



Research

Salivary cortisol and behavior in therapy dogs during animal-assisted interventions: A pilot study



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ABSTRACT

Animal-assisted interventions (AAIs) have been associated with positive effects on human psychological and physiological health. Although the perception of quality standards in AAIs is high, only few investigations have focused on potential welfare implications for therapy dogs linked to their performance in AAIs. The standardized program “multiprofessional animal-assisted intervention (MTI)” has been carried out in adult mental health care, significantly improving patients’ prosocial behaviors. In the present study, we monitored salivary cortisol and behavioral measures in therapy dogs that participated in MTI group therapy sessions in an in-patient substance abuse treatment facility. Work-related activity (lay, sit, stand, walk, and run), behavior (lip licking, yawning, paw lifting, body shake, tail wagging, and panting), response to human action (taking food treats and obeying commands), and salivary cortisol levels were analyzed over the course of 5 subsequent MTI working sessions in experienced therapy dogs ($N = 5$), aged 5.4 ± 2.8 years (mean $\pm$ standard deviation). Salivary cortisol levels decreased from pre-session to postsession in sessions 1, 2, and 3. However, only in session 4 and 5, postsession cortisol levels were significantly lower than pre-session levels ($P = 0.043$). There was no difference between salivary cortisol levels sampled on a nonworking day at home and work-related levels sampled at the therapy site. None of the behavioral parameters varied significantly over the course of the 5 MTI sessions. Both lip licking ($P = 0.038$) and body shake ($P = 0.021$) were positively correlated with the decline in cortisol during session 5. The study results suggest that trained dogs are not being stressed by repeated participation in in-patient substance abuse therapy sessions. Further investigation into the effects of animal-assisted therapy on dogs’ physiological markers and behavior is warranted.

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Introduction

The practice of using dogs in therapy environments is constantly emerging. An extensive amount of research has attempted to link human–animal interaction during animal-

assisted interventions (AAIs) with parameters important to human physical and psychological health (Friedmann et al., 2011). Using animals for human benefit, AAIs can be considered animal-assisted therapy (AAT) when they advocate the implementation of goal-directed, documented, and evaluated methodology into professional settings (Kruger and Serpell, 2006). In contrast, animal-assisted activities are not centered on a specific goal or treatment outcome and can be carried out by nonprofessional volunteers too (Kruger and Serpell, 2006). Animals are believed to be a source of motivation to participate in health interventions, exercise, and social interaction (Wilson and Barker, 2003).

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Dog-assisted interventions with adult substance abuse patients improved the patient–therapist alliance, therapy motivation, and success (Wesley et al., 2009). Moreover, it has been proposed that a dog may provide more comfort and trust than a human therapist (Beetz et al., 2011). The multiprofessional animal-assisted intervention (MTI) meets all required criteria to be considered AAT (Kruger and Serpell, 2006) and is carried out by 2 human experts with a background in psychology, pedagogy, life science, and/or social science, providing wide-ranging expertise in their subject and a specially trained dog (Stetina et al., 2011). With a strong focus on positive reinforcement, respectful interaction, and appropriate dog handling, MTI has been standardized and evaluated with research outcomes that underpin the effectiveness of the intervention (Stetina et al., 2011). Pilot results by Burger et al. (2011) indicate that participation in 10 subsequent MTI sessions led to improvements in drug-addicted offenders' emotion regulation and self-control. Although the therapy animal is per definition a significant part of the AAI treatment process (Kruger and Serpell, 2006), attempts to monitor animal welfare in AAls have been scarce (Hatch, 2007; Marinelli et al., 2009). Animal welfare has been referred to an animal's ability to adapt to and/or cope with the demands imposed by its environment (Broom and Fraser, 2007). In addition, the freedom to express natural behavior depicts an important aspect of dog welfare (Haupt et al., 2007). Behavioral concomitants of stress have been previously described in dogs (Beerda et al., 1999; Hydbring-Sandberg et al., 2004; Dreschel and Granger, 2005). Dogs subjected to social and spatial restriction showed enhanced frequencies of locomotion, yawning, paw lifting, and body shaking (Beerda et al., 2000). Bellaio et al. (2009) have identified lip licking, yawning, and body shaking as concomitants of stress in rescue dogs during training sessions. Schilder and van der Borg (2004) linked paw lifting in dogs to a state of conflict, confusion, and fear of punishment. Increased secretion of the adrenal glucocorticoid hormone cortisol has been related to cascading levels of physiological arousal (Chrousos, 2009). Although short-term effects of rising cortisol have an adaptive function in regulating an organism's bodily processes, prolonged high cortisol levels can lead to stress-related diseases and have been associated with negative effects on health (Chrousos, 2009). Over the past years, salivary cortisol in dogs has become an important marker in noninvasive stress assessment (Dreschel and Granger, 2009; Bennet and Hayssen, 2010). A combination of behavioral and physiological measurements is likely to yield reliable results in reflecting animal welfare. Behavioral studies targeting dog welfare and performance have been predominantly conducted with shelter dogs (Coppola et al., 2006; Hennessy et al., 2006), working dogs (Haverbeke et al., 2008; Horváth et al., 2008; Tomkins et al., 2011), and companion dogs (Kotrschal et al., 2009; Pastore et al., 2011). Welfare implications for therapy dogs may arise from interaction with strangers in unfamiliar environments, forced positions with no possibility to escape, and/or inappropriate training methods (Hatch, 2007; Piva et al., 2008). With regard to AAls, animal welfare science lacks accurate studies that evaluate the effects of human–animal interaction on therapy dogs (Hatch, 2007; King et al., 2011). Preliminary investigations (Haubenhofer and Kirchengast, 2006, 2007; Marinelli et al., 2009; King et al., 2011) and anecdotal reports of case studies (Heimlich, 2001; Piva et al., 2008) have presented a conflicting picture regarding the potential welfare implications in dogs in therapy environments, but none of these studies was carried out with human adults participating in repeated AAI group sessions during in-patient substance abuse treatment. Wilson and Barker (2003) emphasized that results that were derived from experimental sampling in 1 particular facility are doubtfully generalizable to other facilities and that a clear description of an AAI needs to be given. The lack of

