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“A Part of Our Family”? Effects of Psychiatric Service Dogs on Quality of Life and Relationship Functioning in Military-Connected Couples

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ABSTRACT

Posttraumatic stress disorder (PTSD) can have corrosive impacts on family relationships and individual functioning. Emerging evidence has shown that psychiatric service dogs may be an effective complementary treatment for military veterans with PTSD, benefiting veterans’ mental and social health. However, few studies have examined the effects of psychiatric service dogs on the family members of veterans, specifically their partners. Mixed-methods data from 60 veteran-partner dyads examined individual and relationship functioning among partners of veterans paired with a service dog (service dog group; $n = 37$) and those awaiting placement (waitlist group; $n = 23$). While there were no statistically significant differences across groups, the effect sizes for group differences suggested that partners in the service dog group (relative to those on the waitlist) may experience higher levels of resilience and companionship, and lower levels of anger, social isolation, and work impairment. A topical survey of partner qualitative data within the service dog group indicated that service dogs provided more benefits than challenges. Partners reported improvements in veteran functioning, family relationships, and partners’ quality of life. Results, although preliminary, suggest that psychiatric service dogs may provide modest positive experiences for some veteran family systems.

KEYWORDS

Posttraumatic stress disorder; families and children; military couples; psychiatric service dogs; family systems; human-animal interaction; animal-assisted intervention; veterans

Beyond impairing individual functioning, veterans’ posttraumatic stress disorder (PTSD) can corrode family relationships and disrupt the functioning of family systems (e.g., Dekel & Monson, 2010). Emerging evidence has shown that the use of psychiatric service dogs, as an adjunct to PTSD standard treatment, is associated with improvements in veterans’ mental well-being and quality of life (e.g., Yarborough et al., 2018). Still to be examined, however, is the broader impact of psychiatric service dogs on veterans’ family systems. Given that caregivers of veterans of the post-9/11 conflicts are most commonly their romantic partners (Ramchand et al., 2014), it is important to understand the impact of complementary treatments on family relationships. The present study examined associations between veterans’ use of psychiatric service dogs and veteran-partner

relationship functioning, as well as partners’ quality of life, mental well-being, work functioning, and social functioning. Guided by family systems theory, we expected that the positive effects of psychiatric service dogs experienced by veterans (e.g., Kloep et al., 2017; O’Haire & Rodriguez, 2018; Yarborough et al., 2018) would extend to veterans’ families (in this case, their romantic partners).

According to family systems theory (Cox & Paley, 1997), family dynamics are defined by both the actions and responses of each individual member. This interdependence within family systems has been used to describe how veteran’s PTSD can impact other family members (Lester et al., 2017). Existing research indicates that companion animals (i.e., pets) make positive social, emotional, and instrumental contributions to family environments (Mueller et al., 2015; Walsh,

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2009). The bond between humans and animals has also been hypothesized to promote family resilience (Walsh, 2009), though this has received little empirical attention. Human-animal interaction scholars have repeatedly called for a better understanding of the roles that animals—both companion animals and service animals—play in family systems (Mueller et al., 2015; Triebenbacher, 2006). Responding to this need, we examined individual and relationship functioning across couples with and without psychiatric service dogs in the household.

Veteran mental health

Military service members can experience traumatic events, such as combat exposure, military sexual trauma, or training accidents, that can lead to elevated rates of PTSD, depression, anxiety, substance use, and comorbid mental health problems among veterans (Tanielian & Jaycox, 2008; Trivedi et al., 2015). PTSD is an enduring psychiatric disorder characterized by high levels of reactivity and arousal, the reexperiencing of traumatic events (e.g., flashbacks), intrusive and negative thought patterns (e.g., anger, sadness), and avoiding triggering situations (American Psychiatric Association, 2013). PTSD is a “signature wound” of the post-9/11 conflicts (Tanielian & Jaycox, 2008) and has an estimated prevalence rate of 23% (Fulton et al., 2015), although estimates have ranged from 1 to 30% (Institute of Medicine, 2013). Consequences of PTSD for veteran functioning include elevated risky behavior such as suicide ideation and substance use, poor physical functioning, financial and employment challenges, and decreased social engagement (Tanielian & Jaycox, 2008).

Veterans and psychiatric service dogs

The reach and effectiveness of evidence-based treatments for PTSD (e.g., cognitive behavioral therapy, pharmacotherapy, prolonged exposure) can be limited due to institutional barriers to accessing care, stigma surrounding mental health, high treatment dropout and nonresponse, and limited ability to pay for care (Schottenbauer et al., 2008). As such, there has been growing interest in adding complementary and integrative health practices to evidence-based treatments to optimize veterans’ PTSD treatment response (Department of Veterans Affairs/Department of Defense, 2017). One such complementary treatment, animal-assisted intervention, utilizes animals to assist in goal-directed, targeted therapy (Krause-Parello &

Morales, 2018; Kruger & Serpell, 2010; O’Haire, 2010). PTSD service dogs are a type of psychiatric service dog that are trained to perform tasks directly related to PTSD symptomatology, such as waking veterans from nightmares, positioning themselves behind veterans in public to “watch their back” or responding to veterans’ distress during reexperiencing episodes. However, it is important to acknowledge that no evidence has yet met the VA’s threshold for considering PTSD service dogs an evidence-based treatment for veterans’ PTSD (Department of Veterans Affairs/Department of Defense, 2017). Some clinicians have argued that PTSD service dogs can undermine veterans’ PTSD primary standard treatment by reducing opportunities to confront negative experiences in daily life (Finley, 2013).

