

The Magic of Touch

Healing Effects of Animal Touch & Animal Presence

Viktor and Annie Reinhardt



ANIMAL WELFARE INSTITUTE

THE MAGIC OF TOUCH:
HEALING EFFECTS OF ANIMAL TOUCH & ANIMAL PRESENCE

The Magic of Touch

Healing Effects of Animal Touch & Animal Presence

Viktor and Annie Reinhardt



ANIMAL WELFARE INSTITUTE

Second Edition

To our daughter, Catherine

The Animal Welfare Institute is a nonprofit charitable organization founded in the United States in 1951 and dedicated to reducing animal suffering caused by people. AWI engages policymakers, scientists, industry, and the public to achieve better treatment of animals everywhere—in the laboratory, on the farm, in commerce, at home, and in the wild.

Copyright 2017 © Animal Welfare Institute

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the prior written permission of the publisher.

Published by the Animal Welfare Institute
900 Pennsylvania Avenue, SE, Washington, DC 20003
www.awionline.org

The Magic of Touch: Healing Effects of Animal Touch & Animal Presence
by Viktor and Annie Reinhardt

ISBN 978-0-938414-77-3
LCN 2017946988

Printed in the United States
Edited by Dave Tilford and Cathy Liss
Design by Ava Rinehart and Alexandra Alberg
Cover photo: Lena Wurm

The Magic of Touch

ANIMALS OF THE SAME SPECIES TOUCHING EACH OTHER

Touch Buffers Stress and Distress ... 2

Touch Mediates Conflict ... 12

Touch Functions as “Social Glue”... 20

ANIMALS OF DIFFERENT SPECIES TOUCHING EACH OTHER

Touch Calms, Comforts and Buffers Depression, Pain, Stress and Anxiety ... 24

Touch Enhances Quality of Life ... 36

Touch Promotes Health ... 40

Animal-Assisted Therapy ... 45

MERE PRESENCE OF A COMPANION ANIMAL ... 60

CONCLUSION ... 64

REFERENCES ... 65



INTRODUCTION

Social animals, which include humans, are biologically adapted to transmit life-affirming energy to other individuals through touch. This energy is experienced as pleasant; it has calming, relaxing, de-stressing and healing properties. The positive experience of being touched functions as social reinforcer; it attracts individuals, thereby fostering social cohesion, and it mediates antagonistic conflicts, thereby re-establishing social harmony. Touching another creature with friendly intention is, in itself, a rewarding experience that brings about ease of mind and ease of body. The gesture generates a closed feedback system in which all participants share mutual benefits.

In the present context, “touching” means contacting another creature with the fingers, hand, forehead, lips or tongue. The touching may simply imply a brief contact (touching), a prolonged contact (e.g., hugging) or a repeated

contact while moving the fingers, hands or tongue over a body area of a partner (e.g., stroking, petting, grooming, massaging).

This book has been inspired by extensive personal experiences with wild and captive animals and observations of their social behavior and strategies of living together harmoniously. We reviewed the scientific and professional literature on touch to gather published evidence of the life-promoting effect of friendly touch between individuals, and of the mere presence of a friendly companion.

In this second edition, we have updated the data-based literature and refined the accompanying collection of figures.

It is our wish that this book will foster an appreciation of a rather mysterious capacity that is biologically inherent in all animals and interconnects them on a deeply positive level beyond species boundaries.

We are grateful to Cathy Liss and Dave Tilford for their very thorough reading of the book's manuscript and providing very helpful editorial corrections and comments. Special thanks are due to Ava Rinehart and Alexandra Alberg for designing this book. With many gentle touches and lots of patience they managed to arrange the text and the images in such a way that the specific communicative objectives could be achieved without breaking the rules.

Viktor and Annie Reinhardt

Mt. Shasta, California

May, 2017



ANIMALS OF THE SAME SPECIES
TOUCHING EACH OTHER



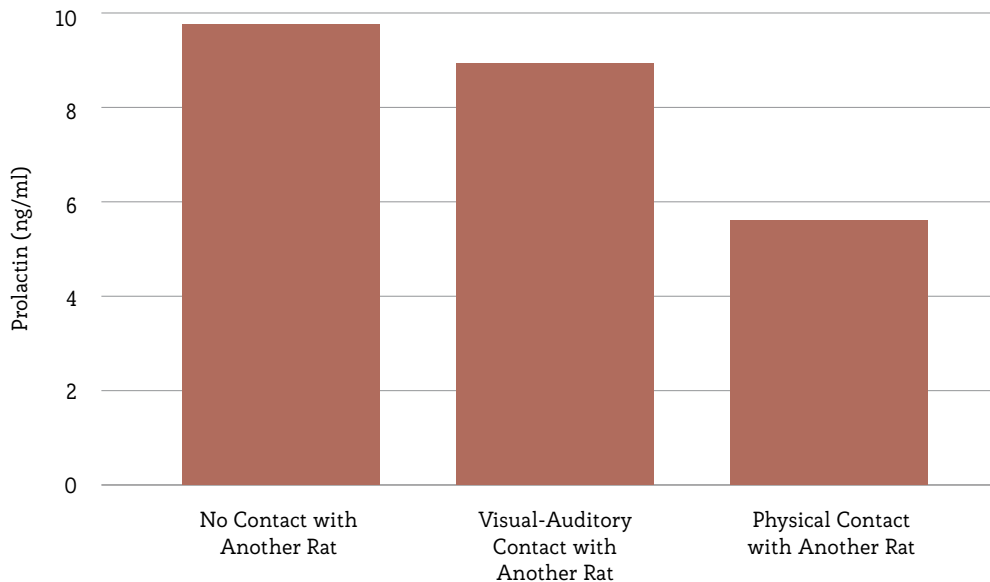


TOUCH BUFFERS STRESS AND DISTRESS

The mere touch by a conspecific has healing powers: it calms, comforts and protects against stress. Rats are afraid of an open area because it could expose them to a raptor. The stress experienced when having to cross an open area is reflected by an increased output of prolactin, a hormone that is released into the bloodstream in response to acute stress (Fava & Guaraldi, 1987), such as confrontation with a predator. Wilson (2001) placed 70 rats, one at a time, in an open field for 10 minutes, either alone, with another rat, or with a rat behind a transparent barrier. Being placed in the open field alone increased the rats' prolactin levels; they were stressed. When they were placed in the open field in

pairs, the two animals spent 73 percent of the 10-minute test sessions in direct physical contact with each other; their mean prolactin levels were significantly lower (5.7 ng/ml) than when tested alone (9.8 ng/ml). When individual animals were placed in the open field with another rat behind a transparent barrier, they spent 37 percent of the 10 minutes right next to the other, but the two could not touch each other; their mean prolactin levels were significantly higher than in the contact test situation, but not significantly lower than in the alone (8.7 ng/ml) test situation. Visual and auditory contact was not enough to mitigate stress; it was the sensation of physical contact with a companion that protected the rats against stress.

The importance of physical touch as stress mediator in rats has also been emphasized by Latané (1969). She exposed the animals to an open field and noticed that their fear responses—as measured in freezing behavior



and defecation—were significantly reduced when they were tested with a companion whom they could touch, but not when they were tested with a companion in a cage that did not allow for physical contact.

Using remote recorders, DaCosta et al. (2004) monitored the heart rate of 11 sheep, both in their familiar group and while they were isolated for 30 minutes. Being separated was a stressful experience for them, causing their mean heart rate to increase from 94 to 113 beats per minute. When they could see a large picture of another sheep, their heart rate did not increase (91 beats per minute). Apparently, for sheep, a mere picture of a conspecific exerts such a reassuring influence that the stress resulting from social isolation is mitigated. A similar effect has been reported for cattle and horses (Piller et al., 1999; McAfee et al., 2002; Mills & Davenport, 2002; McLean & Swanson, 2004).

Solitary imprisonment is one of the most serious stressors for primates—humans, monkeys and apes alike. For them, the sight of a conspecific in an adjacent cell or cage, the picture of a conspecific or the sight of their own reflection in a mirror will not help to diminish their distress, which they often express by mutilating and biting themselves to the point of life-threatening lacerations (Johnson & Britt, 1967; Erwin et al., 1973; Yaroshevsky, 1975; National Research Council, 1998; Shaw, 2000). It has been shown in apes and monkeys that the behavioral pathology of self-injurious behavior can be successfully treated only by physical touch and interaction with a live conspecific (Fritz, 1989; Reinhardt, 1999; Alexander & Fontenot, 2003; Weed et al., 2003).

Drescher et al. (1980) monitored the heart rate changes of four women after quiet rest, when a familiar person stood next to them for 1 minute, and

when the familiar person touched their wrist for 30 seconds. The test sequence was repeated five times. On average, heart rate was

- › 67.0 beats per minute at rest; it increased to
- › 68.3 beats per minute when the person stood next to the subject; it decreased significantly to
- › 64.4 beats per minute when the person touched the subject.

In a supplemental experiment, subjects were asked to touch their own wrists for 30 seconds after a quiet rest period. Unlike being touched by another person, self-touching had no significant effect on heart rate; in fact, self-touching slightly increased the subject's heart rate to 68.2 beats per minute. These experiments were repeated with four men with equivalent results. The findings provide evidence that physical touch by a member of the same species also has a strong calming effect in humans.

Drescher et al. (1985) confirmed in a subsequent study with 20 participants that physical touch by another person leads to a significant heart rate deceleration. In line with this physiologically calming effect is the finding of Henricson (2008); he noted during intensive care of 44 patients that 22 patients who were gently touched by the nurse showed significantly lowered levels of anxiety compared with 22 patients who were not touched. Being compassionately touched by a nurse has a calming and reassuring effect. Kim et al. (2001) conducted a study with 29 patients who had a hand gently stroked (hand massage) for a few minutes while having cataract surgery under local anesthesia. After the hand massage, the patients' mean anxiety level, blood pressure and pulse rate were significantly lower than before the massage.

“As a young nurse—I worked on a cardiovascular and thoracic surgery unit—I learned a lot about touch. We dealt with pain every day, significant



pain. I learned that pain medication sometimes wasn't enough, but that holding a hand for five minutes often was enough to ease pain and suffering. I learned that a reassuring touch could calm anxiety and get someone through a frightening procedure. I learned that sometimes it was a family member who needed a gentle touch or a hug. I learned that touch always goes both ways—I often initiated touch to calm someone and was calmed and nurtured myself by the interaction. It's a beautiful thing" (Sluss, 2012). "Patients are often starved for touch and long for human contact. If they are connected to multiple IV

lines and other interventional technology, family members and visitors may shy away from touching them for fear of disconnecting something. Visitors may feel the patient is too fragile or susceptible to harm. This results in the patient feeling increasingly isolated. Even while overwhelmed with tasks, nurses must not miss opportunities for administering touch to patients, however brief. That touch is crucial. It brings humanity and compassion to nursing care and the patient experience” (Carlson, 2015). Reports by Triplett & Arneson (1979), Norberg et al. (1986), Fisher & Joseph (1989), Schoenhofer (1989), Mulaik et al. (1991), Moore & Gildbert (1995), Routasalo (1996), Routasalo & Isola (1996 & 1998), and McKie (2000) confirm that human patients greatly benefit from being touched. A nurse’s touch not only has a physiologically calming effect, but is also emotionally comforting and buffers fear and anxiety.

To be touched by another person is a calming, anxiolytic pleasant experience that is physiologically mediated by oxytocin and endorphins (Uvnäs-Moberg et al., 1993; Uvnäs-Moberg, 1997; Lund et al., 2002; Grewen et al., 2005; Light et al., 2005).

Touching is an ancient method of comforting and healing; applied as massage—an ancient Chinese healing art—it is widely practiced for symptom relief in patients with anxiety, depression, headache, vertigo, and chronic pain in the neck, shoulder and back (Xiong et al., 2015). Receiving a massage is a pleasant and de-stressing experience that is accompanied by an increased secretion of oxytocin and a decreased secretion of adrenocorticotropin hormone (Morhenn et al., 2012).

Massage therapy is increasingly used for effective symptom relief in patients with cancer (Weinrich & Weinrich, 1990; Ferrell-Torry & Glick, 1993; Grealish et al., 2000; Stephenson et al., 2000; Hernandez-Reif et al., 2004;

Stringer et al., 2008; Lee et al., 2015). Cassileth & Vickers (2004) evaluated the symptom scores of 1,290 patients with cancer before and after a 20- to 60-minute massage. The massage resulted in significant reductions of the patient's reported scores of pain, fatigue, nausea, anxiety and depression.

Seers et al. (2008) conducted a randomized controlled trial, in which 101 patients attending a pain relief unit were assigned to a massage group (n=50) or control group (n=51). The massage group received a 15-minute manual massage and the control group a 15-minute visit from a friendly person. Patients in the massage group but not the control group reported significantly less pain and anxiety as a result of the intervention (massage).

