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Reflections on Recent Research Into Animal-Assisted Interventions in the Military and Beyond

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Abstract
Purpose of Review The purpose of the present review was threefold: to address the current state of Animal-Assisted Interactions (AAI) within the military; to summarize recent literature (within the past three years) in the field of AAI; and to discuss trends in AAI research since 2014.
Recent Findings With regard to AAI within the military, several canine interaction programs have been utilized to assist service members in coping with various issues. Therapy dogs have been deployed with Combat-Operational Stress Control units; they have been integrated into medical clinics and behavioral health treatment programs in garrison; and policy has been developed to address the use of therapy animals in military treatment facilities. General research in AAI has demonstrated efficacy for certain presenting issues (stress management, trauma, autism spectrum disorder) and specific populations (children, the elderly, acute care patients). Overall trends in research include calls for increased consideration for animal welfare in AAI and increased rigor in research methodology.
Summary Current research supports the structured use of therapy dogs in the treatment of various disorders and with specific populations, including military service members and veterans; however, the need for additional research with rigorous methodology remains.

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Introduction

Interactions with animals have always been important to humans. The relationship between humans and animals has evolved from spiritual and mystical veneration, through domestication, and eventually partnership and co-habitation. The next step in the evolution of human-animal relations appears to be the use of animals for therapeutic purposes. To this end, the field of Animal-Assisted Interactions (AAI) has grown exponentially since Boris Levinson's early work on the therapeutic value of dogs. AAI is an umbrella term that includes goal-directed therapeutic interventions with animals (Animal-Assisted Therapy, AAT); less structured wellness activities with animals (Animal-Assisted Activities, AAA); and the use of animals to assist with daily living (Service and Assistance Animals) [1]. AAI is currently the more popular nomenclature in the literature. It is important to highlight the difference between service animals and therapy animals. Service dogs are trained to perform specific tasks to assist individuals with disabilities, in managing their needs. The service dog's tasks must be directly related to the individual's disability (e.g., guide dogs for the visually impaired), and the purpose of the dog's involvement is to mitigate disability. In terms of psychiatric service dogs, the dog must perform tasks beyond general emotional support for anxiety or PTSD symptoms. Therapy dogs are utilized in goal-directed, structured interventions with a health care provider. While the dogs might perform specific tasks, the therapy dog is used as a conduit to address patient goals, rather than to compensate for a disability. Typically, therapy dogs are co-facilitators of

therapeutic services (with the Behavioral Health Provider/Handler).

Interest in human-animal interactions research expanded in 1987 when the National Institutes of Health (NIH) held a workshop on the health benefits of pets. Interest from the NIH aided in the movement to legitimize the field through scientific research [2]. It was around this time that Pet Partners (formerly called The Delta Society) developed AAT registration programs for therapy animals and handlers [3], and the American Veterinary Medical Association (AVMA) initiated the Human-Animal Bond Task Force [4]. In 2006, representatives from Japan, Germany, Luxemburg, and Switzerland created the International Society for Animal-Assisted Therapy, naming quality control, professional recognition, and continuing education of AAT as its primary goals [5]. Additionally, the Waltham Centre for Pet Nutrition and the American Association of Human-Animal Bond Veterinarians began offering grants for AAI research in 2009. The interest in AAT research coincided with the increased use of animals in healthcare and educational settings, as well as increased media exposure regarding human-animal interactions [2]. Today, therapy animals provide a variety of services in many settings. AAI is interdisciplinary, encompassing nearly all areas of physical and mental health, as well as education. Experts in the fields of psychology, sociology, ethology, human development, clinical medicine, aging, veterinary medicine, and public health participate in AAI research and practice [6].

The primary aims of the current review were threefold: first, to examine the role of AAI in the military; second, to evaluate the most recent literature in the field of AAI, emphasizing the benefits of AAI to humans; and third, to consider recent trends in AAI research. Articles mentioned subsequently only pertain to AAI that involve dogs, the most commonly utilized and researched therapy animal in the literature. Additionally, meta-analyses indicated consistent moderate to high effect sizes for the use of dogs in AAI, particularly with regard to measures of well-being, reduced psychiatric symptoms, and behavioral and medical benefits [7]. Finally, the current authors are both members of registered therapy dog teams and specialize in AAI with dogs. For these reasons, research that includes other animals was not reviewed.