While controversy exists, early research is promising. For example, in multi-group intervention studies, veterans with PTSD service dogs reported less PTSD symptoms, less anxiety, less depression, and better psychological well-being than veterans on waitlists (O’Haire & Rodriguez, 2018; Whitworth et al., 2019). Qualitative studies of veterans with PTSD service dogs have found increased feelings of safety and community connectedness; improved sleep, quality of life, and social relationships; and reduced need for medication (Crowe et al., 2018; Yarborough et al., 2018). Recent research found that PTSD service dogs are associated with changes in the body’s stress response system, suggesting that the benefits of PTSD service dogs’ assistance and companionship may extend to biological and physiological processes (Rodriguez et al., 2018). Despite these benefits, studies have reported notable drawbacks to PTSD service dog therapy, including concerns about animal welfare, financial costs, difficulty maintaining service dog training, and challenges arising from the public’s lack of knowledge regarding service dogs (Krause-Parello et al., 2016; Yarborough et al., 2018). While the number of studies examining associations between PTSD service dogs and veterans’ functioning has increased in recent years, family member functioning with regard to service dogs has received less attention.

Families and veteran mental health

Partners of veterans with PTSD experience high psychological distress (Manguno-Mire et al., 2007) and are at elevated risk for developing their own mental health symptomatology such as depression, PTSD, anxiety, sleep problems, and suicidality (Mansfield et al., 2010; Renshaw et al., 2008). Caring for veterans with

PTSD is associated with increased caregiver burden and social isolation, and decreased involvement in education or employment (National Alliance for Caregiving, 2010; Ramchand et al., 2014; Tanielian & Jaycox, 2008). Within romantic relationships, PTSD is associated with lower relationship satisfaction, decreased intimacy, and strained relationship functioning (Allen et al., 2010; Campbell & Renshaw, 2013). In turn, impaired relationship functioning can predict worsening PTSD across time (Evans et al., 2010), though evidence is mixed regarding bidirectional associations (Meis et al., 2017). Despite these negative effects of veterans' PTSD, partners have reported positive experiences of caregiving including closeness to their partner, pride in caregiving, and individual growth (National Alliance for Caregiving, 2010). There is also evidence that supportive partners and effective family processes can serve as protective factors for veterans' PTSD symptoms (Olson et al., 2018).

Families and psychiatric service dogs

Research exploring the effects of PTSD service dogs on veterans' family relationships has produced mixed results. In one qualitative study, veterans reported that their service dogs acted as a "social lubricant" for improving family interactions (Krause-Parello & Morales, 2018, p. 69). In other qualitative studies, veterans with a service dog reported being able to participate more in family activities due to the dog's presence (Lessard et al., 2018) or that the dog helped to repair and reclaim aspects of their family relationships (Crowe et al., 2018).

On the other hand, PTSD service dogs may lead to increased stress for partners. Some partners may feel jealous of or threatened by the support provided to the veteran by the service dog, especially if partners are already feeling emotionally and socially isolated. In fact, a qualitative study on the benefits and challenges of PTSD service dogs found that partners reported mixed emotions, such as feeling left out of the new relationship, feeling jealous, or experiencing challenges in readjusting to the caregiver role (Yarborough et al., 2018). Financial costs of caring for service dogs, such as feeding and grooming, can contribute to family burden (Krause-Parello & Morales, 2018). It is also possible that the assistance and companionship veterans receive from their service dogs may affect partners indirectly rather than directly. For example, in a sample of parent and partner caregivers of nonmilitary individuals with physical disabilities, the presence of a mobility service dog in the home

was associated with less worry and better quality of life among caregivers as a result of the improved health of the care recipient (Bibbo et al., 2019). Thus, associations between PTSD service dogs and veterans' partners might be indirect, operating through improvements in veterans' functioning that produce benefits for other family members.

Much of the research on the associations between PTSD service dogs and veterans' family systems has not focused on the functioning of romantic partners as the primary outcome. In addition, while some studies have examined experiences of PTSD caregivers in this context (e.g., Yarborough et al., 2018), they have not addressed the interdependence between veterans and partners that family systems theory would lead us to expect. We addressed this gap by utilizing data from veterans and their partners in a mixed-methods, treatment-waitlist study in which veterans were either paired with a PTSD service dog (service dog group) or awaiting placement with a PTSD service dog (waitlist group). The current study is an extension of a recent study examining effects of PTSD service dogs on veteran functioning (O'Haire & Rodriguez, 2018) by incorporating data from veterans' romantic partners. Based on their results, we expected that partners in the service dog group would report better individual functioning (i.e., mental well-being, quality of life, social functioning, work functioning) than partners in the waitlist group (Hypothesis 1). We also expected that couples in the service dog group would report better relationship functioning (i.e., relationship satisfaction and family functioning) than couples on the waitlist (Hypothesis 2). Finally, we explored qualitative data for themes related to hypotheses to better understand the experiences of partners in the service dog group.

Methods

Procedures

This study was approved by the Purdue University Human Research Protection Program Institutional Review Board (IRB Protocol 1504015973). A waiver was obtained from the Purdue University Institutional Animal Care and Use Committee (IACUC) because no interactions occurred between researchers and service dogs during the study.

Veterans were recruited between November 2015 and February 2016 from the database of K9s For Warriors (K9FW; O'Haire & Rodriguez, 2018; Rodriguez et al., 2018), a national nonprofit organization that places PTSD service dogs to military veterans with PTSD free of charge across the United States.

Veteran inclusion criteria to receive a service dog through K9s For Warriors consisted of (a) military service in the U.S. Armed Forces after September 11, 2001, (b) a clinician referral letter verifying a diagnosis of PTSD and/or meeting the clinical cutoff of 50 on the PTSD Checklist for the DSM-IV (Weathers 1993), (c) honorable discharge or current honorable service, (d) no current substance abuse, (e) no conviction of any crime against animals or felonies, and (f) no more than two pet dogs currently in the home.