Based on a study with 30 primiparous women, Chang et al. (2002) suggest that massage is a cost-effective nursing intervention that can decrease pain and anxiety during labor. Taghinejad et al. (2010) conducted a clinical trial to compare the effects of massage and music therapy on the severity of labor pain in 101 primiparous women who were hospitalized and randomly stratified into two groups of either massage (n=51) or music (n=50) therapies. Women in the massage therapy group reported a significantly lower level of pain compared with those in the music therapy group. Agonizing labor pain was significantly relieved with massage therapy, not with music therapy. The authors concluded that massage can be clinically recommended as an alternative, safe and affordable method of labor-pain relief.

Mitchinson et al. (2007) assessed perceived pain and anxiety of veterans undergoing major surgery when they received (a) routine postoperative care (control=203) versus (b) a massage each evening for up to 5 postoperative days (n=200). Compared with the control group, patients in the massage group experienced immediate, significant decreases in pain intensity, pain

unpleasantness, and anxiety along with a faster rate of decrease in pain intensity and unpleasantness during the first 4 postoperative days. The authors conclude that “massage may ameliorate suffering by helping to relieve the anxiety that so effectively synergizes with pain to create distress.”

In human and nonhuman primates, and presumably also in most other social mammals such as rats, dogs, cats, cattle and horses, touch through grooming (social body care) is the primary stress-buffering contact behavior. Boccia (1989) found in a telemetry-implanted female pigtail macaque that her heart rate decreased significantly whenever she was groomed by a companion. This decrease in heart rate was particularly pronounced when she was groomed right after an agonistic encounter. Her heart rate did not change



when she groomed herself or when she groomed a partner. Aureli et al. (1999) confirmed this observation in a study of two female rhesus macaques, who also experienced a significant heart rate decrease when they were groomed by companions.

Keverne (1989) found in 10 talapoin monkeys that beta-endorphins—neurotransmitters that facilitate relaxation and a feeling of enhanced well-being (Grant, 2015)—increase significantly while a monkey is being groomed but remain at baseline levels while a monkey is actively grooming a partner. This suggests active grooming is a kind of social service that is enjoyed by the recipient.

The positive effect of grooming can also be measured by examining its influence on so-called displacement activities; these manifest when a subject feels tense and is not sure how to react in a given situation. For example, a monkey or a person may yawn or scratch her head during a threatening situation when she is not sure if she should stand her ground or run away (Reinhardt, 2009). Schino et al. (1988) demonstrated in cynomolgus macaques that being groomed by another monkey significantly reduces the urge to engage in displacement activities. Eleven instances were observed when males were paired with females during their receptive phase. Being introduced to the sexually attractive females initially created a conflict situation for the males, because they were not bonded with the females and were therefore unsure if they would accept, avoid or attack them. Not knowing how to handle the situation, the males yawned and scratched themselves frequently. After some time, the females approached their cage mates hesitantly and started to groom them intermittently. This had a calming effect on the males, who not only relaxed while they were groomed but also stopped yawning and scratching themselves.



TOUCH MEDIATES CONFLICT

Grooming has a beneficial effect not only on the subject who is groomed; actively grooming a partner also serves as a mediator to reduce social tension. Studies of captive primates have shown that the animals can anticipate potential conflict and adjust their behavior accordingly. For example, they groom each other particularly often in crowded conditions and immediately prior to food distribution when the risk for agonistic competition over food is particularly high; grooming each other helps them avoid overt aggression and override social tension. De Waal (1989) observed a group of 19 chimpanzees in a corral and noted a significant increase in friendly contact behaviors prior to the daily feeding. Anticipating the possibility of food-related aggressive disputes, the chimpanzees engaged much more in amicable mutual grooming right before food was distributed than at other times of the day. Koyama &



Dunbar (1996) studied a group of 11 chimpanzees at a zoo over a 3-month period and found that the animals often started to groom each other conspicuously right before the usual time of food distribution. The mean number of dyads engaged in grooming was nearly three times higher during the half hour before feeding than during the first half hour after feeding (2.4 versus 0.9 dyads); the difference was statistically significant. This effect was more pronounced when all the food was stockpiled, thus creating more reason for competition, than when it was dispersed over a large area, allowing individuals to eat undisturbed at a greater distance from one another.

De Waal & Aureli (1997) noticed that chimpanzees employ the same “peacemaking” strategy, both to forestall aggression and to reconcile after an aggressive dispute. For example, if an animal caretaker arrives with a bucket full of fruit, the apes will first rush toward each other, embracing reassuringly, kissing, and patting one another on the back. Only then will they come forward to collect their share of the food. The same tension-mitigating strategy works when animals are confined in small quarters, leading to crowded living conditions. Judge & de Waal (1997) compared the behavior of adult male rhesus macaques of three different breeding groups living (a) in the wild with no crowding, (b) in captivity with moderate crowding, and (c) in captivity with intense crowding. Unexpectedly, the mean hourly rates of the males’ aggression did not differ significantly between the not crowded, moderately crowded and intensely crowded groups, but there was a positive correlation between social grooming and the degree of crowding; the males’ grooming activity increased significantly with the degree of crowding. This behavioral adaptation to crowding effectively controlled aggression and maintained positive social relationships even under living conditions that were potentially very distressing.

Judge et al. (2006) made a similar observation in a captive harem group of nine hamadryas baboons who lived in large outdoor quarters. When the animals were locked up in small indoor quarters on 11 different occasions during 30-minute “crowding sessions,” mean hourly grooming rates increased from 2.6 incidents in the outdoor quarters to 3.8 incidents in the crowded indoor quarters, where the aggression rate per hour decreased from 2.2 to 1.5 incidents. The females were the peacemakers: They groomed the males significantly more often in the crowded indoor quarters than in the large outdoor section of their enclosure. Obviously, they succeeded in their efforts to keep the males in a relatively peaceful rather than aggressive mood. These findings justify the conclusion that the females anticipated aggressive disruptions when they were crowded indoors, and routinely used friendly contact behavior to buffer social tension and forestall overt aggressive conflicts.





Some studies have shown that touch is also central to restoring harmonious relationships after aggressive disputes. De Waal & van Roosmalen (1979) witnessed 229 agonistic disputes in a large colony of chimpanzees. Opponents made friendly contact during the 2 minutes before a dispute in 50 cases. During the 2 minutes right after a dispute, however, they made friendly contact in 179 cases. After each conflict, the chimpanzees preferred to kiss, embrace and gently touch their former opponents, rather than a third partner. Bystanders often made friendly contact right after a conflict and “consoled” the recipient of aggression. Sometimes a third individual took the initiative to get the two former opponents to interact again in a friendly manner. Especially after fights between adult males, the two opponents were often brought together by an adult female, who would carefully approach one male and touch and kiss him while slowly moving in



the direction of the other male. If the first male followed her, he did so closely behind the female—often inspecting her genitals—and without looking at the other male. On a few occasions, the female would look behind at her follower and, if necessary, turn around and pull the male's arm to make him move. When the female had finally achieved her goal, she would sit down next to the second male, who would inevitably start grooming her, which in turn prompted the first male to also groom the female. The two males would now eagerly groom in unison for a while, until the female discreetly sneaked away, leaving the two males to continue grooming each other, while reassuringly panting and lip-smacking. These observations make it clear that the deleterious effects of aggression can readily be buffered by amicable touching. It defuses tense moments and repairs social relationships. Reconciliatory grooming and hugging can turn former antagonists into friends.

Demaria & Thierry (2001) confirmed in rhesus and Tonkean macaques that these two species also use friendly contact behavior, especially grooming, to reconcile after disputes. In two breeding troops, a total of 540 agonistic encounters were witnessed. The opponents engaged in friendly contact interactions right after a conflict in 21.0 percent of cases, while they did this during neutral circumstances in only 1.4 percent of cases. Reconciliative grooming helped the animals to quickly overcome hostile tendencies and re-establish harmony within their group.

Cools et al. (2008) witnessed 1,711 agonistic conflicts among a large number of pair-housed dogs. The conflict was terminated in 606 cases (35 percent) by one of the dogs showing a friendly contact behavior, such as licking the lip corner of the opponent (Reinhardt, 2009).



The Magic of Touch



Butovskaya et al. (2001) showed in children that friendly touch not only re-establishes social harmony on the behavioral level, but also reduces the physiological stress—as measured in saliva cortisol levels—that is associated with social conflict: Among 30 boys, aggressive conflicts and their consequences were observed during a summer camp. Mean cortisol levels 10 minutes after a conflict were significantly lower (1.1 ng/ml) when the two opponents engaged in reconciliatory contact gestures than when they failed to do so (2.3 ng/ml).

The peacemaking strategy of initiating friendly physical contact with the opponent after a conflict has also been documented in stump-tailed macaques (de Waal & Ren, 1988), long-tailed macaques (Aureli et al., 1989), capuchin monkeys (Verbeek & de Waal, 1997), leaf monkeys (Arnold & Barton, 2001), bonobos (Palagi et al., 2004), gorillas (Mallavarapu et al., 2006), humans (Fujisawa et al., 2004), lions (Schaller, 1972), goats (Schino, 1998), hyenas (Wahaj et al., 2001) and dolphins (Weaver, 2003). Peacemaking through friendly touch-mediated behaviors probably also occurs in other species, such as rats, wolves, cattle, horses, elephants and seals, who depend on harmonious social relationships.

TOUCH FUNCTIONS AS “SOCIAL GLUE”

The partner who is being touched with friendly intentions remains stationary and takes a position that makes it easy for the other partner to groom, hug or lick specific parts of the body. Often, the eyes get a glazed, blissed-out look and may shut completely when the grooming continues for an extended period of time; some animals, for example, dogs, cats, deer, cattle and humans can get so relaxed that they start drooling. And when the grooming stops, gentle nudging or unmistakable invitation gestures are used to prompt the partner to resume the grooming. To be gently touched is a pleasant, enjoyable experience; this in turn makes the grooming partner very attractive.

These touch-related attractions function as a kind of “social glue” that motivates animals to stay in close proximity to each other as pairs or groups.









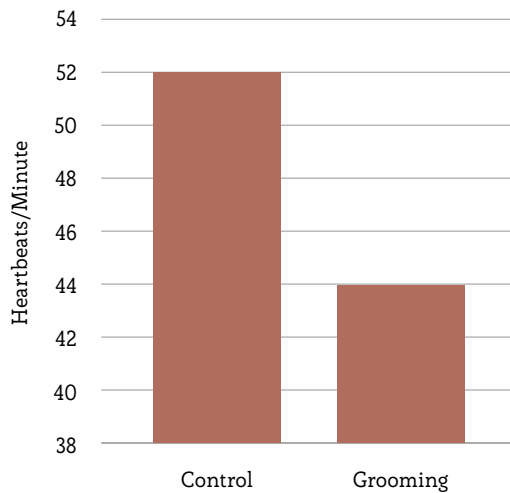
ANIMALS OF DIFFERENT SPECIES
TOUCHING EACH OTHER



TOUCH CALMS, COMFORTS AND BUFFERS DEPRESSION,
PAIN, STRESS AND ANXIETY

Sheep do not groom each other, yet their heart rate slows down when a friendly person strokes them. Coulon et al. (2015) found in 12 lambs that their mean heart rates decreased significantly while their caregiver stroked them for 8 minutes. The calming effect of the human touch was also reflected in the lambs' postural response (hanging ears).

Feh & de Mazières (1993) monitored 16 horses and found that mean heart rates at rest (Control) significantly decreased when a friendly person groomed them (Grooming).



These findings were confirmed by Normando et al. (1999) and McBride et al. (2004), who concluded that being groomed reduces stress in horses.

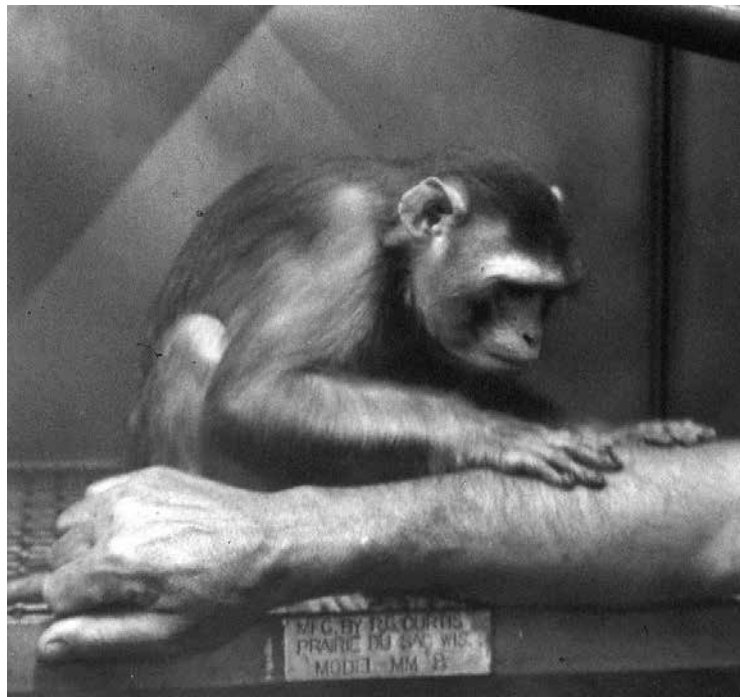
Gentle tactile contact by a human also diminishes stress in dogs. Kostarczyk & Fonberg (1982) and McGreevy et al. (2005) found in 5 and 28 dogs, respectively, that being stroked by a person for a few minutes significantly decreased the animals' heart rate. Coppola et al. (2006) and Dudley et al. (2015) noticed a significant decrease in plasma cortisol and salivary cortisol, respectively, in 54 and 15 dogs who had tactile contact with a friendly person during approximately 30-minute sessions.

