned could be beneficial in order to help lessen the impact the stress response could have on the handler or veterinary personnel. Additionally, there is the possibility of the stress the combat and emotional stress control dogs may undergo during their travels from location to location, separation from their handlers, or environmental factors. The stress the animal undergoes is important to keep in mind because managing undue harm to the animal is just as important as preventing harm to the individual receiving the intervention. As for the individuals receiving the combat and emotional stress control dog intervention, another challenge that could arise is the lack of availability of the intervention, possibly due to high demands or the intervention only being available in a group format versus individual. The lack of availability of could hinder active-duty soldiers' willingness to engage with the combat and emotional stress control dog. Furthermore, due to the combat and emotional stress control dog traveling to various duty locations, it is possible there could be further lack of availability due to time constraints, which may leave some active-duty soldiers not receiving the intervention despite their desire to do so. The cost of the training programs and time needed to effectively train the combat and emotional stress control dogs could also prove to be a challenge.

As for Paro, there appears to be some benefits observed regarding PTSD, depression, and anxiety symptom reduction, such as a decrease in negative mood, agitated behavioral states, and avoidance behaviors. Paro has also been noted to aid in the reduction of negative mood and agitated behavioral states associated with cognitive functioning (i.e., dementia). Interpersonal

functioning and quality of life can also be positively impacted by the use of Paro, as seen in an increase in participation and communication amongst individuals, especially for those with dementia.

However, there are a few noteworthy limitations regarding the use of this intervention with military personnel. First and foremost, Paro is an expensive treatment modality and has a learning curve for both staff and the individual utilizing Paro (Birks et al., 2016; Sung et al., 2014). Therefore, it may be difficult to obtain more than one Paro simply due to cost, which limits the use of this intervention. For instance, cost factors may make it feasible within only a group setting versus individual sessions. Additionally, the use of Paro requires time to train staff on the proper utilization of Paro and how to teach Paro's use to the individual receiving the treatment and instill a desire to use the intervention. Furthermore, individuals may experience Paro as humiliating and demeaning due to it resembling a baby harp seal, which was a response noted to occur in cognitively impaired individuals (Birks et al., 2016). Therefore, the perception of Paro could impact an individual's decisions on engaging in the use of this intervention possibly due to their first impression of Paro, such as Paro possibly being viewed as a stuffed animal versus an intervention.

Recommendations for the Use of Animal-Assisted Therapy and Complementary and Alternative Techniques with Military Personnel

Regarding recommendations for the use of animal-assisted therapy and complementary and alternative techniques with military personnel, there are some attitudinal barriers that may impact these individuals' desire to engage in live animal-assisted therapy and/or complementary and alternative techniques, such as the use of combat and emotional stress control dogs or Paro the social robot. Within the military there is not only a general fear of stigmatization that seeking

help would harm their career, not be an effective treatment, or would indicate a sign of weakness due to gender-role socialization, but there are also reintegration difficulties that both active-duty soldiers and veterans experience (Danish & Antonides, 2013; Furst, 2015). Due to these attitudinal barriers of help-seeking, gender-role socialization, and reintegration difficulties, mental health symptoms are typically underreported or there is a high treatment dropout rate (Weiss et al., 2011).

Based upon the studies completed thus far, both quantitative and qualitative, the use of animal-assisted therapy and complementary and alternative techniques has shown and been observed to help reduce the stigma attached to mental illness, by increasing the an individual's confidence in the inherent confidentiality, the increased sense of a nonjudgmental atmosphere, and the increase in emotional awareness that is needed for disclosure (Carper et al. 2016; Furst, 2016). This learned information alone is noteworthy because it has a direct positive impact on what has been conveyed thus far regarding the negative aspects of military culture. Additionally, the increase in help-seeking behavior has been observed to increase for both active-duty soldiers and veterans, and has been noted to occur because animals do not inherently carry stigmatization and are generally seen more favorably (Gregg, 2012; Krol, 2012). These conclusions illustrate the direct impact the use of animal-assisted therapy and complementary and alternative techniques may have on attitudinal barriers that military personnel are often faced with.

Furthermore, the use of animal-assisted therapy and complementary and alternative techniques has the potential to positively impact the reintegration difficulties that are often experienced by both active-duty soldiers and veterans. For instance, the use of animal-assisted therapy can help with the transition to post deployment or to civilian life by helping to bridge the role changes through creating a renewed sense of purpose and responsibility, instilling more

confidence in the transition, and learning to manage life after deployment or retirement (Furst, 2015, 2016; Pollock et al., 2017). For the active-duty soldier, the use of combat and emotional stress control dogs' aids in their adjustment to the deployment and serves as something familiar from home (Fike et al., 2012). It is also possible that the use of the use of animal-assisted therapy and complementary and alternative techniques can be utilized as a prevention strategy prior to deployment or retirement versus being utilized solely as a treatment strategy in hopes to increase the individual's confidence in themselves, willingness to seek help if needed, and challenge the negative beliefs the military culture inherently holds.

Regardless of the attitudinal barriers previously mentioned, the use of animal-assisted therapy and complementary and alternative techniques appear to positively impact the engrained perceptions or difficulties within the military. The use of animal-assisted therapy and complementary and alternative techniques could help the military population in several ways, such as the points previously mentioned, if the use of this therapy and/or techniques were more widely available and properly resourced. First and foremost, more outcome studies need to be completed in order to increase the confidence of utilizing animal-assisted therapy and complementary and alternative techniques. If more outcome studies were completed, it would help to support what has been found and observed thus far and hopefully peak an interest into further exploration of this type of service and possibly lead to more availability. To continue to aid in the availability, the VA could investigate partnering with more programs that are already in existence in the community. Through this avenue, service members, both active-duty and veteran, could be referred to the existing programs through the VA. This approach could prove to be beneficial because it could allow for more varied demographics or vulnerable populations, such as a homeless veteran to take place in the therapy or intervention and outcome studies.