AAI in the Military

Over the past ten years, the military has utilized various forms of canine interaction programs to improve health care delivery. The 18–25-year-old is the largest percentage of the military demographic. This same population is believed to have the potential to be an ideal candidate to benefit from AAT interventions for the following reasons. Growing up, many service members had pets in their home with whom they engaged on a daily basis. They left their pets at home when they entered into active military service.

For some young service members, it may be their first time ever leaving home. They may experience loneliness, loss, sadness, or countless other financial, occupational, or interpersonal stressors. They can be dealing with issues related to identity, development, separation from home, and autonomy, and may also find themselves in a variety of new roles (supervisor, subordinate, parent, spouse, and so on) which can add to the sense of being overwhelmed. Service members occasionally come from chaotic families and homes with a history of abuse or violence. These issues may trigger them to seek out initial treatment with Behavioral Health, where they may find the opportunity to engage with a therapy dog.

Having a therapy dog in session with service members makes the clinic atmosphere more homelike. This environment may make them feel more comfortable, may hasten patient-provider rapport building, and may enhance patients' disclosure to the therapist. Military males, in general, may feel more awkward or uncertain when talking to a therapist initially. Having a therapy dog present can facilitate relaxation and raise comfort levels to improve therapeutic outcomes.

An Animal-Assisted Therapy interaction could give service members their first opportunity to experience unconditional love. It can also provide an opportunity for physical affection (animal and patient) without worrying about boundary violations in the therapeutic relationship. The human-animal relationship can be beneficial in numerous ways, but the population that self-selects for military service may especially gain benefits from work with animal therapy. This is, however, another area where ongoing study is needed to verify this hypothesis [8].

In 2007, Walter Reed Army Medical Center initially used therapy dogs to improve rehabilitative efforts of Soldiers returning from war in an occupational therapy clinic. They discovered that "wounded warriors who were very tired of all the human attention and had (subsequently) withdrawn responded very well to the touch of an animal".

At the same time, the Acting Army Surgeon General, MG Gale Pollock, approved the request of the 85th Medical Detachment (COSC) to send two dogs on deployment to Iraq. The unit commander anticipated that placing canines in behavioral health units would provide an element of stress relief to Soldiers serving in harm's way. Challenges arose with deploying these Combat Stress therapy dogs, to include how to ensure canine and human wellness, determining appropriate deployment length, measuring program success, not to mention what to do with the dogs after return from deployment [9].

The immeasurable benefits were also apparent in the eyes of Service Members who found moments of canine comfort from the battlefield in these furry warriors. Other sets of therapy dogs were subsequently deployed to Afghanistan in support of the Operation Enduring Freedom over the next several

years. The official Army program deploying these Combat-Operational Stress Dogs has ceased with the draw-down of troops. Yet, units are still requesting to deploy with Combat Stress canines. Military behavioral health providers who have personally owned and trained therapy dogs are now being called on to fill the void. Returning stateside, programs have become more numerous and diverse across the Department of Defense as the field of animal therapy continues to show benefit. Programs have ranged from unstructured wellness visits via volunteer therapy teams on hospital wards; goal-orientated animal-assisted therapy in behavioral health clinics; [10] and more. The Warrior Canine Connection (WCC) in Bethesda, MD, engages service members healing from PTSD to assist in training service dogs for other Veterans with disabilities. Similar types of programs for incarcerated inmates have been showed to provide therapeutic benefits as inmates learn to re-identify themselves in positive societal roles such as teachers [11]. The WCC volunteer program utilizes the warrior ethos and can appeal to even the most treatment-resistant patients. Intensive PTSD exposure-based treatment programs for Veterans have also shown significantly improved remission rates of depression and anxiety symptoms (at end of treatment and 6 months post-treatment) when trained PTSD service dogs are also included [12]. Canine-Assisted Therapy in all its forms is currently viewed by the military as a developing complementary alternative medicine (CAM) practice alongside traditional evidence-based treatments for PTSD [13, 8].