Animals in research laboratories are often touched by not-so-friendly people during procedures that are life-threatening and/or painful. Under

those circumstances, being touched evokes fear (resistance), perhaps even panic (struggling). It is not so much the actual procedure that is distressing for an animal but to be touched by a person whom she or he cannot trust, perhaps due to aversive conditioning. It has been demonstrated in baboons (Levison et al., 1964), macaques (Bunyak et al., 1982; Reinhardt & Cowley, 1992; Friscino et al., 2003; Andrews, 2014), pigs (Grandin, 1986; Chilcott et al., 2001; Williams & Watson, 2003) and dogs (Savastano, 2013) that behavioral and physiological stress responses are minimized or avoided altogether when the same procedure is done by a friendly person who has gained the trust of the individual animal; her touch does not evoke fear and anxiety but has a reassuring, stress-buffering effect.

Macaques—the prevailing nonhuman primates found in research laboratories—enjoy it when a person whom they can trust grooms them.





The relaxing effect of being groomed by a friendly human is reflected in a significant heart rate deceleration (Grandi & Ishida, 2015). The same is probably true when a macaque reciprocates the grooming; it's a “touching,” uplifting experience for the human.

The friendly touch typically relaxes the recipient, but the subject who does the touching with kind intention also benefits from the interaction. Odendaal & Meintjes (2003) investigated the physiological effects of such an interaction on the active subject and on the recipient. The study involved 18 humans and their companion dogs. The interaction consisted of gently stroking the dog and scratching him or her behind the ears for approximately 15 minutes. Mean arterial pressure was taken to assess emotional tension, measured with an automatic blood pressure unit applied to the inactive arm of the human and

the tail base of the dog. Blood plasma was analyzed for endogenous substances associated with a state of well-being and enjoyment—beta-endorphin, oxytocin and dopamine. Compared with quiet resting, petting the dog resulted in a significant decrease in blood pressure and a significant increase in beta-endorphin, oxytocin and dopamine not only in the dog but also in the person, suggesting that the tactile interaction was calming and enjoyable for both. Baun et al. (1984) also found in a study group of 24 people that subjects experienced a significant decrease in blood pressure while petting their dogs. Similar results were reported by Katcher (1981), Jenkins (1986) and Vormbrock & Grossberg (1988).

	PERSON		DOG	
	Resting	Grooming	Resting	Grooming
Blood pressure (mmHg)	87.6	84.4	91.0	87.7
Beta-endorphin (pmol/L)	3.1	8.0	1.2	2.8
Oxytocin (ng/L)	2.1	4.0	0.1	0.5
Dopamine (ph/L)	86.5	107.0	35.0	60.5

Shiloh et al. (2003) assessed anxiety levels of 58 nonclinical participants after a 2-minute exposure to a tarantula in a glass jar. Mean anxiety scores were equivalent among participants who were holding and petting a rabbit (28.5) or a turtle (28.9); they were significantly lower than mean anxiety scores of participants serving as controls (34.5) and participants holding a toy rabbit (32.1) or a toy turtle (34.3). The findings showed that petting an animal significantly reduced anxiety; petting a rabbit or a turtle had the same anxiolytic effect independent of the animal's texture (soft rabbit fur vs. hard



turtle shell); the effect could not be attributed to the petting per se, since it was observed only with live animals but not with matched toys.

Morgan (2008) studied the emotionally comforting effect of interaction with a companion dog versus interaction with a friendly person in 126 volunteers exposed to a difficult speaking task. The subjects were significantly less anxious when they had the company of a dog than when they had the company of a person, or when they were alone. Unlike the person, the dog shielded the subjects from the anxiety of the anticipated speaking task; they were probably unconsciously aware that the dog—unlike the person—did not evaluate their speaking task performance in any way. Beetz et al. (2012) conducted a similar study with 47 children and found that being with a companion dog buffered their stress response (Trier Social Stress for Children)—as measured via mean 60-minute salivary cortisol concentrations—more effectively (40 nmol/L) than being with a friendly person (170 nmol/L). Cortisol levels correlated negatively with the amount of physical contact between the child and the dog. The dog provided a psychologically safer and more reassuring environment than the person.

Harris et al. (1993) monitored the blood pressure of 16 home-bound seniors who were visited in alternation by a friendly person or the same friendly person with a companion dog. Being visited by the person did not affect the subjects' blood pressure. When the person came with the dog, however, both the systolic and diastolic blood pressure of the subjects decreased significantly, from 145 to 136 mmHg and from 74 to 70 mmHg, respectively. The decline in blood pressure suggests that the encounter with the dog—but not with the person—was a stress-reducing experience for the seniors.



Stewart et al. (2014) made it possible for 55 college students to interact with a dog for up to 2 hours twice monthly during an academic quarter. Following the sessions with the dog, 60 percent of students reported a decrease in anxiety and loneliness. The anxiolytic effect of touching a dog has also been reported in patients with psychotic disorders (Barker & Dawson, 1998; Arnold, 1995).

Krause-Parello & Gulick (2015) compared the heart rates of children during potentially very distressing forensic interviews. While 19 children showed no change in heart rate when they could interact with a dog during the interview, 23 children experienced a significant rise in heart rate when no dog was present during the interview. “The results suggest that the presence of the canine in the forensic interview may have acted as a buffer or safeguard for the children when disclosing details of sexual abuse.”

Dietz et al. (2012) found in 153 survivors of child sexual abuse that the inclusion of a dog in group therapy programs was associated with significant decreases in trauma symptoms including anxiety, depression, anger, intrusive thoughts and nightmares. Hamama et al. (2011) published similar findings regarding nine teenage girls who had a history of physical or sexual abuse prior to therapeutic intervention. The presence of a dog during therapy sessions led to a significant decline of post-traumatic stress disorder (PTSD) symptoms.

Lass-Hennemann et al. (2014) exposed 57 female participants to a “traumatic” film clip. One group (n=17) watched the film in the presence of a dog, a second group (n=20) watched it with a toy animal and a third group (n=20) watched it alone. Participants who were accompanied by the dog reported significantly lower anxiety ratings after viewing the film compared with the “toy dog group” and the “alone group.” The presence of the dog served as a buffer against undue emotional stress.

Ohtani et al. (2015) found in 36 alcohol-dependent individuals during psychiatric daycare that having contact with dogs or cats significantly reduced both subjective and physiological measures of anxiety and significantly improved general well-being.

Earles et al. (2015) tested the efficacy of touching horses for treating anxiety and PTSD in 16 volunteers who had experienced a traumatic event, such as rape or a serious accident, and had current PTSD symptoms. Participants engaged in six weekly 2-hour sessions with horses (ground activities and basic horsemanship). Immediately following the final session, participants reported significantly reduced post-traumatic stress symptoms, less severe emotional responses to trauma, less generalized anxiety and fewer symptoms of depression. Frederick et al. (2015) found that at-risk adolescents





who had repeated sessions with horses experienced significantly increased levels of hope and significantly decreased levels of depression.

McNicholas & Collis (2006) examined the role of a person-pet relationship in the adjustment to the first 3 months following spousal bereavement. Subjects were asked to self-report symptoms of distress—such as sleep disturbance, cognitive disturbance, lack of appetite, physical ailments, intrusive thoughts and concentration difficulties—during this time period. Results indicated that 57 subjects who owned a cat and/or a dog experienced

symptoms of distress significantly less frequently (mean=50/3 months) than 109 subjects who had no pet (mean=75/3 months). Pet owners mentioned that their dog or cat provided vital stability in daily routines, alleviating a sense of “aloneness” and giving them “a reason to get up each morning.” The pets also provided a safe outlet for emotions. Many subjects reported that they would often cry while holding their pet or just in the company of their pet; this helped them release painful emotions.

Calvo et al. (2016) collected saliva samples for cortisol analysis of 14 institutionalized patients with chronic schizophrenia before and after completion of a therapy program consisting of twice-weekly 1-hour sessions during which each patient was with a dog and interacted with him or her. The saliva samples showed that the patient’s mean cortisol concentrations were significantly lower ($p < 0.05$; supportive data are missing) after repeatedly being with and interacting with a dog over the course of 6 months than before, when they had no contact with a dog. The dog had a stress-mitigating effect on these patients.

Orlandi et al. (2007) evaluated the presence of a dog on 89 oncological patients undergoing chemotherapy. The same number of patients without a dog present during chemotherapy served as a control. It turned out that the patients who could interact with a dog during chemotherapy showed a significant reduction in depression and a significant increase in arterial oxygen saturation, both of which were absent in the control group without a dog.



TOUCH ENHANCES QUALITY OF LIFE

Physical contact with an animal can have an emotionally uplifting effect on humans. Fleishman et al. (2015) evaluated the effect of a companion dog during radiation-chemotherapy regimens in 37 patients. Each patient completed the Functional Assessment of Cancer Therapy-General scale (FACT-G) questionnaire before the first visit of a dog and after two radiation-chemotherapy sessions, during which the patient petted, talked to and played with the dog. The analysis of the FACT-G showed a statistically significant and clinically meaningful increase in emotional well-being in the face of a moderate to high symptom burden.

Several studies have shown that pets provide elderly people with a sense of purpose and responsibility, as well as opportunities for nurturing (Levinson, 1969; Mugford, 1980; Hart, 1995; Raina, 1999). A companion dog prompts them to be more active and playful, take regular walks (Serpell, 1991; Siegel, 1993; McColgan & Schofield, 2007), interact with other people (Hunt et al., 1992; Rogers et al., 1993; Hart, 1995; McNicholas & Collis, 2006; Johnson & Gayer,

2008) and feel less lonely (Levinson, 1978; Cusak, 1988; Perretti, 1990; Kidd & Kidd, 1994). Dogs also seem happy to be with elderly people and cheer them up. An animal provides mental stimulation and forms a nonthreatening, reassuring, nonverbal and tactile comfort that helps break a cycle of boredom, hopelessness, social withdrawal and depression (Salmon & Salmon, 1981; Michaels, 1982; Francis et al., 1985; Bolin, 1987; Garrity et al., 1989; Roberts et al., 1996; Guest et al., 2006).

Based on a 1-year study of more than 250 seniors who had a dog or cat, and 750 seniors who were alone, Raina et al. (1999) concluded that elderly people with pets are more independent and participate more in routine activities of daily living—in particular, taking care of their pets. Caring for a pet brings joy and meaning into the life of otherwise lonely people. Seniors who lacked a social support system in the form of family or friends remained emotionally healthier during crisis times when they had a companion animal, compared with individuals who faced the same type of situation alone.

Not only dogs and cats, but also birds and insects, can be a source of psychological support to their owners (Loughlin & Dorwick, 1993; Jessen et al., 1996). Old-age pensioners living alone in an urban area were randomly given either budgerigars or begonias. The budgerigar owners were better off emotionally, had more friends and visitors, and were more involved in the community than the plant owners (Mugford & McComisky, 1975). Colombo et al. (2006) reports similar findings from a study that assessed the health status and well-being of 144 elderly people in seven retirement homes. The participants were randomly divided into three groups, who were given a bird (n=48), a plant (n=43) or nothing (n=53). After 3 months, there was a significant improvement in perceived health for the group that cared for the

The Magic of Touch



bird. A bird can uplift the spirits of a person who is feeling lonely. Although not statistically significant, there was also an improvement in health status in the group caring for the plant, while the control group's health status was relatively low. Caring for the bird also increased the subjects' emotional well-being; they experienced significantly less anxiety and depression and felt more at ease with their life's situation. This was not the case for the subjects with the plant or the control subjects. Ko et al. (2016) investigated the effect of pet insects on the psychological health of 46 community-dwelling elderly people, each of whom received five crickets in a cage with sufficient fodder and a detailed instruction manual on the species-appropriate care of these animals. The subjects underwent psychometric tests via a direct interview before they received the crickets (baseline) and 8 weeks after they had received the crickets. Caring for the crickets had positive effects on depression and cognitive function of these elderly people; relative to baseline values, Geriatric Depression Scale scores were significantly lower (3.20 vs. 4.90) and changes in Mini-Mental State Examination scores significantly greater (1.13 vs. 0.31) after the subjects had cared for the crickets for 8 weeks.



