

One Health Research Project Abstract

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Title: Veteran-service dog dyads: A One Health approach to examining human, animal, and social environment

Research Abstract:

Partnerships between veterans with posttraumatic stress disorder (PTSD) and service dogs are on the rise.¹ While evidence for their health benefits are growing, to date the majority of research has focused primarily on the human.² **With increased attention to the importance of One Health, there is a push to both (1) recognize the inextricable link between humans, animals, and the environment, and (2) work collaboratively to better understand these interdependences.**³

Attachment theory, a well-established model which been studied extensively in human-human and animal-animal bonds, states that unique benefits arise from certain close relationships; yet while it is postulated that it could also be a mediator for the human-animal bond, evidence is limited.⁴ Coregulation, a defining feature of normative attachment, describes achievement of homeostasis between two beings and emergence of “felt security” – the feeling that an environment and its exploration are safe.⁵ An environment can be conceptualized both in the physical sense as well as in the social sense, i.e., the veteran’s ability to **participate in society and function within their community.**

Coregulation in bonded dyads can be evidenced across numerous biological systems, including sleep.^{5,6} Although it has been demonstrated that service dogs may affect the sleep of veterans with PTSD,⁷ it has yet to be determined whether these specific human-canine relationships involve coregulation. Understanding the attachment between service dogs and veterans with PTSD is of particular interest since the two share not only an emotional bond, but also a working relationship. Many of the tasks that these dogs have been trained to perform are directly aimed at **increasing their partner’s felt security within their social environment.**⁸ Specifically, determining whether the emergent sleep patterns in veteran and service dog dyads exhibit the characteristics of coregulation will inform our understanding of attachment theory’s pertinence to the human-canine bond as well as its association with health outcomes.

My objective is to understand sleep coregulation within a veteran-service dog dyad in a manner consistent with well-regulated and secure attachment in humans. **I hypothesize that the sleep patterns in veteran-service dog dyads will exhibit coregulation, that the degree of sleep synchrony will be positively associated with the strength of the bond, and that the presence of coregulation will be positively associated with better health and social outcomes.**

Methods: A total of $N=67$ veterans with PTSD and their service dogs were recruited through the national nonprofit service dog provider K9s For Warriors. Assessments were conducted longitudinally at baseline (0 months) and follow-up (3 months) for 14 days at each timepoint. Baseline measures were collected immediately prior to veteran and service dog pairing. Significant work remains to process, analyze, collate, disseminate these data. To address my hypotheses, I will perform hierarchical regression

analysis of actigraphy data (a validated measure for monitoring activity and sleep^{9,10}) collected in 60s epochs. This will be supplemented by morning sleep diaries and standardized measures to assess health, social participation, and the strength of the human-animal bond.

Analysis. Analyses will be conducted to address three key questions: **(1) Do the sleep patterns in veteran service dog dyads exhibit coregulation?** I will perform minute-by-minute comparisons to calculate sleep synchrony as the percentage of the total sleep interval that human and canine were both awake or asleep (as opposed to one being awake and the other asleep). Based on human coregulation literature, mean synchrony at or above 75% would suggest that coregulation is present.⁶ **(2) Is greater synchrony positively correlated with the strength of the human-animal bond?** I will use linear mixed effects regression analysis while controlling for covariates (such as other humans or pets sharing the bed, children, age, gender, race/ethnicity, marital status, and pet ownership) to examine the association between the percentage of synchrony and self-reported measures of bond strength. If attachment theory is indeed a mediator of the human-canine bond, I expect that a stronger bond would be related to greater sleep coregulation. **(3) What is the impact of coregulation (or lack thereof) on health and social environment?** The longitudinal study design will allow me to assess this question by comparing the veteran's health at the baseline (prior to the service dog) and 3-month study time points. Using linear regression and controlling for covariates (including baseline health, concurrent treatments, comorbid diagnoses, and demographic characteristics), I will examine the associations between presence of coregulation (yes/no), health-related outcomes for each member of the dyad (veteran: Patient Health Questionnaire [PHQ-9], a standardized health measure; canine: levels of physical activity, rest, and sleep), and social functioning outcomes for the veteran (employment status, activity participation, and social interaction quality).

References

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