At this time, the Veterans Administration (VA) does not provide veterans with dogs for PTSD, though they do provide service dogs for Veterans with some physical disabilities. They halted research studies that begun in 2010 and 2011 designed to examine the effect of dogs on veterans with PTSD after two of the dogs bit children in Veterans' homes. The setbacks were a learning experience for the VA. The studies restarted in 2015 after being redesigned with tighter standards for service dogs included in the study and a more rigorous design. This study will be the first randomized, controlled trial involving service dogs, emotional assistance animals, and mental health conditions [14].

The current Army policy (Army Directive 2013-01—Guidance on the Acquisition and Use of Service Dogs by Soldiers) [15] mirrors the VA policy and disallows service dogs (including emotional assistance animals) for behavioral health conditions. It does allow each military treatment facility (MTF) to develop structured treatment programs and local policy for animal-assisted activities and animal-assisted therapy. Some MTFs such as the Air Force Academy in Colorado Springs, CO, are going still further and are finding equine therapy a valuable modality for psychological wellness. As MTFs continue to utilize animal therapy in appropriate and structured ways, the positive benefits can continue to evolve and catapult the field of AAT further forward.

Psychological Benefits of AAI

The benefits of AAI to humans typically fall into the categories of physical health benefits, psychological benefits, general wellness, and benefits to special populations. Mental health and wellness benefits are the focus of the current review, and therefore, physical benefits are only addressed insofar as psychophysiological assessments and physical health benefits impacting overall wellness.

Animals have been utilized in the therapeutic treatment of psychological disorders for many years. Interventions are generally intended to decrease symptoms, increase motivation, and/or enhance education. Recent research on the psychological benefits of AAI to humans spans a great deal of content areas, primarily falling into two categories: benefits of AAI on the treatment of specific disorders/presenting issues and benefits to specific populations. In reviewing the literature from the past three years, there has been significant focus on trauma treatment, stress management, and treatment of autism spectrum disorder (ASD) particularly in children. Other special populations addressed in the literature include children in general, the elderly, veterans and military service members, and acute care patients.

Trauma

The treatment of trauma, a growing literature of its own, has embraced AAI, with studies evaluating the benefits of AAI on reduction of PTSD symptoms. In a review of the impact of AAI on trauma-related symptoms, results supported the use of therapy animals for short-term reduction in depression and anxiety associated with trauma, as well as reduction in overall PTSD symptoms, such as dissociation and physiological arousal [1], with one study reporting an 82% reduction in PTSD symptoms when comparing self-report scales pre- to post-AAI program [16]. Psychophysiological data, such as heart rate, blood pressure, and salivary hormone levels, further support the stress-buffering impact of AAI [17–20], which suggests AAI as a potentially valuable intervention for trauma treatment. The implication being that therapy animals alter the perception of stress, distress, and psychological symptoms. To that end, a large body of research supports the use of therapy dogs as stress-buffering agents.

Stress Management

Some of the earliest research into AAI examined the stress-reducing benefits of interacting with animals, including Friedman et al.'s (1983) seminal work that found the stress of a task (reading aloud) could be moderated by the presence of a dog [21]. The authors implied that the dog's presence modified participants' perception of the situation, leading to reduced physiological signs of stress (e.g., blood pressure,

heart rate). Replication of physiological measurement of stress reduction has been a focus of recent research in AAI, with findings significant for salivary immunoglobulin [19], heart rate [18, 19, 22], and salivary cortisol [22], all physiological indicators of decreased stress. Self-report measures have also been significant for decreased stress levels, supporting Friedman et al.'s implication that it is the perception of the situation that moderates stress perhaps through reducing perceived stigma and enhancing the therapeutic alliance [23]. Additionally, Wright et al. found that having a pet dog attenuated total stress and parental distress in parents of children with ASD [24].