TOUCH PROMOTES HEALTH

Being gently touched by humans can have a health-protective effect in animals. Gourkow et al. (2014) assessed clinical records of 139 shelter cats and found that the incidence of upper respiratory disease was 58 percent lower ($p < 0.0001$) and secretory antibody immunoglobulin A (IgA) level significantly higher (6.9 vs. 5.9 $\log_{10} \mu\text{g/g}$) in 70 cats who were gently petted on a daily basis compared with 69 cats who were not petted.

Not only being touched but also actively touching another living creature can boost the immune system. Charnetski et al. (2004) assessed IgA levels in 19 students who stroked a companion dog for 18 minutes, and in 17 other students who stroked a stuffed replica similar in size, shape and texture to the dog. While IgA levels increased significantly (33 percent) in students who petted the dog, they remained unchanged in those who petted the lifeless stuffed dog.

Serpell (1991) examined the health status of 47 people and noticed that the subjects reported minor health problems significantly less often over the course of 10 months after they had acquired a dog from the local animal shelter. These observations indicate that companion animals can have a health-promoting effect. Siegel (1990 & 1993) supports this conclusion by prospectively following Medicare enrollees in a health maintenance organization for a 1-year period. Individuals owning a dog (n=202) or a cat (n=141) had reported fewer doctor contacts than individuals with no pet (n=593). On average, pet owners had consulted a physician 8.1 times, individuals without a pet 9.7 times; the difference was of statistical significance.

Headey et al. (2002) found that people who had owned a pet for an extended period of time had significantly fewer doctor visits than people who had no pet. In a subsequent survey (Headey et al., 2008) of 3,030 respondents, those who owned a dog (n=1515) reported better health, took fewer days off sick from work and had fewer doctor visits than those who did not own a dog (n=1515).

Looking after a companion animal involves responsibilities that make one feel useful and needed; one strives to remain or become healthy in order to continue caring for the pet. It is not uncommon for the healthcare system to find pet owners insisting upon early discharge so that they can get back to make sure that their pets are well taken care of (Benda & Lightmark, 2004).

Contact with animals can have such a calming influence on humans that symptoms of Alzheimer's disease get buffered (Mossello et al., 2011). Fritz et al. (1995) studied 64 patients through medical records and information provided by caregivers; 34 of the patients had a dog or a cat, 30 patients had no pet.

- › Patients with a pet displayed significantly less verbal aggression compared with patients without a pet (8 vs. 43 percent).

- › Significantly fewer patients with a pet expressed feelings of anxiety than patients without a pet (38 vs. 63 percent).

Richeson (2003) examined the effects of a dog on two cardinal symptoms of 15 patients with dementia. Regular interaction with the dog for 3 weeks resulted in statistically significant decreases in the subjects' agitated behaviors and significant increases in positive social interactions. The nursing staff commented on how alert and responsive some of these patients had become, often talking endlessly about the dog. Similar findings were reported by Kongable et al. (1989), Churchill et al. (1999), Kanamori et al. (2000) and Edwards & Beck (2002).

Anderson et al. (1992) compared risk factors for cardiovascular disease in 462 men who had one or several pets in their home with 2,932 men who had no pet at home. It turned out that pet owners were relatively shielded against two risk factors; both their mean blood pressure and mean triglyceride levels were significantly lower across all age groups than the mean blood pressure (125 vs. 127 mmHg) and mean triglyceride levels (1.2 vs. 1.4 mmol/L) of men without a pet.

The healing effect of pets on humans becomes manifest in an increased chance of survival after a major health problem. Friedmann & Thomas (1995) assessed the recovery from acute heart failure in 373 patients. Survival rate after 1 year was

- › 93.9 percent (246/262) for patients who had no pet;
- › 93.2 percent (41/44) for patients who had a cat; and
- › 98.9 percent (86/87) for patients who had a dog.

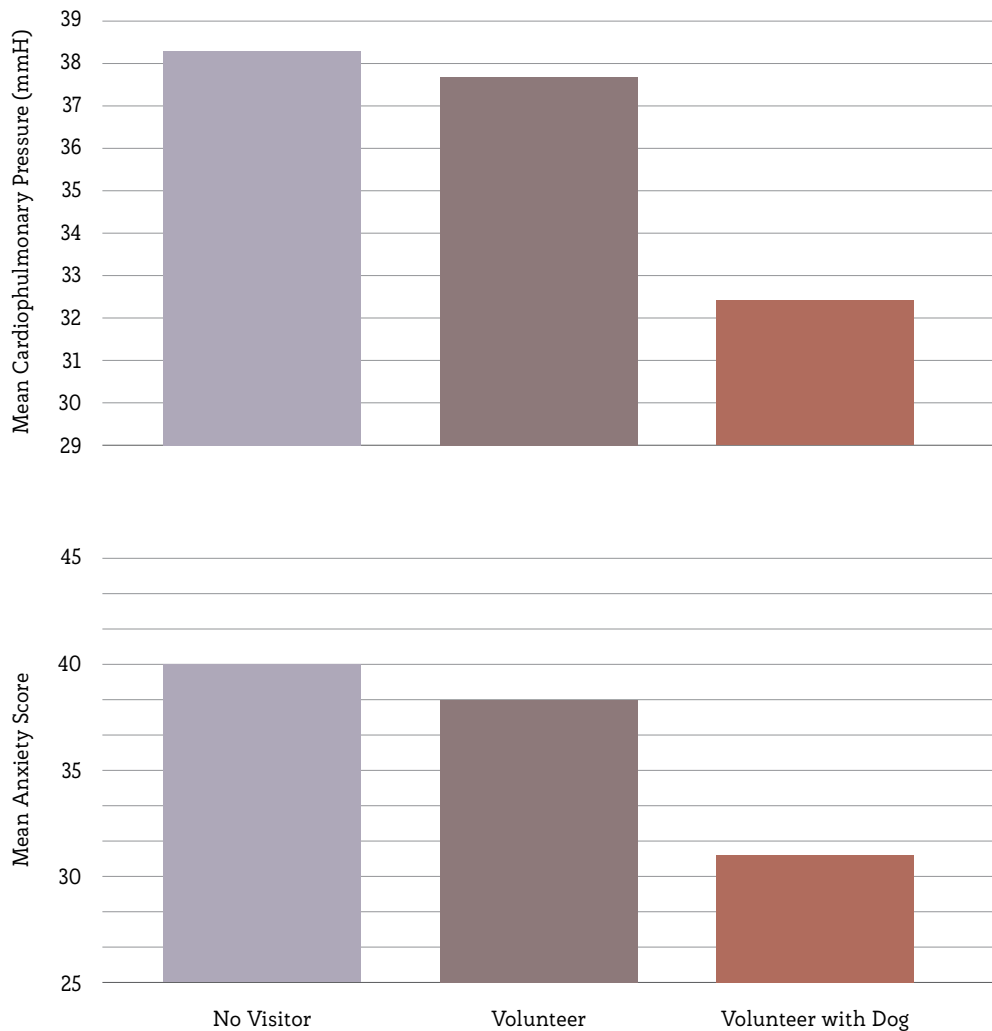
The difference in survival rate of patients with dog companions versus those with cats or no pets was of statistical significance. Dogs seem to provide a

rather unique emotional support system that promotes cardiovascular health in human subjects.

Cole et al. (2007) studied the impact of 12-minute visits by therapy dogs on patients with advanced heart failure. A group of 26 patients had significantly lower cardiopulmonary pressures and significantly lower anxiety scores when they were visited by a dog and a volunteer than another group of 25 patients



who were visited by a volunteer alone. Compared with the dog, the volunteer's positive influence on the patient was insignificant. The dog created a more relaxing environment that allowed the patient to experience more ease of mind. Satisfaction surveys indicate that critically ill patients benefit from dog visits. They "feel more happy, calm, and loved and less lonely" (Cole & Gawlinski, 1995).





ANIMAL-ASSISTED THERAPY

The health benefits of animals on humans have inspired practitioners in nursing, social work, marriage and family counseling, psychology, and psychiatry to include companion animals in their therapeutic programs (animal-assisted therapy). The distress-buffering effect of companion animals is particularly valuable for patients in the unfamiliar, potentially fear- and anxiety-triggering environment of a hospital. Lynch et al. (2014) had 82 antepartum hospitalized women with high-risk pregnancies complete the State-Trait Anxiety Inventory and the Beck Depression Inventory before and after a therapy dog visit. Both the patients' mean scores for depression and for anxiety significantly decreased (depression: 10.1 vs. 6.3; anxiety: 44.8 vs. 34.5) as a result of their encounter with the therapy dog.

Krause-Parello et al. (2016) examined the effects of one 20-minute dog-assisted therapy session on cortisol levels in 25 hospitalized veterans. Saliva samples were taken immediately before and again 30 minutes after the session with the dog. Mean salivary cortisol concentration was significantly lower after the session with the dog (0.29 µg/dl) than before (0.42 µg/dl), suggesting that interacting with the dog reduced stress in the patients. When these were asked how often they would like a dog visit, most wanted a dog visit every day.

Marcus et al. (2013) evaluated in fibromyalgia patients the impact of 12-minute therapy-dog visits (106 cases) compared with sitting alone for about 17 minutes in a waiting room (49 cases). Self-reported pain, fatigue and emotional distress were recorded, using an 11-point numeric rating scale before and after both situations. Unlike patients who were waiting alone, patients who were visited by a therapy dog reported significant improvements not only for mood and other measures of distress but also for pain. Clinically meaningful pain relief occurred in 34 percent of cases as a result of the dog visits.

Harper et al. (2015) conducted a controlled trial of 72 patients undergoing knee surgery. Patients were randomized to a 15-minute visitation with a therapy dog before physical therapy, or standard postoperative physical therapy regimens. Reduction in pain was assessed using the visual analogue scale (VAS) after each physical therapy session, beginning on postoperative Day 1 and continuing for three consecutive sessions. Patients in the group with a therapy dog had lower VAS scores after each physical therapy session than the patients without a therapy dog, with a final significant VAS score difference of 2.4 units after the third therapy session. The presence of the dog had a strong pain-buffering effect on the patients.



Quantitative and qualitative findings provide support for decreased pain, tension, anxiety, and fatigue and improved overall mood in patients who are visited by companion animals (Coakley & Mahoney, 2006). A visiting, tail-wagging dog makes any acute care unit seem more homelike. Stroking and talking to the animal relaxes the patient. Because animals do not require verbal communication to interact with humans, aphasic and uncommunicative patients can greatly benefit from animal visits. The animal shows unconditional love, regardless of a patient's unusual manner of speech or physical appearance (Barba, 1955). Watching a depressed patient's smiling face while having his chin licked by a black and tan mutt is also enough to raise any caregiver's spirits (Haggard, 1985). The improved outlook of both staff and patients results in more sensitive care and a more optimistic attitude (Barba, 1955).

Roosevelt (2001) reports from her visit to the UCLA (University of California, Los Angeles) Medical Center:

The 65-year-old patient, hospitalized for quadruple-bypass surgery, had not moved or opened her eyes in days. Her relatives, grim-faced, stood around the bed. “They thought they had lost her,” recalls Betty Walsh, a volunteer in the intensive-care unit at the UCLA Medical Center. Then Walsh ushered in Kolya, a 145-lb. shaggy white Great Pyrenees, who climbed right up onto the woman’s bed and snuggled against her body. Five minutes passed in silence. Then the woman’s hand moved slowly toward the dog. She began to stroke his soft, thick coat. Another five minutes passed. The woman smiled and murmured “So lovely...” “For half an hour she kept petting him and calling him ‘my friend,’” says Walsh. “The whole time, I watched the blood-pressure monitor go down, down, down.”

Hoffmann et al. (2009) assessed Spielberger’s State Anxiety Inventory (STAI) scores of 12 patients hospitalized with major depression, after 30-minute sessions (a) talking with a research assistant and (b) talking with the same research assistant while interacting with a dog. Mean STAI score was 47.0 after the interview with the research assistant versus 42.2 after the same interview while interacting with the dog; the difference was statistically significant. The presence of the dog had a more anxiolytic effect than the person.