To receive a service dog, veterans attended a 3-week training class on site at the K9s For Warriors headquarters in Ponte Vedra, Florida with 6–10 other veterans. Veterans lived in on-site dormitories and attended daily scheduled activities in which they learned how to interact with, care for, and maintain the training of their service dogs. After returning home, veterans and service dog pairs received regular ongoing support with K9s For Warriors to maintain training and care.

For the research study, 304 veterans were mailed recruitment packets providing project information, consent forms, and \$20 cash as remuneration for reviewing the provided materials. From this recruitment pool, 208 consented, either verbally or via email, and indicated interest in participating (68%). We reached a final sample of 141 veteran participants who completed a majority of the online survey (46%).

During this process, veterans indicated whether they had a partner who would be interested in participating. Members of the research team spoke with partners, either during veterans' phone calls, a separate phone call, or email, to gain consent. For the research study, partner inclusion criteria consisted of self-identifying as a cohabitating spouse, significant other, or partner of the veteran participant. No exclusions were made based on partners' own military history or mental health. Of the 141 veterans, 70 had partners who were eligible, provided consent, and completed an online survey. Because it was unknown how many of the 304 veterans were currently cohabitating with a partner, the response rate of partners is unknown. For participating in the research, partners and veteran participants were given an additional \$20 in remuneration (for a total of \$40 for study participation).

A total of 10 couples were excluded from analyses as a result of incomplete or missing data for a final analytic sample containing $N=60$ partner-veteran dyads. There were no significant differences on any demographic measure between couples with complete data ($n=60$) and those with incomplete data who were excluded from subsequent analyses ($n=10$).

Measures

Online surveys consisted of several standardized self-report measures and open-ended qualitative questions. Where applicable, scale reliability (Cronbach's alpha) within the current sample is presented.

Partner mental well-being

Measures from the *Patient-Reported Outcomes Measurement Information System* (PROMIS; Cella et al., 2010) were used to assess several aspects of mental well-being including anger (SF-5A), anxiety (SF-8A), and depression (SF-8A). Each PROMIS measure consists of 5 to 8 self-reported items regarding the frequency of a given symptom in the past two weeks using a Likert scale from 1 "Never" to 5 "Always." Raw summed scores were converted into standardized T-scores according to the scoring manual for each PROMIS measure. Each T-score has a mean of 50 and a standard deviation of 10, with higher scores reflecting more anger, anxiety, or depression. All three measures demonstrated high reliability in the current sample ($\alpha = .95, .96,$ and $.94$, respectively).

The *Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2003) was used as an additional measure of depression due to the complexity of depressive symptoms. The PHQ is a 9-item measure capturing frequency of depressive symptoms over the past two weeks using a Likert scale from 0 "Not at all" to 3 "Nearly every day." Possible summed scores range from 0 to 27 with higher scores indicating greater depressive symptomology ($\alpha = .90$).

Partner quality of life

The *Veterans RAND 12-Item Health Survey* (VR-12; Iqbal et al., 2007) is a normed, standardized measure that calculates two summary scores for mental health (e.g., feeling calm and peaceful) and physical health (e.g., daily limitations due to physical problems) during the past four weeks. Items are weighted according to 1990 population norms and T-transformed to have a mean of 50 and a standard deviation of 10. High scores on each summary score indicated better mental or physical functioning, respectively.

The *Bradburn Scale of Psychological Wellbeing* (BSPW; Bradburn & Noll, 1969) is a 10-item validated scale that measures positive (e.g., feeling excited or interested) and negative (e.g., feeling upset or restless) affect during the past few weeks. Response choices are 1 "Yes" or 0 "No," with summed subscales reflecting greater positive ($\alpha = .77$) or negative ($\alpha = .82$) affect.

The *Satisfaction with Life Scale* (SWLS; Diener et al., 1985) is a 5-item measure that captures participants'

global evaluations of satisfaction within their own life (e.g., conditions of life are excellent). Participants reported their level of agreement with each statement using the scale 1 “Strongly disagree” to 7 “Strongly agree,” with higher summed scores indicating greater satisfaction with life ($\alpha = .87$).

The *Connor Davidson Resilience Scale* (CDRS-10; Campbell-Sills et al., 2009) is a 10-item scale that measures individuals’ abilities to cope with and manage adversity and stress. Partners reported their abilities within the past month (e.g., staying focused and thinking clearly under pressure) using the Likert scale 1 “Not at all true” to 5 “True nearly all of the time.” Items were summed with higher scores indicating greater resilience ($\alpha = .90$).

Partner social functioning

Measures from the *PROMIS* (Cella et al., 2010) assessed partners’ social isolation (SF-8A), companionship (SF-6A), and ability to participate in social activities (SF-8A). Partners self-reported the frequency of 6 to 8 social activities using a Likert scale from 1 “Never” to 5 “Always.” Summed scores were standardized into a T-score according the scoring manual for each measure with higher scores indicating greater social isolation ($\alpha = .96$), companionship ($\alpha = .93$), or ability to participate in activities ($\alpha = .93$).

Partner work functioning

The *Work Productive and Activity Impairment Questionnaire* (WPAI; Reilly et al., 1993) measures partners’ functioning in paid employment. Partners reported six items on the extent of impairment at work in the preceding seven days, including activity impairment, absenteeism due to health issues, work impairment due to health, and overall work impairment. Higher values reflect greater impairment (e.g., less productive).

Partner and veteran family functioning

The *McMaster Family Assessment Device* (FAD; Epstein et al., 1983) measured veterans’ and partners’ reports of family functioning with two subscales. The general functioning subscale includes 12 items that measure the overall health of family processes (e.g., decision making, planning family activities,) whereas the affective responsiveness subscale consists of 6 items and measures perceptions of emotional functioning. Participants reported the functioning of each process using the Likert scale 1 “Strongly agree” to 4 “Strongly disagree.” Items within subscales were averaged with higher scores reflecting *worse* general

functioning or affective responsiveness. Reliability was adequate for partners ($\alpha = .90$ and $.87$) and veterans ($\alpha = .90$ and $.87$).