Autism Spectrum Disorder

Additional research into the utilization of therapy dogs in ASD treatment found that participants who engaged a therapeutic dog-walking program increased rate of smiling threefold, which authors suggested was due to the influence the dogs had in altering the meaning of the social environment (e.g., social interaction with and about the dog was evaluated more positively by participants and therefore led to an increase in pro-social, smiling behavior) [25]. Other notable research supports the use of AAI for promoting pro-social behavior in children with ASD, including increased social approach behavior, improved social skills, and decreased social withdrawal [26].

Special Populations

Children Children were the focus of many of the current studies of the benefits of AAI. Research spans age groups, presenting concerns, and severity of symptoms. Previously discussed was the role of AAI in treating ASD, an increasingly popular intervention. Other research found that the presence of therapy dogs during forensic interviews with child survivors of sexual abuse reduced physiological indicators of stress [19]. Likewise, in an examination of children of military service members with a deployed parent, Mueller and Callina found that children with attachments to pets demonstrated increased adaptive coping, compared to non-pet owners [27]. In studies of pediatric medical patients, literature suggests AAI influenced reduction in anxiety and pain [28]. In pediatric surgical patients, Calcaterra et al. found that AAI facilitated quick recovery from anesthesia, as well as enhanced emotional pre-frontal cortex response (measured by EEG) [29].

Elderly Much of the recent research in AAI assessed the benefits for elderly humans. Many of these studies examined the effects of AAI on participants diagnosed with some form of dementia, finding improved self-reported quality of life and decreased depression among older adults with advance-stage dementia [30]. Menna et al. found that the effectiveness of Reality Orientation Therapy (ROT) among elderly patients diagnosed with Alzheimer's disease was statistically significant in groups that included AAI, compared to controls [31]. In AAI programs implemented in nursing homes, studies found reductions in self-reported depression, improved short-term memory, increased physical activity, and increased sleep [32, 33]. Strickland and Davidson additionally identified pet attitudes and gender significantly predicted the willingness of elderly patients to engage in AAI, suggesting potential mediators for assessing therapeutic relevance [34].

Acute Care Patients Integration of therapy animals in hospital and acute-care facilities is relatively common. Visitation programs, as well as structured programs in inpatient care, are found in most hospitals across the country. Some of the specific benefits noted in the literature include decreased self-reported pain, fatigue, and anxiety among participants who received a brief (5–10 min) interaction with a therapy dog [35]. It is noteworthy that participants represented varying acuities and medical presentations, to include surgery, cardiac ICU, oncology, neurology, and rehabilitation, among others. Creagan et al. reviewed the benefits of AAI in hospital settings to argue for increased implementation at the Mayo Clinic, specifically noting the healing power of human-animal interactions, as well as the favorable cost-benefit analysis [36].

Current research focuses on many diverse areas of AAI. With regard to the psychological benefits, most studies examine particular disorders, presenting issues, or special populations. Reviewed here were the benefits to treating trauma, stress, and autism spectrum disorders. Additionally, research on the benefits to special populations (children, the elderly, veterans and military service members, and acute care patients) was discussed.

Recent Trends in AAI Research

With regard to the state of AAI literature in general, several recent reviews analyze the most common themes and outcomes within the cannon. First, Hosey and Melfi's literature review discusses the themes present in HAI/HAB literature, to include in order of popularity: AAI in general, benefits of pet ownership and interactions with pets, animal welfare, methodological issues in research, theory, characteristics of caretakers, role of veterinarians, and sociological approaches [37]. Already discussed were AAI in general and benefits of interactions with animals. The following discussion is a review of two remaining themes that are noted throughout recent AAI research: animal welfare and methodological issues.

Animal Welfare in AAI

Welfare of therapy animals is an emerging body of literature, most recently addressed as a full issue of the peer-reviewed journal *Animals* (2017). In the issue, Glenk reviewed the current state of research into the well-being of therapy dogs, finding nine total studies that assessed dog biomarkers (salivary cortisol, heart rate), behavior, and cognition, in addition to handler questionnaires [38]. Outcomes were mixed, with some indications of increased distress in dogs during AAI [39–43]. Though the author stated the need for more research into the welfare of therapy dogs, she also noted that the current evidence does not raise concern regarding the implementation of therapy dog programs. Indeed, Byrd et al. reported that 90% of survey respondents believed animal use was acceptable for the purpose of service or therapy [44]. Pet Partners published a position paper on therapy animal health and welfare, which emphasizes the importance of the handle knowing and advocating for their therapy animal(s). Additionally, the International Organization of Human-Animal Interaction Organizations (IOHAIO) published a White Paper in 2014 that stated therapy animals should be regularly re-assessed for health and wellness. Again, it should be noted that this is an emerging area of research in AAI and should continue to be evaluated for best practices.