Barak et al. (2001) provided each of 10 schizophrenic patients with his “own” dog during weekly 4-hour sessions over a period of 12 months. The therapy dog was accompanied by a psychiatric nurse and volunteer. Sessions with the dog included activities such as petting, feeding, grooming

and teaching the dog to walk on a leash. The dogs created novelty in the patients' daily routine, requiring caring attention and fostering an affectionate relationship with another creature who demanded nothing, yet gave unconditional love. A control group of 10 patients was provided with social distraction in the form of reading and discussion with three certified nurses, also during weekly 4-hour sessions for a 12-month period. While social skills—talking with people, social appropriateness/politeness, social engagement, friendships, participation in social events—did not change in the 10 subjects without pets, social skills improved significantly after 6 months in the 10 patients with companion dogs; the improvement was maintained until the end of the 12-month study. Kovács et al. (2004) confirmed these findings in seven schizophrenic patients who also showed a significant improvement in social skills after weekly 50-minute sessions with a therapy dog for a 9-month period.

Martin & Farnum (2002) looked at the effects of animal-assisted therapy on 11 children with pervasive developmental disorders and found that the participants exhibited significantly more “playful moods” in the presence of a dog and were more focused. Limond et al. (1997) observed similar effects in children with Down syndrome, while Redeker & Goodman (1989) and Sams et al. (2006) observed such effects in children with autism.

Viau et al. (2010) measured the salivary cortisol levels of 42 children with autism syndrome disorders prior to and during the introduction of a service dog to their family, and after a short period during which the dog was temporarily removed. The introduction of the dog translated into a statistically significant diminished cortisol response shortly after the children woke up in the morning. The cortisol increase after awakening was 58 percent the day before the family got the dog; it diminished to 10 percent once the dog



was present, and jumped back to 48 percent when the dog was temporarily removed. It was concluded that the physiological stress-buffering impact of dogs is likely to have behavioral benefits for children with autism.

Interviews with hospitalized children, their parents and attending nurses suggest that regular dog visits relieve pain and distress in the children, facilitate their adaptation to the therapeutic process and promote their well-being while hospitalized (Gagnon et al., 2004; Sobo et al., 2006). Caprilli & Messeri (2006) noticed that the introduction of companion dogs into the pediatric wards of a hospital was a positive event because of the active participation of the patients and the satisfaction expressed by the medical staff. The benefit received by the children from dog visits correlates with the amount of time they spent in physical contact with the companion dog

(Wu et al., 2002), who distracts them from pain and possibly activates comforting thoughts of companionship and home (Sobo et al., 2006).

Vagnoli et al. (2015) took blood samples of 25 children who could touch/stroke a dog during venipuncture and of 25 children who did not have a dog present during venipuncture. When a dog was available, the children reacted with significantly less behavioral distress and had significantly lower plasma cortisol concentrations (mean=9.6 $\mu\text{g}/\text{dl}$) compared with the condition when no dog was present (mean=13.4 $\mu\text{g}/\text{dl}$). Contact with the dog during the moderately painful blood collection procedure buffered fear, anxiety (distress) and physiological stress.

Kaminski et al. (2002) compared the effect of play therapy with dog therapy in a study of 70 hospitalized children. The parents rated their child as happier





after dog therapy than after play therapy. Children involved in dog therapy displayed significantly more positive emotions than did children engaged in play therapy. These findings underscore the emotionally healing power of a live animal (Erikson, 1964; Levinson, 1978; Blue, 1986; Melson, 1988; Bryant, 1990; Robin & ten Bensel, 1990). Cuddling with an animal fosters emotional well-being and a sense of security in children.

Nursing homes and other long-term care facilities serving seniors are among the most common settings where animal-assisted therapy is used to mitigate loneliness, depression, fatigue and anxiety (Calvert, 1989). By providing a welcome change in routine and something to look forward to, a regularly visiting therapy dog brings joy and uplifts the spirits. Dogs are unconcerned with age or physical ability; they accept people as they are (Cangelosi & Embrey, 2006) and always seem happy to meet the person who needs to be cheered up.

Stasi et al. (2004) assigned 28 subjects with chronic age-related disabilities living in a nursing home to pet therapy, consisting of three 1-hour sessions per week with a little cat over a period of 6 weeks. Being visited by the cat was the seniors' highlight of the day. The interaction with the animal improved their depressive symptoms and resulted in a significant decrease in their mean blood pressure values from 151 mmHg before the study to 121 mmHg at the end of the study. Luptak & Nuzzo (2004) conducted a similar study with 15 elderly women and found that interacting with therapy dogs also decreased their blood pressure.

Banks & Banks (2005) assessed the degree of loneliness of 17 long-term care residents before and after weekly 30-minute sessions with a companion dog for a 6-week study period. Loneliness, as measured by the Loneliness Scale (Russell, 1996), was markedly affected by regular interactions with the dog. It decreased



significantly, from an average score of 49 before the first dog visit to 41 after the dog visits. Prosser et al. (2008) conducted a similar study with 18 seniors and emphasize that the nursing staff would comment on how the seniors often talked endlessly about their visiting animals and that they complained much less about poor health and expressed more enjoyment of life.

Crowley-Robinson et al. (1996) conducted a 2-year study in three different nursing homes to find out how the mood of residents was influenced by once-a-week visits from a friendly person (n=32), once-a-week visits from a therapy dog (n=31), or a dog living permanently on the premises (n=32). The temporary visits by a friendly person or therapy dog had relatively little effect on the general well-being of the seniors. The resident dog, however, significantly reduced the elder people's tension, confusion, fatigue and depression. Being available all the time made the resident dog a particularly reliable friend who always had an uplifting effect on the seniors.

Lust et al. (2007) found in 58 patients living in a residential rehabilitation facility that their use of as-needed analgesic medication decreased significantly while their perceived quality of life increased as a result of a dog residing permanently in the facility. Bardill & Hutchinson (1997) carried out a qualitative study with psychiatric adolescents admitted to an inpatient unit that also had a resident dog. The constant presence of the dog had a therapeutic effect on the patients who could freely talk to the dog about their problems without being judged; many of them felt that the dog was their best friend.

Animal-assisted therapy programs have been implemented in several correctional institutions. At the Eastern Oregon prison, for example, 18 inmates prepare "death row" dogs from animal shelters for adoption. Each inmate cares for and trains a dog to sit for petting, react calmly when approached by

Pawsitive Dog Prison Training Program Airway Heights Corrections Center, Spokane, WA



*"What a gift to be able to learn how to use force-free training
to better the life of your K-9 pal and your life together."*

*"I learned how to apply a new type of training to my dogs
and walked away with a new way to live my life."*



a friendly person, walk on a loose leash, come when called and socialize with other dogs in a compatible manner. The inmates say that having dogs among the prison population is healing. "A lot of us haven't seen a dog for a long time. They do a lot for your soul and mend a lot of holes. We've all gotten attached, but the whole point of the program is to rescue the dogs and make sure they go on to a better life." The inmates who take care of the dogs "benefit as much as the dogs, or more" (Aney, 2015). While cruelty to animals has been identified by many researchers as a potential indicator of future criminal activity, conversely, a mutual, loving relationship between a violent inmate and an animal may lead to positive behavior modification (Moneymaker & Strimple, 1991). A year-long comparison of psychiatric incarcerated patients revealed that patients with pets needed only half the amount of medication as before and had zero suicide attempts, compared with eight documented attempts in the same ward by comparable patients who had no pets (Lee, 1987).



MERE PRESENCE OF
A COMPANION ANIMAL





MERE PRESENCE OF A COMPANION ANIMAL

The mere presence of a companion animal radiates life-affirming energy. Allen et al. (2002) monitored the heart rates and systolic blood pressures at rest of 120 humans who shared their homes with a dog or cat, and 120 other humans who had no pets. The cardiovascular recordings were taken in the subjects' familiar home; in the case of the pet owner, the cat or dog was present, but not touched during the procedure. Pet owners had significantly lower mean heart rates (68 vs. 71 bpm) and significantly lower blood pressures (115 vs. 119 mmHg) than subjects who had no pet. In a supplemental unpublished study, 30 participants were randomized either to adopt a dog from a shelter or to defer adoption of a dog. Resting blood pressure was similar in the two groups before adoption or deferred adoption. Blood pressure monitored 2 and 5 months later was significantly lower

in the adoption group than in the deferred-adoption group. Subsequently, the subjects who originally deferred adoption also adopted dogs. At a later follow-up assessment, their blood pressure had lowered in a manner similar to that of the group who had originally adopted dogs.

Friedman et al. (1983) also found in 18 children that their resting blood pressure (112 mmHg) significantly decreased (107 mmHg) when a companion dog was brought into the room, even though they didn't interact with him.

These children were then asked by an adult to read aloud from a book. The expected mean blood pressure increase (cardiovascular stress response) was significantly lower (0.9% = 113 mmHg) when the dog was present than when the adult was alone with the child in the room (5.4% = 118 mmHg). The mere presence of the dog not only calmed the children, it also created a nondemanding and nonjudgmental environment. Unlike the dog, the



person unintentionally made the reading test a relatively threatening, hence stressful, experience for the children.

DeMello (1999) made a similar observation in 50 adults who were exposed to a distressing situation consisting of arithmetic tasks. The subjects recovered from the cardiovascular stress response faster when a companion dog was in the room whom they could see, but not touch, than when they were resting alone. Three minutes after the distressing task, mean blood pressure was significantly lower when the subjects rested in the company of the dog (111 mmHg) than when they rested alone (113 mmHg). The mere presence of the dog had a de-stressing effect.

Polheber & Matchock (2014) made similar findings in 32 participants who completed the Trier Social Stress Test (oral presentation plus arithmetic task) alone (n=16) or with a dog present in the room (n=16); the presence of the dog attenuated anxiety, heart rate and salivary cortisol levels.

Allen et al. (2002) assessed the stress-buffering effect of a pet (dog or cat) in comparison to a spouse or a friend. Cardiovascular recordings were taken of 480 people in their homes, when they rested and when they were exposed to a 5-minute mental stressor alone or with their pet (n=240), spouse (n=240) or friend present (n=240) but not physically touching the subject. The response to the stressor—as measured in changes in heart rate and blood

	CHANGE IN HEART RATE	CHANGE IN BLOOD PRESSURE
Alone	+33%	+19%
Pet Present	+7%	+8%
Spouse Present	+45%	+40%
Friend Present	+41%	+41%

pressure, relative to resting values—was significant when the subject was alone. The stress response was significantly reduced when the pet was present, but increased when either the spouse or the friend was present. While the presence of the pet calmed the subject and reduced his or her tension while doing serial subtractions, the presence of the spouse and the friend probably made the subject nervous, rather than composed. In line with this assumption, the subjects made significantly fewer errors in the serial subtractions when the pet was present than when they were alone, or when the spouse or the friend were present. Companion animals—unlike people—create a psychologically “safe” environment in which judgment or competition are absent. They silently and unconditionally emanate a sense of ease and emotional comfort that is absent when a human companion unwittingly creates tension by his or her mere presence during such tasks.

Nagengast et al. (1997) and Hansen et al. (1999) recorded the behavior of 23 and 34 children, respectively, undergoing a medical examination with or without the presence of an unfamiliar but friendly dog in the examination room. In both studies, the children’s blood pressure and heart rate were lower when the dog was present in the room. Analysis of the videotapes revealed that the children showed significantly fewer behavioral signs of distress when the dog was in the room than when they were alone with the examining health professional.

Braun et al. (2009) found in children exposed to an acute medical care setting a significant reduction in pain level when a dog was present (n=18) compared with when no dog was present (n=39). The presence of the dog not only buffered the anxiety that is normally associated with a medical examination in an unfamiliar hospital environment, but also buffered the perception of pain.



CONCLUSION

Through gentle physical touch, social animals—including humans—express an intrinsic interconnectedness. When we touch another living being without any preconception, we experience this sacred oneness; we feel connected, whole and at ease.

Animals emanate a deep stillness that is rooted in pure awareness. It is not dependent on physical touch, is free of thinking and, therefore, has a calming, stress-buffering and uplifting effect on humans. The mere presence of an animal is sacred.