Partner and veteran relationship satisfaction

The *Relationship Assessment Scale* (RAS; Hendrick et al., 1998) measured veterans’ and partners’ relationship satisfaction. Seven items captured participants’ perceptions of their relationship (e.g., how well partner meets needs). Participants used a Likert scale ranging from 1 “Low satisfaction” to 5 “High satisfaction,” with summed scores indicating more satisfaction in their relationship for partners and veterans ($\alpha = .89$ and $.90$, respectively).

Veteran PTSD symptomology

The *PTSD Checklist* (PCL; Weathers 1993) was assessed as part of a larger study of veteran participants (O’Haire & Rodriguez, 2018) and included in the present study as a descriptor of veterans’ self-reported PTSD severity. The PCL is a 17-item self-report scale based on the DSM-IV criteria of PTSD. Veterans reported symptom frequency over the past month using a Likert scale from 1 “Not at all” to 5 “Extremely.” Possible scores range from 17 to 85 with higher scores indicating more PTSD symptoms with a clinical cutoff of 50 for screening positive for PTSD (Forbes et al., 2001).

Qualitative prompts

Partner surveys included six open-ended questions. Partners in the service dog group were asked to describe: (1) their own goals for having a service dog, (2) changes experienced as result of the service dog, (3) helpful aspects of having a service dog, (4) drawbacks of having a service dog, (5) components of service dog training that have helped the most, and (6) additional information they would like to share in order to advance the understanding of service dogs. Partners in the waitlist group were asked similar questions to describe their *expectations* for having a service dog (e.g., expected drawbacks a service dog). Because these questions surrounded expectations rather than retrospective accounts, we did not utilize the qualitative data from the waitlist group. All answers were entered into Qualtrics by the participant themselves.

Analytic strategy

To evaluate mean differences between groups, we ran a series of independent samples *t*-tests in SPSS (IBM Corp, 2016). In accordance with recent

recommendations (Sullivan & Feinn, 2012), we evaluated both effect sizes and statistical significance of $p < .002$ to account for multiple testing using Bonferroni adjustment. To account for imbalanced groups, we calculated Hedge's g , an effect size similar to Cohen's d (Lakens, 2013) and interpreted all effect sizes $.20$. Prior to analyses, normality of distributions was evaluated and appropriate transformations were performed. Results did not differ between analyses using raw or transformed variables, so raw variables are presented.

To better understand the experiences of partners in the service dog group, qualitative data were coded using NVivo 12 software (QSR International Pty Ltd, 2018). We conducted a topical survey of the qualitative responses (Sandelowski & Barroso, 2003) to code where participants mentioned benefits, challenges, or no changes as a result of the service dog in each domain. Two members of the research team first coded 20% of the transcripts and modified the coding manual. Initial discrepancies between coders pertained to ambiguous content (e.g., who the partner was referring to), content areas missing from the codebook (e.g., veteran benefits), and lack of clarity in the exclusion/inclusion criteria for each code. We then refined the codebook by (1) adding more detailed definitions of the domains based on existing literature, (2) adding exclusion criteria for certain codes (e.g., what distinguished social functioning from relationship functioning), and (3) adding more categories (e.g., family functioning and veteran functioning). This updated codebook included eight domains: partner mental well-being, partner quality of life, partner social functioning, partner work functioning, partner relationship functioning, family functioning, veteran functioning, and general comments about the service dog. Each domain included three "a priori" codes: benefits, challenges, and no changes; with the inclusion of an "unclear" code for ambiguous content, our codebook had a total of 25 potential codes. The members recoded the transcripts with the updated codebook and reached full agreement.

Results

Participants

Cross-sectional pilot data from 60 veteran-partner dyads in the service dog ($n = 37$) and waitlist groups ($n = 23$) were used. Veterans in the service dog group had been paired with their service dog for an average of 1.58 years

(range 1.18 months to 3.58 years). The PTSD service dogs, which were Labrador Retrievers, Golden Retrievers, or mixed breeds, were predominantly sourced from local shelters and trained for a minimum of 6 months by K9s For Warriors for basic obedience and tasks to mitigate PTSD symptoms. Examples of tasks included positional commands ("block" and "cover") to lessen hypervigilance and provide personal space in public; waking the veteran from a nightmare; reminding of or retrieving medication; providing tactile interruption or deep pressure during distress; and allowing the veteran to physically brace on the dog for stabilization.

Veterans on the waitlist had already been approved to receive a service dog and were waiting until their scheduled date to receive a service dog at the time of participation in the study. K9s For Warriors uses a time-based waitlist system, in which the receipt of a service dog is based on order of application, rather than need-based expedited placement. Couples in the waitlist group had been on the waitlist for an average of 7.57 months (range 4.03 months to 1.17 years), which is typical of this organization.

As presented in Table 1, across both groups, most partners were female (88%), employed (57%), and had some college education (52%). Almost 20% of partners had served in the military. Most veterans were male (85%), unemployed (73%), had some college education (55%), and had served in the Army (70%). Table 1 displays analyses examining differences in demographic variables between groups. There were no significant group differences in partners' demographic characteristics. Veterans in the service dog group reported significantly less severity in PTSD symptoms than veterans on the waitlist, $t(58) = -2.76$, $p < .01$. Almost all veterans on the waitlist (96%) reported PTSD Checklist scores above the clinical cutoff of 50 ($M = 68.57$, $SD = 11.21$) whereas 78% of veterans with a service dog reported scores above the clinical cutoff ($M = 59.54$, $SD = 12.97$).