standardized manuals, the variability in populations, working schedules, and the different contexts, in which AAls are carried out, pose a problem for researchers (Marinelli et al., 2009; Deaton, 2005). Hence, a detailed description of the AAI program (including the duration of sessions, between session intervals, number of patients at 1 time, permanent or visiting animal), the research site, patient and dog population, from which the study samples are drawn, are crucial. The primary aim of this pilot study was to examine whether therapy dogs experience work-related stress during the MTI program, carried out with drug-addicted inpatients. Hence, we documented therapy dogs' salivary cortisol levels, activity, behaviors that have previously been related to stress, and responses to human action. To put the dogs' work-related cortisol levels into context, we compared them to samples that were collected at home on a nonworking day. Moreover, we strove to determine whether there were changes in the dogs' cortisol levels or behavioral variables linked to the effects of repeated weekly sessions.

Materials and methods

Animal subjects

Health care professionals who regularly work with their personal dog(s) in the MTI program were recruited via e-mail or telephone invitation. All participating dogs were privately owned and led by their handlers who had a professional background in human mental health care and also participated in the AAls. To lessen experimenter influence, the experimenter attended 3 therapy sessions before data collection so that the dogs and patients were familiar with her presence. The 5 adult dogs (4 crossbreeds, 1 Labrador retriever) ranged in age from 3 to 10 years (mean $\pm$ standard deviation, 5.4 ± 2.8) and weighed from 20 to 35 kg (mean $\pm$ standard deviation, 27.8 ± 2.9). One dog was an intact male, 3 female dogs were spayed, and 1 female dog was intact. To be eligible for participation in the study, the dogs were required to be in good clinical health (i.e., free from pain, external and internal parasites, and immunized) and subjected to regular health screening and behavioral monitoring by a veterinarian or an ethologist. To choose a representative sample of therapy dogs, each participating dog had been awarded an AAI certificate and exhibited a minimum of 2 years of working experience. All dogs were previously trained with only positive reinforcement techniques. Moreover, only dogs that regularly (at least once a month) participated in AAls over the past 2 years were considered.

Study design

Sampling was carried out during 5 subsequent MTI sessions per dog, that is, 25 MTI sessions in total, with offenders in an inpatient substance abuse treatment facility in Austria. In the specialized facility, MTI was first launched in 2008 and has been established as an adjunct socialization therapy to rehabilitate offenders whose crimes have been associated with substance abuse. All the adult human participants of the MTI sessions that were analyzed over the course of this study enrolled in residential substance abuse treatment in Austria, participated voluntarily, agreed to be video-recorded for scientific purpose, underwent clinical–psychological screening, and appeared physically and mentally stable so that they posed no risk to themselves, the MTI professionals, and the therapy dog. MTI in residential substance abuse treatment aims at the training of social skills that shall ease reintegration of residents into working life and society. Each MTI session was 55–60 minutes in length and carried out once a week in groups of 8–10 participants who interacted with 1 therapy dog

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