REFERENCES

- Allen, K., Blascovich, J., & Mendes, W. (2002) Cardiovascular reactivity and the presence of pets, friends, and spouses: the truth about cats and dogs. *Psychosomatic Medicine*, 64, 727–739
- Alexander, S. N., & Fontenot, M. B. (2003) Isosexual social group formation for environmental enrichment in adult male *Macaca mulatta*. *American Association for Laboratory Animal Science Meeting Official Program*, 141
- Anderson, W. P., Reid, C. M., & Jennings, G. L. (1992) Pet ownership and risk factors for cardiovascular disease. *Medical Journal of Australia*, 157, 298–301
- Andrews, C. (2014) Using positive reinforcement training to refine daily medical treatment of a cynomolgus macaque. *Journal of the American Association for Laboratory Animal Science*, 53, 565–566
- Aney, K. (2015) Inmates train dogs in Eastern Oregon prison. *The Bulletin*, <http://www.bendbulletin.com/localstate/3039274-151/inmates-train-dogs-in-eastern-oregon-prison>
- Arnold, J. C. (1995) Therapy dogs and the dissociative patient: preliminary observations. *Dissociation*, 8, 247–252
- Arnold, K., & Barton, R. A. (2001) Post-conflict behaviour of spectacled leaf monkeys (*Trachypithecus obscurus*). II. Contact with third parties. *International Journal of Primatology*, 22, 267–286
- Aureli, F., Preston, S. D., & de Waal, F. B. M. (1999) Heart rate responses to social interactions in free-moving rhesus macaques (*Macaca mulatta*): a pilot study. *Journal of Comparative Psychology*, 113, 59–65
- Aureli, F., Van Schaik, C. P., & Van Hooff, J. A. R. (1989) Functional aspects of reconciliation among captive long-tailed macaques (*Macaca fascicularis*). *American Journal of Primatology*, 19, 39–51
- Baker, L. (1995) Cerebral palsy and therapeutic riding. *NARHA Strides* 1(2) <http://www.cpementalhealth.com/content/pdf/1745-0179-4-9.pdf>
- Banks, M. R., & Banks, W. A. (2005) The effect of group and individual animal-assisted therapy on loneliness in residents of long-term care facilities. *Anthrozoös*, 18, 396–408
- Barak, Y., Savorai, O., Mavashev, S., & Beni, A. (2001) Animal-assisted therapy for elderly schizophrenic patients: a one-year controlled trial. *American Journal of Geriatric Psychiatry*, 9, 439–442
- Barba, B. E. (1995) The positive influence of animals: animal assisted therapy in acute care. *Clinical Nurse Specialist*, 9, 91–95
- Bardill, N., & Hutchinson, S. (1997) Animal-assisted therapy with hospitalized adolescents. *Journal of Child and Adolescent Psychiatric Nursing*, 10, 17–26

- Barker, S. B., & Dawson, K. S. (1998) The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. *Psychiatric Services, 49*, 797–801
- Baun, M. M., Bergstrom, N., Langston, N. F., & Thoma, L. (1984) Physiological effects of human/companion animal bonding. *Nursing Research, 33*, 126–129
- Beetz, A., Julius, H., Turner, D., & Kotrschal, K. (2012) Effects of social support by a dog on stress modulation in male children with insecure attachment. *Frontiers in Psychology, 3*, 1–9
- Benda, W., & Lightmark, R. (2004) People whisperer. *Shift, 3*, 30–33
- Bertoti, D. B. (1988) Effects of therapeutic horseback riding on posture in children with cerebral palsy. *Journal of the American Physical Therapy Association, 68*, 1505–1512
- Blue, G. F. (1986) The value of pets in children's lives. *Childhood Education, 24*, 85–89
- Boccia, M. L., Reite, M., & Laudenslager, M. L. (1989) On the physiology of grooming in a pigtail macaque. *Physiology and Behavior, 45*, 667–670
- Bolin, S. E. (1987) The effects of companion animals during conjugal bereavement. *Anthrozoös, 1*, 26–35
- Braun, C., Stangler, T., Narveson, J., & Pettingel, S. (2009) Animal-assisted therapy as a pain relief intervention for children. *Nursing Faculty Publications*. Paper 9
- Bryant, B. K. (1990) The richness of the child-pet relationship: a consideration of both benefits and costs of pets to children. *Anthrozoös, 3*, 253–261
- Bunyak, S. C., Harvey, N. C., Rhine, R. J., & Wilson, M. I. (1982) Venipuncture and vaginal swabbing in an enclosure occupied by a mixed-sex group of stumptailed macaques (*Macaca arctoides*). *American Journal of Primatology, 2*, 201–204
- Butovskaya, M. L. (2001) Reconciliation after conflicts: ethological analysis of post-conflict interactions in Kalmyk children. In J. M. Ramirez, & D. R. Richardson (Eds.), *Cross-Cultural Approaches to Aggression and Reconciliation* (pp.167–190). Huntington, NY: Nova Science
- Calvert, M. M. (1989) Human-pet interaction and loneliness: a test of concepts from Roy's adaptation model. *Nursing Science Quarterly, 2*, 194–202
- Calvo, P., Fortuny, J., Guzman, S., Macias, C., Boewn, J., Garcia, M., Orejas, O., Mollins, F., Tvarijonavičiute, A., Cerón, J., Bulbena A., & Fatjó, J. (2012) Animal assisted therapy (AAT) program as a useful adjunct to conventional psychosocial rehabilitation for patients with schizophrenia: results of a small-scale randomized controlled trial. *Frontiers in Psychology, 7*, 1–12
- Cangelosi, P. R., & Embrey, C. N. (2006) The healing power of dogs - Cocoa's story. *Journal of Psychosocial Nursing & Mental Health Services, 44*, 17–20

- Carlson, K. (2015) Nursing and the power of touch. *MULTIBRIEFS*, <http://exclusive.multibriefs.com/content/nursing-and-the-power-of-touch/medical-allied-healthcare>
- Caprilli, S., & Messeri, A. (2006) Animal-assisted activity at A. Meyer Children's Hospital: a pilot study. *Complementary and Alternative Medicine*, 3, 379–383
- Cassileth, B. R., & Vickers, A. J. (2004) Massage therapy for symptom control: outcome study at a major cancer center. *Journal of Pain and Symptom Management*, 28, 244–249
- Chang, M. Y., Wang, S. Y., & Chen, C. H. (2002) Effects of massage on pain and anxiety during labour: a randomized controlled trial in Taiwan. *Journal of Advanced Nursing*, 38, 68–73
- Charnetski, C. J., Riggers, S., & Brennan, F. X. (2004) Effect of petting a dog on immune system function. *Psychological Reports*, 95, 1087–1091
- Chilcott, R. P., Stubbs, B., & Ashley, Z. (2001) Habituating pigs for in-pen, non-invasive biophysical skin analysis. *Laboratory Animals*, 35, 30–35
- Churchill, M., Safaoui, J., McCabe, B. W., & Baun, M. M. (1999) Using a therapy dog to alleviate the agitation and desocialization of people with Alzheimer's disease. *Journal of Psychosocial Nursing & Mental Health Services*, 37, 16–22 & 42–43
- Coakley, A. B., & Mahoney, E. K. (2006) Creating a therapeutic and healing environment with a pet therapy program. *Complementary Therapies in Clinical Practice*, 15, 141–146
- Cole, K. M., & Gawlinski, A. (1995) Animal-assisted therapy in the intensive care unit. *Nursing Clinics of North-America*, 30, 529–537
- Cole, K. M., Gawlinski, A., Steers, M., & Kotlerman, J. (2007) Animal-assisted therapy in patients hospitalized with heart failure. *American Journal of Critical Care*, 16, 575–585
- Colombo, G., Buono, M., Smania, K., Raviola, R., & De Leo, D. (2006) Pet therapy and institutionalized elderly: a study on 144 cognitively unimpaired subjects. *Archives of Gerontology and Geriatrics*, 42, 207–216
- Cools, A. K. A., Van Hout, A. J. M., & Nelissen, M. H. J. (2008) Canine reconciliation and third-party-initiated postconflict affiliation: do peacemaking social mechanisms in dogs rival those of higher primates? *Ethology*, 114, 53–63
- Coppola, C. L., Grandin, T., & Enns, R. M. (2006) Human interaction and cortisol: can human contact reduce stress for shelter dogs? *Physiology & Behavior* 97, 537–541
- Coulon, M., Nowak, R., Peyrat, J., Chandeze, H., Boissy, A., & Boivin, X. (2015). Do lambs perceive regular human stroking as pleasant? Behavior and heart rate variability analyses. *PloS One*, 10, doi: 10.1371/journal.pone.0118617

- Crowley-Robinson, P., Fenwick, D. C., & Blackshaw, J. K. (1996) A long-term study of elderly people in nursing homes with visiting and resident dogs. *Applied Animal Behaviour Science*, *47*, 137–148
- Cusak, O. (1988) *Pets and Mental Health*. New York, NY: Hawthorn Press
- DaCosta, A. P., Leigh, A. E., Man, M. S., & Kendrick, K. M. (2004) Face pictures reduce behavioural, autonomic, endocrine and neural indices of stress and fear in sheep. *Proceedings of the Royal Society, Series B*, *271*, 2077–2084
- Demaria, C., & Thierry, B. (2001) A comparative study of reconciliation in rhesus and Tonkean macaques. *Behaviour*, *138*, 397–410
- DeMello, L. R. (1999) The effect of the presence of a companion-animal on physiological changes following the termination of cognitive stressors. *Psychology and Health*, *14*, 859–868
- de Waal, F. B. M. (1989) Food sharing and reciprocal obligations among chimpanzees. *Journal of Human Evolution*, *18*, 433–459
- de Waal, F. B. M., & Aureli, F. (1997) Conflict resolution and distress alleviation in monkeys and apes. *Annals of the New York Academy of Science*, *807*, 317–328
- de Waal, F. B. M., & Ren, R. M. (1988) Comparison of the reconciliation behavior of stump-tail and rhesus macaques. *Ethology*, *78*, 129–142
- de Waal, F. B. M., & van Roosmalen, A. (1979) Reconciliation and consolation among chimpanzees. *Behavioral Ecology and Sociobiology*, *5*, 55–66
- Dietz, T. J., Davis, D., & Pennings, J. (2012) Evaluating animal-assisted therapy in group treatment for child sexual abuse. *Journal of Child Sexual Abuse*, *21*, 665–683
- Drescher, V. M., Gantt, W. H., & Whitehead, W. E. (1980) Heart rate response to touch. *Psychosomatic Medicine*, *42*, 559–559
- Drescher, V. M., Whitehead, W. E., Morril-Corbin, E. D., & Cataldo, M. F. (1985) Physiological and subjective reactions to being touched. *Psychophysiology*, *22*, 96–100
- Dudley, E. S., Schiml, P. A., & Hennessy, M. B. (2015) Effects of repeated petting sessions on leukocyte counts, intestinal parasite prevalence, and plasma cortisol concentration of dogs housed in a county animal shelter. *Journal of the American Veterinary Medical Association*, *247*, 1289–1298
- Earles, J. L., Vernon, L. L., & Yetz, J. P. (2015) Equine-assisted therapy for anxiety and posttraumatic stress symptoms. *Journal of Traumatic Stress*, *28*, 149–153
- Edwards, N. E., & Beck, A. M. (2002) Animal-assisted therapy and nutrition in Alzheimer's disease. *Western Journal of Nursing Research*, *24*, 697–712

- Eddy, J., Hart, L. A., & Boltz, R. P. (1988) The effects of service dogs on social acknowledgements of people in wheelchairs. *Journal of Psychology*, 122, 39–45
- Erikson, E. H. (1964) *Childhood and Society*. New York: Norton
- Erwin, J., Mitchell, G., & Maple, T. (1973) Abnormal behavior in non-isolate-reared rhesus monkeys. *Psychological Reports*, 33, 515–523
- Fava, M., & Guaraldi, G. P. (1987) Prolactin and stress. *Stress Medicine*, 3, 211–216
- Feh, C., & de Mazières, J. (1993) Grooming at a preferred site reduces heart rate in horses. *Animal Behaviour*, 46, 1045–1254
- Ferrell-Torry, A. T., & Glick, O. J. (1993) The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain. *Cancer Nursing*, 16, 93–101
- Fick, K. M. (1993) The influence of an animal on social interactions of nursing home residents in a group setting. *American Journal of Occupational Therapy*, 47, 529–534
- Fila, D. (1991) The significance of companion animals to a geriatric vascular patient: a case study. *Holistic Nursing Practice*, 5(2), 11–15
- Fisher, L. M., & Joseph, D. H. (1989) A scale to measure attitudes about nonprocedural touch. *Canadian Journal of Nursing Research*, 21, 5–14
- Fleishman, S. B., Homel, P., Chen, M. R., Rosenwald, V., Abolencia, V., Gerber, J., & Nadesan, S. (2015) Beneficial effects of animal-assisted visits on quality of life during multimodal radiation-chemotherapy regimens. *Journal of Community Supportive Oncology*, 13, 22–26
- Francis, G. M., Turner, J., & Johnson, S. (1985) Domestic animal visitation as therapy with adult home residents. *International Journal of Nursing Studies*, 22, 201–206
- Frederick, K. E., Hatz, I., & Lanning, B. (2015) Not just horsing around: the impact of equine-assisted learning on levels of hope and depression in at-risk adolescents. *Community Mental Health Journal*, 51, 809–817
- Friedmann, E., Katcher, A. H., Thomas, S. A., Lynch, J. J., & Messent, P. R. (1983) Social interaction and blood pressure. Influence of animal companions. *Journal of Nervous and Mental Disease*, 171, 461–465
- Friedmann, E. & Thomas S. (1995) Pet ownership, social support, and one-year survival after acute myocardial infarction in the cardiac arrhythmia suppression trial. *American Journal of Cardiology*, 76, 1213–1217
- Friscino, B. H., Gai, C. L., Kulick, A. A., Donnelly, M. J., Rockar, R. A., Aderson, L. C., & Iliff, S. A. (2003) Positive reinforcement training as a refinement of a macaque biliary diversion model. *American Association for Laboratory Animal Science Meeting Official Program*, 101