Quantitative evidence

We predicted that partners in the service dog group would report higher levels of individual functioning than partners on the waitlist. Table 2 presents results from t -tests indicating that groups did not significantly differ, refuting our first hypothesis. We did, however, find effect sizes meeting the threshold for interpretation ($.20$) within each domain of partner and relationship functioning, with all corresponding to small effects in the hypothesized directions. With regard to *mental well-being*, partners in the service

Table 1. Demographic Characteristics of Partners and Veterans.

Variables	Group			Group Difference		
	Service Dog (<i>n</i> = 37)	Waitlist (<i>n</i> = 23)	Total (<i>N</i> = 60)	<i>t</i>	χ^2	<i>p</i>
Partners						
Sex, <i>n</i> (%) female	33 (89.19)	20 (86.96)	53 (88.33)		0.07	.79
Employment status, <i>n</i> (%) employed	20 (54.05)	14 (60.87)	34 (56.67)		0.27	.60
Education, <i>n</i> (%)					6.78	.15
High school or GED	6 (16.22)	1 (4.35)	7 (11.67)			
Some college	21 (56.76)	10 (43.48)	31 (51.67)			
Bachelor's degree	6 (16.22)	10 (43.48)	16 (26.67)			
Master's degree	3 (8.11)	2 (8.70)	5 (8.33)			
Advanced graduate work or PhD	1 (2.70)	0 (0.00)	1 (1.67)			
Number of children <i>M</i> (<i>SD</i>)	2.03 (1.44)	2.35 (1.27)	2.15 (1.38)	0.88		.38
Veterans						
Age <i>M</i> (<i>SD</i>)	36.59 (8.02)	36.83 (7.32)	36.68 (7.69)	0.11		.91
Gender, <i>n</i> (%) male	32 (86.49)	19 (82.61)	51 (85.00)		0.17	.68
Employment status, <i>n</i> (%) employed	8 (21.62)	8 (34.78)	16 (26.67)		1.26	.26
Education					3.84	.43
High school or GED	6 (16.22)	2 (8.70)	8 (13.33)			
Some college	22 (59.46)	11 (47.83)	33 (55.00)			
Bachelor's degree	6 (16.22)	5 (21.74)	11 (18.33)			
Master's degree	3 (8.11)	4 (17.39)	7 (11.67)			
Advanced graduate work or PhD	0 (0.00)	1 (4.35)	1 (1.67)			
Military branch, <i>n</i> (%)					1.34	.72
Air Force	5 (13.51)	1 (4.35)	6 (10.00)			
Army	25 (67.57)	17 (73.91)	42 (70.00)			
Marines	4 (10.81)	3 (13.04)	7 (11.67)			
Navy	3 (8.11)	2 (8.70)	5 (8.33)			
Deployment location, <i>n</i> (%)					3.07	.38
Iraq	13 (35.14)	11 (47.83)	24 (40.00)			
Afghanistan	4 (10.81)	3 (13.04)	7 (11.67)			
Both locations	10 (27.03)	7 (30.43)	17 (28.33)			
Other locations	10 (27.03)	2 (8.70)	12 (20.00)			
PTSD Symptomology	59.54 (12.97)	68.57 (11.21)	63.00 (13.01)	2.76		.01
Traumatic Brain Injury, <i>n</i> (%) yes	8 (21.62)	4 (17.39)	12 (20.00)		0.16	.69

dog group reported somewhat lower levels of anger than partners on the waitlist ($t(58) = -0.94$, $p = .35$, $g = -.25$). Within the *quality of life* domain, partners in the service dog group reported higher levels of resilience than those on the waitlist ($t(58) = 1.35$, $p = .18$, $g = .35$). In the domain of *social functioning*, partners in the service dog group reported less social isolation ($t(58) = -0.76$, $p = .45$, $g = -.20$) and greater companionship ($t(58) = 1.26$, $p = .21$, $g = .33$). Partners in the service dog group also reported less health-related impairment at work ($t(30) = -0.59$, $p = .56$, $g = .21$) with regard to their *work functioning*.

We also predicted that couples with a service dog would report better relationship functioning than couples on the waitlist. Partners in the service dog group reported greater relationship satisfaction ($t(58) = 1.17$, $p = .25$, $g = .31$) but did not otherwise differ from partners in the waitlist group. Veterans with a service dog reported fewer problems in general family functioning ($t(58) = -1.29$, $p = .20$, $g = -.34$) and affective responsiveness ($t(58) = -1.44$, $p = .16$, $g = -.38$), and greater relationship satisfaction ($t(58) = 0.86$, $p = .40$, $g = .22$).

Qualitative evidence

All partners in the service dog group provided a response to at least one qualitative prompt, with most (92%) providing answers to at least five of the six qualitative questions. Among the 37 partners in the service dog group, 185 codes were assigned with an average of five codes per participant ($SD = 2.53$) representing all eight domains. Codes most frequently mentioned pertained to veterans (37%), followed by general comments about service dogs (30%), partners' reference to their own quality of life (11%), family functioning (11%), veteran-partner relationship functioning (4%), their own social functioning (3%), mental well-being (2%), and employment functioning (1%). Most codes (81%) described the benefits of having a service dog, whereas 17% described challenges; approximately 2% was either no changes or unclear. Eight predefined codes were not represented within the data: partner mental well-being challenges or no changes; no changes to partner quality of life; challenges in romantic relationship functioning; partner social functioning challenges or no changes; and partner work functioning benefits or no changes.

Table 2. Comparison of Partner and Veteran Functioning Between Service Dog ($n = 37$) and Waitlist ($n = 23$) Groups.