Methodological Issues

From the inception of AAI research, there has been a call for more rigorous methodology and analysis of AAI studies. The field long utilized anecdotal evidence and popular media reports of the benefits of human-animal interactions. While these stories are meaningful and serve a purpose, they do not necessarily legitimize the field of AAI from an academic viewpoint. Because of this shortcoming, many researchers in AAI have called for increased academic rigor and methodology, specifically randomized control trails (RCTs), larger sample sizes, and analyses of effect sizes [45–47]. Current research is trending in the direction of increased rigor. Lundqvist et al. identified 14 randomized controlled studies of dog-assisted interactions, encompassing therapy dog and dog visitation programs [48]. The majority of these studies (79%) were published between 2013 and 2016, indicating movement in the direction of increased academic rigor. Lopez-Cepero Borrego et al. noted that nearly all of the AAI research studies in the past 10 years have been empirical, indicating a more away from anecdotal and case study reports [49]. To date, more than 20 AAI studies passed the National Institutes of Health (NIH) peer review process [50]. These numbers will likely continue to increase as interest in AAI extends into academia. Grants through NIH/Mars-WALTHAM and governmental funding in some countries (the Austrian Science Fund and UK Medical Research Counsel) have allowed for more research opportunities [46], as has the implementation undergraduate and graduate programs specific to human-animal interactions; establishment of the Human-Animal Interaction Bulletin, a peer-reviewed journal published by the American Psychological Association (APA); and additional faculty positions at major universities (Purdue University, University of Denver) [46]. It is clear from these steps that the field is striving toward development of an academically rigorous research base. In addition to the need for rigorous methodology is the need for standardized terminology in the field. Much of the current research notes this need [37, 47, 48]. Because human-animal interaction is a cross-disciplinary, multi-faceted field, unified terminology is essential to building the evidence-base for AAI.

Current trends in research emphasize the need for further evaluation of the benefits of AAI in general, increased rigor in research methods, and advocacy for therapy animals to ensure their welfare. These are the main themes of research since 2014. By emphasizing these themes, researchers and practitioners have the opportunity to grow the field of AAI.

Future Directions

The field of AAI has grown over the past several decades, and the support for use of animals in therapeutic interactions continues to grow an evidence base. While great strides have been made, further quantitative research, especially RCTs, will assist in furthering the field. Essentially, more research is required to make AAI an evidence-based complimentary treatment modality. To this end, we echo the need for standardization of language and increased rigor in research.

Within the military, several policies and procedures outline the therapeutic use of animals; yet, resistance to implementation of these programs remains. Much of this resistance is in response to the belief that there is no sufficient evidence to support AAI; therefore, it is important to educate those in leadership positions of the current state of the research. Part of this education requires and understanding of the different types of AAI (e.g., service animal versus therapy animal), as well as implementation of AAI programs; therefore, the need for program evaluation is essential to establishing AAI in the military healthcare system. From this research, it will be possible to develop practice guidelines and standardization of therapy dog programs beyond current scope and practice.

The aim of the current review was first to examine the current state of the literature on AAI, especially with regard to the psychological benefits of human-animal interactions; second to analyze trends in AAI research over the past three years; and third to explore the role of AAI in the military. Additionally, future directions for the field of AAI and implementation of AAI in the military were considered. Research and critical examination are essential to the progress of all

forms of treatment, with the goal of further developing empirically supported treatments and establishing evidence-based practices. The long-term goal of AAI research is no different, in that AAI has the potential to be an evidence-based CAM.

Compliance with Ethical Standards

Conflict of Interest Christina B. Rumayor and Amy M. Thrasher each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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