- Fritz, J. (1989) Resocialization of captive chimpanzees: an amelioration procedure. *American Journal of Primatology*, 19 (Supplement), 79–86
- Fritz, C. L., Farver, T. B., Kass, P. H., & Hart, L. A. (1995) Association with companion animals and the expression of noncognitive symptoms in Alzheimer's patients. *The Journal of Nervous and Mental Disease*, 183, 459–463
- Fujisawa, K., Kutsukake, N., & Hasegawa, T. (2004) Similarity in conflict resolution pattern between primates and preschool children: reconciliation form and friendship. *Folia Primatologica*, 55 (Supplement), 377
- Gagnon, J., Bouchard, F., Landry, M., Belles-Isles, M., Fortier, M., & Fillion, L. (2004) Implementing a hospital-based animal therapy program for children with cancer: a descriptive study. *Canadian Oncology Nursing Journal*, 14, 217–222
- Garrity, T. F., Stallones, L., Marx, M. B., & Johnson, D. (1989) Pet ownership and attachment as supportive factors in the health of the elderly. *Anthrozoös*, 3, 35–43
- Goldmeier, J. (1986) Pets or people: another research note. *The Gerontologist*, 26, 203–206
- Gourkow, N., Hamon, S. C., & Phillips, C. J. (2014) Effect of gentle stroking and vocalization on behaviour, mucosal immunity and upper respiratory disease in anxious shelter cats. *Preventive Veterinary Medicine*, 117, 266–275
- Grandi, L. C., & Ishida, H. (2015). The physiological effect of human grooming on the heart rate and the heart rate variability of laboratory non-human primates: a pilot study in male rhesus monkeys. *Frontiers in Veterinary Science*, 2, doi.org/10.3389/fvets.2015.00050
- Grandin, T. (1986) Minimizing stress in pig handling. *Lab Animal*, 15(3), 15–20
- Grant, G. (2015) Editorial - Beta endorphins & wellness. *MOJ Clinical & Medical Case Reports*, 2(4), 33
- Grealish, L., Lomasney, A., & Whiteman, B. (2000) Foot massage: a nursing intervention to modify the distressing symptoms of pain and nausea in patients hospitalized with cancer. *Cancer Nursing*, 23, 237–243
- Grewen, K. M., Girdler, S. S., Amico, J., & Light, K. C. (2005) Effects of partner support on resting oxytocin, cortisol, norepinephrine, and blood pressure before and after warm partner contact. *Psychosomatic Medicine*, 67, 531–538
- Guest, C. M., Collis, G. M., McNicholas, J. (2006) Hearing dogs: a longitudinal study of social and psychological effects on deaf and hard-of-hearing recipients. *Journal of Deaf Studies and Deaf Education*, 11, 252–261
- Haggard, A. (1985) A patient's best friend. *American Journal of Nursing*, 65, 1374–1376

- Hamama, L., Hamama-Raz, Y., Dagan, K., Greenfeld, H., Rubinstein, C., & Ben-Ezra, M. (2011) A preliminary study of group intervention along with basic canine training among traumatized teenagers: a 3-month longitudinal study. *Children and Youth Services Review, 33*, 1975–1980
- Hansen, K. M., Messinger, C. J., Baun, M. M., & Megel, M. (1999) Companion animals alleviate distress in children. *Anthrozoös, 12*, 142–148
- Harper, C. M., Dong, Y., Thornhill, T. S., Wright, J., Ready, J., Brick, G. W., & Dyer, G. (2015) Can therapy dogs improve pain and satisfaction after total joint arthroplasty? A randomized controlled trial. *Clinical Orthopaedics and Related Research, 473*, 372–379
- Harris, M. D., Rinehart, J. M., & Gerstman, J. (1993) Animal-assisted therapy for the homebound elderly. *Holistic Nursing Practice, 8*(1), 27–37
- Hart, L. A., Hart, B. L., & Bergin, B. (1987) Socializing effect of service dogs for people with disabilities. *Anthrozoös, 1*, 41–44
- Hart, L. A. (1995) The role of pets in enhancing human well-being: effects for older people. In I. Robinson (Ed.), *The Waltham Book of Human-Animal Interaction: Benefits and Responsibilities of Pet Ownership* (pp.19-31). New York: Pergamon
- Haugie, E. (1992) An evaluation of companion pets with elderly psychiatric patients. *Behavioural Psychotherapy, 20*, 367–372
- Headey, B., Grabka, M., Kelley, J., Reddy, B., & Tseng, T. (2002) Pet ownership is good for your health and saves public expenditure too: Australian and German longitudinal evidence. *Australian Social Monitor, 4*, 93–99
- Headey, B., Na, R., & Zheng, R. (2008). Pet dogs benefit owners' health: a 'natural experiment' in China. *Social Indicators Research 87*, 481–493
- Henricson, M. (2008) *Tactile Touch in Intensive Care: Nurses' Preparation, Patients' Experiences and the Effect on Stress Parameters*. Karlstad, Sweden: Karlstad Universitet
- Hernandez-Reif, M., Ironson, G., Field, T., Hurley, J., Katz, G., Diego, M., Weiss, S., Fletcher, M. A., Schanberg, S., Kuhn, C., & Burman, I. (2004) Breast cancer patients have improved immune and neuroendocrine functions following massage therapy. *Journal of Psychosomatic Research, 57*, 45–52
- Hoffmann, A. O. M., Hyung Lee, A., Wertenaue, F., Ricken, R., Jansen, J. B., Gallinat, J., & Lang, U. E. (2009) Dog-assisted intervention significantly reduces anxiety in hospitalized patients with major depression. *European Journal of Integrative Medicine, 24*, 145–148
- Hunt, S. J., Hart, L. A., & Gomulkiewicz, R. (1992) Role of small animals in social interactions between strangers. *Journal of Social Psychology, 132*, 245–256
- Hurst, D. (2008) How a Crufts favourite helped 11-year-old cerebral palsy sufferer Harriet learn to walk. *Daily Mail*. <http://www.dailymail.co.uk/health/article-557481>

- Jenkins, J. L. (1986) Physiological effects of petting a companion animal. *Psychological Reports*, 58, 21-22
- Jessen, J., Cardiello, F., & Baun, M. M. (1996) Avian companionship in alleviation of depression, loneliness, and low morale of older adults in skilled rehabilitation units. *Psychological Reports*, 78, 339-348
- Johnson, E. H., & Britt, B. (1967) *Self-Mutilation in Prisons: Interactions of Stress and Social Structures*. Carbondale, IL
- Johnson, R., & Gayer, A. (2008) Puppy love for older adults. *Journal of Gerontological Nursing*, 34, 51-52
- Judge, P. G., & de Waal, F. B. M. (1997) Rhesus monkey behaviour under diverse population densities: coping with long-term crowding. *Animal Behavior*, 54, 643-662
- Judge, P. G., Griffaton, N. S., & Fincke, A. M. (2006) Conflict management by hamadryas baboons (*Papio hamadryas hamadryas*) during crowding: a tension-reduction strategy. *American Journal of Primatology*, 68, 993-1006
- Katcher, A. H., & Friedmann, E. (1980) Potential health value of pet ownership. *Compendium of Continuing Education for the Practicing Veterinarian*, 2, 117-121
- Katcher, A. H. (1981) Interactions between people and their pets: form and function. In B. Fogle (Ed.) *Interrelationships between People and Pets* (pp. 41-67). Springfield, IL: Charles C. Thomas
- Kalfon, E. (1991) Pets make a difference in long-term care. *Perspectives*, 15(4), 3-6
- Kaminski, M., Pellino, T., & Wish, J. (2002) Play and pets: the physical and emotional impact of child-life and pet therapy on hospitalized children. *Children's Health Care*, 31, 321-335
- Kanamori, M., Suzuki M., Yamamoto K., Kanda M., Matsui Y., Kojima E., Fukawa H., Sugita T., & Oshiro H. (2001) A day care program and evaluation of animal-assisted therapy (AAT) for the elderly with senile dementia. *American Journal of Alzheimer's Disease and Other Dementias*, 16, 234-239
- Keverne, E. B., Martensz, N. D., & Tuite, B. (1989) Beta-endorphin concentrations in cerebrospinal fluid of monkeys are influenced by grooming relationships. *Psychoneuroendocrinology*, 14, 155-161
- Kidd, A. H., & Kidd, R. M. (1994) Benefits and liabilities of pets for the homeless. *Psychological Reports*, 74, 715-722
- Kim, M. S., Cho, K. S., Woo, H., & Kim, J. H. (2001) Effects of hand massage on anxiety in cataract surgery using local anesthesia. *Journal of Cataract and Refractive Surgery*, 27, 884-890
- Ko, H. J., Youn, C. H., Kim, S. H., & Kim, S. Y. (2016) Effect of pet insects on the psychological health of community-dwelling elderly people: a single-blinded, randomized, controlled trial. *Gerontology*, 62, 200-209

- Kongable, L. G., Buckwalter, K. C., & Stolley, J. M. (1989) The effects of pet therapy on the social behavior of institutionalized Alzheimer's clients. *Archives of Psychiatric Nursing*, 3, 191–198
- Kostarczyk, E., & Fonberg, E. (1982) Heart rate mechanisms in instrumental conditioning reinforced by petting in dogs. *Physiology & Behavior*, 28, 27–30
- Kovács, Z., Kis, R., Rózsa, S., & Rózsa, L. (2004) Animal-assisted therapy for middle-aged schizophrenic patients living in a social institution. A pilot study. *Clinical Rehabilitation*, 18, 483–48
- Koyama, N. F., & Dunbar, R. I. M. (1996) Anticipation of conflict by chimpanzees. *Primates*, 37, 79–86
- Krause-Parello, C. A., & Gulick, E. E. (2015) Forensic interviews for child sexual abuse allegations: an investigation into the effects of animal-assisted intervention on stress biomarkers. *Journal of Child Sexual Abuse*, 24, 873–886
- Krause-Parello, C. A., Levy, C., Holman, E., & Kolassa, J. E. (2016) Effects of VA facility dog on hospitalized veterans seen by a palliative care psychologist: an innovative approach to impacting stress indicators. *American Journal of Hospice and Palliative Medicine*, Epub ahead of print
- Lass-Hennemann, J., Peyk, P., Streb, M., Holz, E., & Michael, T. (2014) Presence of a dog reduces subjective but not physiological stress responses to an analog trauma. *Frontiers in Psychology*, 5, doi:10.3389/fpsyg.2014.01010
- Latané, B. (1969) Gregariousness and fear in laboratory rats. *Journal of Experimental Social Psychology*, 5, 61–69
- Lee, D. (1987) Companion animals in institutions. In P. Arkow (Ed.), *The Loving Bond: Companion Animals in the Helping Profession* (pp. 229–236). Saratoga, CA: R & E Publishers
- Lee, S. H., Kim, J. Y., Yeo, S., Kim, S. H., & Lim, S. (2015) Meta-analysis of massage therapy on cancer pain. *Integrative Cancer Therapies*, 14, 297–304
- Levinson, B. M. (1969) Pets and old age. *Mental Hygiene*, 53, 364–368
- Levinson, B. M. (1978) Pets and personality development. *Psychology Reports*, 42, 1031–1038
- Levison, P. K., Fester, C. B., Nieman, W. H., & Findley, J. D. (1964) A method for training unrestrained primates to receive drug injection. *Journal of the Experimental Analysis of Behavior*, 7, 253–254
- Light, K. C., Grewen, K. M., & Amico, J. A. (2005) More frequent partner hugs and higher oxytocin levels are linked to lower blood pressure and heart rate in premenopausal women. *Biological Psychology*, 69, 5–21
- Limond, J., Bradshaw, J., & Cormack, M. (1997) Behavior of children with learning disabilities interacting with a therapy dog. *Anthrozoös*, 10, 84–89