Variables	Group		Group Difference		
	Service Dog <i>M</i> (<i>SD</i>)	Waitlist <i>M</i> (<i>SD</i>)	<i>t</i>	<i>p</i>	<i>g</i>
Partner mental well-being					
PROMIS: Anger ^a ()	54.50 (12.64)	57.44 (10.33)	0.94	.35	0.25
PROMIS: Anxiety ^a ()	54.85 (10.34)	56.13 (7.63)	0.51	.61	0.13
PROMIS: Depression ^a ()	53.91 (10.86)	54.35 (8.68)	0.17	.87	0.04
PHQ-9: Depression ()	7.62 (6.45)	7.43 (5.97)	0.11	.91	0.03
Partner quality of life					
VR-12: Mental health ^a (+)	43.19 (11.97)	43.35 (12.42)	0.05	.96	0.01
VR-12: Physical health ^a (+)	47.82 (9.46)	48.71 (9.94)	0.35	.73	0.09
BSPW: Positive wellbeing (+)	3.32 (1.58)	3.22 (1.41)	0.27	.79	0.06
BSPW: Negative wellbeing ()	2.08 (1.77)	2.39 (2.04)	0.62	.54	0.16
SWLS: Life satisfaction (+)	23.03 (7.39)	22.83 (5.40)	0.11	.91	0.03
CDRS: Resilience (+)	28.76 (6.66)	26.43 (6.22)	1.35	.18	0.35
Partner social functioning					
PROMIS: Social isolation ^a ()	50.00 (10.29)	52.02 (9.46)	0.76	.45	0.20
PROMIS: Companionship ^a (+)	52.97 (10.16)	49.84 (7.85)	1.26	.21	0.33
PROMIS: Participate in social activities ^a (+)	48.85 (8.52)	47.57 (6.86)	0.61	.55	0.16
Partner work functioning					
WPAI: Activity impairment ()	21.08 (25.47)	19.57 (24.58)	0.23	.82	0.06
WPAI: Employed (+)	0.54 (0.51)	0.61 (0.49)	0.51	.61	0.14
WPAI: Absenteeism ^b ()	4.03 (7.70)	3.36 (8.78)	0.23	.82	0.08
WPAI: Work impairment (Health) ^b ()	17.22 (21.09)	22.14 (26.07)	0.59	.56	0.21
WPAI: Work impairment (Overall) ^b ()	20.02 (22.74)	23.61 (27.68)	0.40	.69	0.14
Partner relationship functioning					
FAD: General family functioning ^c ()	1.98 (0.57)	2.00 (0.48)	0.13	.90	0.03
FAD: Affective responsiveness ^c ()	2.18 (0.81)	2.12 (0.66)	0.30	.77	0.08
RAS: Relationship satisfaction (+)	27.24 (5.76)	25.35 (6.60)	1.17	.25	0.31
Veteran relationship functioning					
FAD: General family functioning ^c ()	2.03 (0.68)	2.25 (0.60)	1.29	.20	0.34
FAD: Affective responsiveness ^c ()	2.14 (0.71)	2.41 (0.64)	1.44	.16	0.38
RAS: Relationship satisfaction (+)	28.32 (6.79)	26.78 (6.79)	0.86	.40	0.22

Note. (+) higher scores = greater functioning; () lower scores = greater functioning. *g* = Hedges' *g* reflecting mean differences between groups.

^aStandardized measures with *M* = 50 and *SD* = 10.

^bOf those employed.

^cScores above 2.0 indicate distressed couples.

Frequency of each domain with representative quotes are presented in Table 3.

Partners mentioned veteran functioning in 69 of the 185 codes. This broad code encompassed content such as partners' perceptions of veteran mental health, veterans' relationship with the service dog, or veterans' behaviors. All but three of the codes in this domain indicated some benefit of the service dog to veteran functioning. Partners reported that service dogs helped veterans engage in social situations and be less hesitant to go into public or run errands. A few partners even attributed veterans' re-engagement with work or school as a byproduct of their service dogs' involvement. Emotionally, partners perceived that service dogs provided comfort and companionship which subsequently helped veterans feel safe and secure. Partners also reported that service dogs helped veterans to respond constructively to emotional distress and provided a greater sense of purpose in their life. Of the content coded as a challenge, partners reported a "double-edged sword" of having a service dog in public that attracts unwanted attention. For example, partners mentioned how people may ask intrusive questions about veterans'

conditions or act in unexpected ways that may be triggering for veterans.

General comments about the service dog were second in frequency. This code captured details about the utility of service dog training, public perceptions of the service dog, or global changes to the family environment as a result of the service dog. Of the benefits, partners reported that service dogs were particularly well-trained to help veterans in public settings, such as "watching the veteran's back," or nudging veterans to recognize emotional distress. Common themes pertained to increased confidence in the veteran and more companionship between veterans and their service dogs. Drawbacks coded in this domain included the need to re-train service dogs on certain tasks and some behavior issues (e.g., destroying dog crate to escape). Most challenges coded at this domain surrounded the public's lack of awareness regarding service dogs, including challenges taking service dogs into public areas, people petting the service dog, and constant unwanted questions about veterans' ailments. In addition, partners mentioned the financial costs of caring for a service dog (e.g.,

Table 3. Representative Qualitative Quotes from Partners in Service Dog Group.