Furthermore, in a general sense, the use of animal-assisted therapy would be recommended for those who are able to take care of themselves and the animal on a consistent basis, are financially able to care for themselves and the animal, and are able to keep the animal for the duration of its life. For instance, active-duty soldiers may have trouble caring for the animal due to their career responsibilities, such as deployment, field trainings, change in duty stations, or living in a residence that does not allow animals (i.e., barracks). Therefore, for active-duty personnel, the use of combat and emotional stress control dogs or Paro may be more feasible. Additionally, the use of Paro would be ideal for those who experience animal allergies or a fear of animals (i.e., canine or equines).

Areas of Future Research

Based upon this review, there are many areas of animal-assisted therapy that would benefit from additional research in the future, especially as it is related to its use with military personnel. First and foremost, a unified theory regarding the mechanisms of how animal-assisted therapy works would be beneficial. Such a unified theory could potentially help future researchers develop studies that assess the mechanisms of animal-assisted therapy more easily and begin to establish the use of animal-assisted therapy as an evidence-based practice. Additionally, it may be worthwhile to explore the qualitative benefits observed to occur through empirical quantitative outcome studies in hopes to further solidify the effectiveness of animal-assisted therapy.

Additionally, the studies completed thus far have focused on the use of animal-assisted therapy with veterans, which may be due to the number of programs that are already established for veterans wanting to obtain a service animal, such as the Dogs2Vets program. Therefore, further research is warranted on animal-assisted therapy for active-duty soldiers versus veterans

as separate entities of the military population due to the differing life and job demands required between an active-duty soldier and a veteran. It would be interesting to find out if the use of animal-assisted therapy aided in the longevity of service or improved re-integration for active-duty soldiers due to mental or cognitive health symptom reduction.

Another area of future research is the impact animal-assisted therapy has on interpersonal functioning and quality of life for military personnel. While there have been some studies completed thus far that address quality of life, the breadth of such research is slim, and the research tends to be richer in observational data versus quantitative data. It would be beneficial for more research examining interpersonal functioning and quality of life simply because of the relationship that is established between the human and the animal. More specifically, does the relationship that is established between the human and animal impact the active-duty soldier or veteran's interpersonal functioning and quality of life and if so, how?

An area that needs much research are the use of complementary and alternative techniques, such as the combat and emotional stress dogs and Paro the social robot. The research in this area is extremely limited, especially regarding the use of these two methods with the military personnel. Regarding further research for the use of combat and emotional stress dogs, the information gathered thus far is observational and qualitative; therefore, the completion of empirical and quantitative studies would be beneficial to further help establish the use of combat and emotional stress dogs as a promising intervention with active-duty soldiers. Additionally, further research that addresses the impact combat and emotional stress dogs has various mental and cognitive health domains for active-duty soldiers would be beneficial to assess how effective and practical the use of this intervention can be. Examining the use of combat and emotional stress dogs with active-duty soldiers overseas versus stateside in the United States would also be

interesting in order to see if there are any differences noted regarding the impact of this intervention on not only mental and cognitive health, but also on interpersonal functioning and quality of life. Currently, qualitative studies have only observed the effects combat and emotional stress dogs has on active-duty soldiers who have been deployed. Examining the effects combat and emotional stress dogs has for active-duty soldiers stateside may also have a positive impact on help-seeking behaviors, gender role socialization, and reintegration efforts due to the familiarity of the intervention or its use a prevention strategy prior to deployment.

Regarding further research on the utilization of Paro with military personnel, more empirical studies would be beneficial as breadth of research completed thus far is still limited when compared to the research completed on the use of live animal-assisted therapy. Further research on the use of Paro could prove to be an effective intervention choice with military personnel in situations where traditional live animal-assisted therapy is not as accessible, such as utilization with individuals with animal allergies or when owning an animal is not feasible due to living situations or financial concerns. Furthermore, examining the use of Paro with active-duty soldiers versus veterans would also be interesting in order to see if there are any differences noted regarding the impact of this intervention on not only mental and cognitive health, but also on interpersonal functioning and quality of life. The information gathered from such studies would be useful because currently there does not appear to be any research, qualitative or quantitative, regarding the use of Paro with active-duty soldiers.

An area that needs further research that extends through all forms of animal-assisted therapy, whether the service is provided by a live animal or robotic, is the impact the service has on reintegration for military personnel. Throughout the studies completed thus far, the focus on reintegration has been extremely limited, which is disheartening. Reintegration, whether it is

postdeployment for active-duty soldiers or retirement for veterans, has a domino effect on all other aspects of human functioning, such as quality of life, interpersonal relationships, and mental and cognitive health. Furthermore, future research on reintegration can possibly shed light on whether animal-assisted therapy or complementary and alternative techniques can serve as a preventative intervention for military personnel to lessen the possibility of reintegration difficulties. It is possible that this research could be accomplished through already established VA programs or by partnerships with the VA and other organizations to begin to look at the efficacy of such research.

Lastly, an area that needs further research is the creation of a succinct policy for the use of animal-assisted therapy on military instillations that resembles the ADA's policy. Based upon this current review of literature, there does not seem to be the establishment of such a policy. The development of a policy such as this one could instill the desire for military personnel, both active-duty and veteran, to utilize animal-assisted therapy or other complementary and alternative techniques because of the protection of rights such a policy would instill. This type of policy could also aid in the establishment of normalcy due to the others witnessing the use of animal-assisted therapy.

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