Domain (freq.)	Coding examples
Veteran functioning (69) Benefits (66)	<p>"As a Caregiver for my husband, HIS service dog is an essential part my husband's overall health. Before he received his dog, my husband was a recluse. He did NOT engage in life. My husband's anxiety was through the roof. It was heartbreaking to see my vibrant, loving, outgoing husband be effected so terribly by his PTSD and TBI. Since his SD [service dog] came into the picture, I've noticed that his shoulders have relaxed, he feels more confident, has purpose in life, and loves to show off his baby. He's a GODSEND!!!"</p> <p>"My wife's dog doesn't care what happened in the past or what mistakes she thinks she's made since getting him. He only sees someone he loves and this love is something that can be felt and uplifts her mood. When her dog is around she isn't thinking that a person she walks past has to be thinking badly about her for one reason or another. She now walks around thinking 'they are looking at my dog'. This makes her feel less insecure."</p>
Challenges (3)	"Husband's anxiety has increased because the dog draws attention from strangers. Owner can't go all places he previously did."
General (56) Benefits (32)	<p>"The service dog has been trained to help with PTSD. The service dog blocks people from approaching, watches the surrounding area and provides emotional support during stressful times and situations."</p> <p>"These animals are life savers. Properly trained PTSD/TBI/MST dogs not only help reintegrate, they give back the power to 'be normal.'"</p>
Challenges (24)	"You are always a parade walking down the street. A service dog is like having a sign that says 'Free Candy!' Everybody wants to come pet your dog, many do so without asking which is a trigger. People want to justify themselves for touching the dog that has a huge 'DO NOT PET' sign on it by saying 'well I'm an animal lover'. Everybody loves animals, that doesn't give you the right to come touch our dog. Also, it makes travel difficult sometimes mostly because people don't know the regulations and they don't know the rules so you're CONSTANTLY trying to educate and then people want to argue about it with you and now you're a spectacle. And you always need more space, more time and less people to come try to interact with your dog."
Partner quality of life (20) Benefits (19)	<p>"These animals give us a little pinch of what our old life used to be like."</p> <p>"I can go to the store without my spouse having a panic attack now. I used to never be able to leave the house without my spouse because he couldn't be left alone and he was fearful that I would get injured while away from him. With the service dog I have greater independence."</p> <p>"As a caregiver/wife, his service dog has allowed me to relax. While the dog does NOT attend to MY needs, having him in my husband's life means that I don't have to always watch my husband like a hawk."</p>
Challenges (1)	"If I had to pick a drawback it would only be the added cost of care when we struggle month to month as it is."
Family functioning (20) Benefits (16)	<p>"The service dog has brung my family closer together emotionally. We go out more often as a family and we are more happy. Just seeing the positive changes in my husband makes things better for all of us."</p> <p>"We are able to do more things out of the home with our children. My husband is less stressed at home."</p>
Challenges (3)	<p>"Integration can be very stressful on the spouses and family members. The dog becomes a family member that nobody else can touch for a while and is always loyal to the owner which can be challenging to adjust to emotionally."</p> <p>"I feel like the family gets left behind though. After years of dealing with someone's PTSD and TBI, it can be confusing when things suddenly get better for them but not the rest of the family members."</p>
No changes (1)	"Unfortunately, it hasn't seemed to carry over into his relationships with the kids and myself."
Relationship functioning (8) Benefits (7)	<p>"Having a service animal had dramatically improved the quality of life for my husband, and has given both of us renewed hope for his future!"</p> <p>"I truly feel like I have gotten my husband back."</p>
No changes (1)	"Unfortunately, it hasn't seemed to carry over into his relationships with the kids and myself."
Partner social functioning (5) Benefits (5)	"She [the dog] listens without judgment."
Partner mental well-being (4) Benefits (4)	"I find myself turning to the dog when I am stressed or anxious. Having him there seems to help."
Partner work functioning (1) Challenges (1)	"I can't work a full time job because of my spouses inability to be alone."

Note. Bolded text indicates overall domain with themes listed under each. Frequencies of codes in parentheses. Total coding instances = 185; themes with zero frequencies ($n=8$) or text coded as unclear ($n=2$) not presented. Text not edited to fix grammatical or spelling errors. SD = service dog; PTSD = posttraumatic stress disorder; TBI = traumatic brain injury; MST = military sexual trauma.

grooming and food costs) as well as the demands of maintaining the service dog's training. Some partners also worried about how veterans would respond to the grief if something were to happen to their service dog.

Partner quality of life and family functioning were the next most common domains. All but one of the codes for partners' quality of life described benefits

related to the service dog. Service dogs provided partners the opportunity to have more independence to leave veterans alone and experienced less caregiver burden as service dogs helped veterans perform certain activities. Partners also reported being happier after receiving comfort and affection from the dog themselves. Most content related to the family functioning domain was coded as a benefit. After

placement with a service dog, partners reported improved emotional closeness between family members and mentioned how service dogs had a direct effect on minimizing children's distress. When the veterans were happier and experienced improvements in response to a service dog, family members appreciated that they could do more activities as a family. Some partners, however, reported challenges when service dogs were added into the family dynamics. In particular, partners indicated difficulties adjusting to their new family roles and feeling left out, with positive changes occurring for the veteran but not for themselves.

Discussion

Guided by family systems theory (Cox & Paley, 1997), the present study examined individual and relationship functioning among couples previously paired with a PTSD service dog and those awaiting placement. Given that most post-9/11 veterans live with romantic partners (Ramchand et al., 2014), we suspected that the veterans' family system, in particular their romantic partners, might be directly or indirectly impacted by veterans' service dogs. Refuting our hypotheses, quantitative results did not indicate statistically significant differences in individual or relationship functioning between partners of veterans with a service dog and those on the waitlist. Effect sizes reflected small effects for some variables, with all corresponding to effects in hypothesized directions. Specifically, partners with a service dog in the home reported less anger, social isolation, and work impairment, and greater resilience, companionship, and relationship satisfaction. With regard to veterans, there were also no statistically significant differences in veterans' reports of relationship and family functioning. However, effect sizes indicated that veterans with service dogs reported greater relationship satisfaction and family functioning compared to those on the waitlist.

Results from qualitative data revealed that partners mentioned more benefits than challenges related to veterans' service dogs, with most of the codes referring to veterans' improvements. These data highlighted how partners and relationships were differentially affected by the PTSD service dog, further highlighting the wide variability in the quantitative data. Quantitative and qualitative results suggest that service dogs can provide positive experiences for veterans' romantic partners, although this cross-sectional research was preliminary in nature and non-causal.

Partner functioning

Compared to partners in the waitlist group and based on effect sizes, partners in the service dog group reported higher levels of resilience and companionship as well as lower levels of anger, social isolation, and work impairment. Higher resilience among partners of veterans with a service dog may suggest that PTSD service dogs might serve as a protective factor for families during times of adversity (Walsh, 2009). The directionality of these findings resurfaced in the qualitative data, as partners mentioned a reduction in concerns for veterans' functioning, less emotional distress, and more opportunities to engage socially. It is possible that service dogs may be a conduit for caregivers to gain independence in their own lives by making it possible for them to leave home more often to run errands and to worry less about leaving their partners alone. Similar reductions in caregiver burden were reflected in a sample of caregivers after the placement of a mobility service dog (Bibbo et al., 2019).

Relationship functioning

While not statistically significant, quantitative data suggested that relationships may benefit from the addition of a service dog. Effect sizes reflected that partners and veterans in the service dog group reported higher relationship satisfaction than those on the waitlist. In addition, veterans with service dogs reported less problems in family functioning than those on the waitlist, although no effects emerged for partners' reports of family functioning. This is particularly interesting considering benefits to family relationships was the third most frequently mentioned domain in the qualitative data.

The qualitative data suggest that service dogs might help couple and family processes through positive changes experienced by veterans. In fact, an analysis of the larger sample of veterans found statistically significant differences between service dog and waitlist groups, with small to large effect sizes regarding veterans' mental well-being, quality of life, and social functioning (O'Haire & Rodriguez, 2018). It is possible that changes in veteran functioning could precede the increased involvement in family activities and lead to repairing family relationships (Crowe et al., 2018; Lessard et al., 2018). Some evidence from the qualitative results, however, indicated that veterans' PTSD had already established negative effects in the family which did not suddenly disappear with the addition of a service dog in the household.

Contrasts between quantitative and qualitative data

Qualitative data suggested substantial and positive benefits for spouses, which did not emerge in the quantitative data. One possible explanation for the contrast in findings reflects the differences in structured quantitative measures oriented toward the partner themselves and the open-ended, free response questions about whatever was salient to the partner. The latter is likely measuring processes relevant to family systems as a whole by acknowledging veterans' improvements. It is interesting to note, however, that the quantitative data are measuring functioning comparable to established norms. For example, relative to caregivers for veterans with traumatic brain injury (Carlozzi et al., 2019), spouses in our sample reported comparable scores on the PROMIS depression, anxiety, and anger measures. Further, established cutoff values for distressed civilian couples on the family functioning measures (Miller et al., 1985) indicated that couples in our sample reported comparatively lower levels of distress.

The wide standard deviations in the quantitative data indicate high variability within groups and our examination of mean-level differences could be concealing meaningful individual differences. For example, time since service dog placement might be an important predictor, as one might expect that greater benefits could arise as the human-animal bond is strengthened. Partners' attachment to the service dog or their perceptions of the costs and benefits are likely significant moderators to service dogs' effects. Such moderators are similar to findings that partners' perceptions, and not solely veterans' PTSD symptoms, play an important role in the functioning of individuals and relationships (Renshaw & Caska, 2012). It is also possible that partners' perceptions are tempered by their expectations. Perhaps partners on the waitlist experienced benefits when their partners elected for a PTSD service dog, whereas partners in the service dog group may be disappointed with un-met expectations. Anticipated benefits and violated expectations for medical and mobility service dogs have been investigated (Rodriguez et al., 2020), although it is unclear how these might operate within the context of military relationships.

Limitations & future directions

Results should be evaluated with regard to the limitations of the present study. These cross-sectional findings stem from a non-randomized controlled trial, and as such, we cannot determine causality or attribute effects solely to service dogs. Longitudinal data

from couples as veterans acquire a service dog would be better suited to address how family relationships may change, while controlling for individuals' baseline functioning.

Other unmeasured variables such as veterans' engagement with other PTSD treatments or unobserved individual- or couple-differences could have also affected our findings. Future studies that can control for such confounding variables in the design (e.g., randomized controlled trials) are warranted. These studies would also be able to address potential sample biases such as the utilization of data from couples already open to the idea of having a service dog and the lack of exclusion/inclusion for veterans' partners.

This study also featured a relatively small sample. While large for research on effects of psychiatric service dogs, we were unable to detect small effects and thus rendered findings from the quantitative analyses inconclusive. Larger sample sizes could allow for the examination of sub-group analyses to better understand for whom and under which conditions service dogs may play a role in individual and couple functioning.

With larger samples, dyadic analyses such as actor-partner interdependence models and multilevel models could address research questions innate to family systems theory. These methods would be able to model the interdependent, reciprocal interactions to understand how the addition of a service dog might impact dyadic processes.

Finally, our sample was drawn from a single service dog provider. As there is wide variability in training, structure, and participant requirements between programs, generalizability is limited. The service dog provider collaborated with in this research encourages partners to not interact with service dogs while training or working. This may be contributing to how partners view and interact with a service dog in their family system. Future research should evaluate the mechanisms of different programs and providers, and how the incorporation of partners into the training of service dogs might translate to veteran or family systems benefits. Research should further examine how families uphold the recommendations and guidelines for interaction with the service dog, and how guideline adherence might be associated with couple functioning.

Conclusion

Because healthy romantic relationships can contribute positively to individual well-being (Proulx et al., 2007), catalyzing romantic relationships to support and foster the veteran-service dog bond could have

positive long-term, system-wide impacts. Recent research has highlighted the effectiveness and sustainability of family involvement in veteran treatments (Lucero et al., 2018), leading one to ask how family involvement can bolster effects of animal-assisted interventions and other complementary practices. Further studying the complex dynamics between family systems and service dogs can provide a deeper understanding of how humans, animals, and relationships develop in tandem. Given the important roles that companion animals and service dogs play in the lives of their owners, practitioners could consider how animals may impact the social fabric of the family.

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Data availability

The data that support the findings of this study are available from the corresponding author, [MO], upon reasonable request.

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