- Loughlin, C. A., & Dorwick, P. W. (1993) Psychological needs filled by avian companions. *Anthrozoös*, 6(3), 166–172
- Luptak, J. E., & Nuzzo, N. A. (2004) The effects of small dogs on vital signs in elderly women: a pilot study. *Cardiopulmonary Physical Therapy Journal*, 15, 9–12
- Lund, I., Yu, L. C., Uvnäs-Moberg, K., Wang, J., Yu, C., Kurosawa, M., Agren, G., Rosén, A., Lekman, M., & Lundeberg, T. (2002) Repeated massage-like stimulation induces long-term effects on nociception: contribution of oxytocinergic mechanism. *European Journal of Neuroscience*, 16, 330–338
- Lust, E., Ryan-Haddad, A., Coover, K., & Snell, J. (2007) Measuring clinical outcomes of animal-assisted therapy: impact on resident medication usage. *Consultant Pharmacist*, 22, 580–585
- Lynch, C. E., Magann, E. F., Barringer, S. N., Ounpraseuth, S. T., Eastham, D. G., Lewis, S. D., & Stowe, Z. N. (2014) Pet therapy program for antepartum high-risk pregnancies: a pilot study. *Journal of Perinatology*, 34, 816–816
- Lynch, J. J., Fregin, G. F., Mackie, J. B., & Monroe, R. R. (1974) Heart rate changes in the horse to human contact. *Psychophysiology*, 11, 472–478
- Mallavarapu, S., Stoinski, T. S., Bloomsmith, M. A., & Maple, T. L. (2006) Postconflict behavior in captive western lowland gorillas (*Gorilla gorilla gorilla*). *American Journal of Primatology*, 68, 789–801
- Marcus, D. A., Bernstein, C. D., Constantin, J. M., Kunkel, F. A., Breuer, P., & Hanlon, R. B. (2013) Impact of animal-assisted therapy for outpatients with fibromyalgia. *Pain Medicine*, 14, 43–51
- Martin F., & Farnum J. (2002) Animal-assisted therapy for children with pervasive developmental disorders. *Western Journal of Nursing Research*, 24, 657–70
- McAfee, L. M., Mills, D. S., & Cooper, J. J. (2002) The use of mirrors for the control of stereotypic weaving behaviour in the stabled horse. *Applied Animal Behaviour Science*, 78, 159–173
- McBride, S. D., Hemmings, A., & Robinson, K. (2004) A preliminary study on the effect of massage to reduce stress in the horse. *Journal of Equine Veterinary Science* 24, 76–81
- McColgan, G., & Schofield, I. (2007) The importance of companion animal relationships in the lives of older people. *Nursing Older People*, 19, 21–23
- McKie, D. (2000) *The experience of affectionate touch for survivors of brain injury (Dissertation)*. Calgary, Canada: University of Calgary
- McGreevy, P. D., Righetti, J., & Thomas, P. C. (2005) The reinforcing value of physical contact and the effect on canine heart rate of grooming in different anatomical areas. *Anthrozoös*, 18, 236–244
- McNicholas, J., & Collis, G. M. (2006) Pets as providers of social support: evidence from a longitudinal study of spousal bereavement. In A. H. Fine (Ed.) *Handbook on Animal-Assisted Therapy*, 2nd ed. (pp. 61–65). New York, NY: Academic Press

- Melson, G. F. (1988) Availability of and involvement with pets by children: determinants and correlates. *Anthrozoös*, 2, 45–52
- Melson, G. F. (2002) Psychology and the study of human-animal relationships. *Society and Animals*, 4, 347–352
- Michaels, E. (1982) Pets and the elderly: a therapeutic friendship. *Canadian Medical Association Journal* 127, 70–71
- Mitchinson, A. R., Kim, H. M., Rosenberg, J. M., Geisser, M., Kirsh, M., Cikrit, D., & Hinshaw, D. B. (2007) Acute postoperative pain management using massage as an adjuvant therapy: a randomized trial. *Archives of Surgery*, 142, 1158–1167
- Moore, J. R., & Gildbert, D. A. (1995) Elderly residents: perceptions of nurses' comforting touch. *Journal of Gerontological Nursing*, 21, 6–13
- Mills, D. S., & Davenport, K. (2002) The effect of a neighbouring conspecific versus the use of a mirror for the control of stereotypic weaving behaviour in the stabled horse. *Journal of Animal Science*, 74, 95–101
- Moneymaker, J. M., & Strimple, E. O. (1991) Animals and inmates. *Journal of Offender Rehabilitation*, 16(3/4), 133–152
- Morgan, T. D. (2008) *An Examination of the Anxiolytic Effects of Interaction with a Therapy Dog*. Indiana, PA: Indiana University of Pennsylvania
- Morhenn, V., Beavin, L. E., & Zak, P. J. (2012) Massage increases oxytocin and reduces adrenocorticotropin hormone in humans. *Alternative Therapies in Health and Medicine*, 18, 11–18
- Mossello, E., Ridolfi, A., Mello, A. M., Lorenzini, G., Mugnai, F., Piccini, C., Barone, D., Peruzzi, A., Masotti, G., & Marchionni N. (2011) Animal-assisted activity and emotional status of patients with Alzheimer's disease in day care. *International Psychogeriatrics*, 23, 899–905
- Mugford, R. A. (1980) The social significance of pet ownership. In S. A. Corson, & E. O. Corson (Eds.) *Ethology and Non-Verbal Communication in Mental health: An Interdisciplinary Bio-Psychosocial Exploration* (pp. 111–122). Oxford, UK: Pergamon Press
- Mugford, R. A., & McComisky, J. G. (1975) Some recent work on the psychotherapeutic value of caged birds with old people. In R. S. Anderson (Ed.), *Pet Animals and Society* (pp. 54–65). London, UK: Baillere-Tindall
- Mulaik, J. S., Megenity, J. S., & Cannon, R. B. (1991) Patients' perception of nurses' use of touch. *Western Journal of Nursing Research*, 13, 306–323
- Nagengast, S. L., Baun, M. M., Megel, M., & Leibowitz, J. M. (1997) The effects of the presence of a companion animal on physiological arousal and behavioral distress in children during a physical examination. *Journal of Pediatric Nursing*, 12, 323–330

- National Research Council (1998) *The Psychological Well-Being of Nonhuman Primates*. Washington, DC: National Academy Press
- Norberg, A., Melin, E., & Asplund, K. (1986) Reactions to music, touch and object presentation in the final stage of dementia - An exploratory study. *International Journal of Nursing Studies*, 23, 315–323
- Normando, S., Haverbeke, A., Meers, L., Ödberg, F., Ibañez, O. & Talegōn, M. (1999) Heart rate reduction by grooming in horses (*Equus caballus*). Merelsbeke, Belgium: Havemeyer Foundation
- Odendaal, J. S., & Meintjes, R. A. (2003) Neurophysiological correlates of affiliative behaviour between humans and dogs. *Veterinary Journal*, 165, 296–301
- Ohtani, N., Narita, S., Yoshihara, E., Ohta, M., Iwahashi, K. (2015) Psychological evaluation of animal-assisted intervention (AAI) programs involving visiting dogs and cats for alcohol dependents: a pilot study. *Nihon Arukoru Yakubutsu Igakkai Zasshi*, 50, 289–295
- Orlandi, M., Trangeled, K., Mambrini, A., Tagliani, M., Ferrarini, A., Zanetti, L., Tartarini, R., Pacetti, P., & Cantore, M. (2007) Pet therapy effects on oncological day hospital patients undergoing chemotherapy treatment. *Anticancer Research*, 27, 4301–4304
- Palagi, E., Paoli, T., & Tarli, S. B. (2004) Reconciliation and consolation in captive Bonobos (*Pan paniscus*). *American Journal of Primatology*, 62, 15–30
- Parslow, R. A., & Jorm, A. F. (2003) The impact of pet ownership on health and health service use: results from a community sample of Australians aged 40 to 44 years. *Anthrozoös*, 16, 43
- Perretti, P. O. (1990) Elderly-animal friendship bonds. *Social Behavior and Personality*, 18, 151–156
- Piller, C. A. K., Stookey, J. M., & Watts, J. M. (1999) Effects of mirror-image exposure on heart rate and movement of isolated heifers. *Applied Animal Behaviour Science*, 63, 93–102
- Polheber, J. P., & Matchock, R. L. (2014) The presence of a dog attenuates cortisol and heart rate in the Trier Social Stress Test compared to human friends. *Journal of Behavioral Medicine*, 37, 860–867
- Prosser, L., Townsen, M., & Staiger, P. (2008) Older people's relationships with companion animals: a pilot study. *Nursing Older People*, 20(3), 29–32
- Raina, P., Walter-Toews, D., Bonnet, B., Woodward, C., & Abernathy, T. (1999) Influence of companion animals on the physical and psychological health of older people: an analysis of a one-year longitudinal study. *Journal of the American Geriatrics Society*, 47, 223–329
- Redefer, L. A., & Goodman, J. F. (1989) Brief report: pet-facilitated therapy with autistic children. *Journal of Autism and Developmental Disorders*, 19, 461–467
- Reinhardt, V. (1999) Pair-housing overcomes self-biting behavior in macaques. *Laboratory Primate Newsletter*, 38(1), 4

- Reinhardt, V. (2009) *Roots of Human Behavior*. Washington, DC: Animal Welfare Institute
- Reinhardt, V., & Cowley, D. (1992) In-home cage blood collection from conscious stump-tailed macaques. *Animal Welfare*, 1, 249–255
- Richeson, N. E. (2003) Effects of animal-assisted therapy on agitated behaviors and social interactions of older adults with dementia. *American Journal of Alzheimer's Disease & Other Dementias*, 18, 353–358
- Roberts, C. A., McBride, E. A., Rosenvinge, H. P., Stevenage, S. V., & Bradshaw, J. W. S. (1996) The pleasure of a pet: the effect of pet ownership and social support on loneliness and depression in a population of elderly people living in their own homes. In J. Nicholson & A. Podberscek (Eds.), *Further Issues in Research in Companion Animal Studies* (pp. 64). Callander, UK: The Society for Companion Animal Studies
- Robin, M., & ten Benschel, R. (1990) Pets and the socialization of children. *Latham Letter* 11(2), 1–23
- Rogers, J., Hart, L. A., & Boltz, R. P. (1993) The role of pet dogs in casual conversations of elderly adults. *The Journal of Social Psychology*, 133, 265–277
- Roosevelt, M. (2001) Canine candy strippers - Dogs in hospitals are treating human patients with succor, creature comfort and unconditional love. *TIME*, August 06, 2001
- Routasalo, P. (1996) Non-necessary touch in the nursing care of elderly people. *Journal of Advanced Nursing*, 23, 904–911
- Routasalo, P., & Isola, A. (1996) The right to touch and be touched. *Nursing Ethics*, 3, 165–167
- Routasalo, P., & Isola, A. (1998) Touching by skilled nurses in elderly care. *Scandinavian Journal of Caring Science*, 12, 170–178
- Russell, D. W. (1996) UCLA Loneliness Scale (Version 3): reliability, validity, and factor structure. *Journal of Personality Assessment*, 66, 20–40
- Sable, P. (1995) Pets, attachment, and well-being across the life cycle. *Social Work* 40, 334–341
- Salmon, I. M., & Salmon, P. W. (1981) A dog in residence: a companion animal study undertaken at the Caulifield Geriatric Hospital. *Anthrozoös*, 7, 34–35
- Sams, M. J., Fortney, E. V., & Willenbring, S. (2006) Occupational therapy incorporating animals for children with autism: a pilot investigation. *American Journal of Occupational Therapy*, 60, 268–74
- Savastano, G. M. (2013) Operant conditioning with laboratory beagles. *American Association for Laboratory Animal Science Meeting Official Program*, 144
- Schaller, G. B. (1972) *The Serengeti Lion*. Chicago, IL: University of Chicago Press

- Schino, G. (1998) Reconciliation in domestic goats. *Behaviour*, 135, 343–356
- Schino, G., Scucchi, S., Maestripieri, D., & Turillazzi, P. G. (1988) Allogrooming as a tension-reduction mechanism: a behavioral approach. *American Journal of Primatology*, 16, 43–50
- Schoenhofer, S. O. (1989) Affectional touch in critical care nursing: a descriptive study. *Heart and Lung*, 18, 146–154
- Seers, K., Crichton, N., Martin, J., Coulson, K., & Carroll, D. (2008) A randomised controlled trial to assess the effectiveness of a single session of nurse administered massage for short term relief of chronic non-malignant pain. *BMC Nursing*, 4, doi: 10.1186/1472-6955-7-10
- Serpell, J. (1991) Beneficial effects of pet ownership on some aspects of human health and behavior. *Journal of the Royal Society of Medicine*, 84, 717–720
- Shaw, M. (2000) Women, violence, and disorder in prison. In K. Hannah-Moffat, & M. Shaw (Eds.), *An Ideal Prison? Critical Essays on Women's Imprisonment in Canada* (pp. 61–70). Halifax, Canada: Fernwood Publishing
- Shiloh, S., Sorek, G., & Terkel, J. (2003) Reduction of state-anxiety by petting animals in a controlled laboratory experiment. *Anxiety, Stress, and Coping*, 16, 387–395
- Siegel, J. M. (1990) Stressful life events and use of physician services among the elderly: the moderating role of pet ownership. *Journal of Personality and Social Psychology*, 58, 1081–1086
- Siegel, J. M. (1993) Companion animals: in sickness and in health. *Journal of Social Issues* 9(1), 157–167
- Sobo, E. J., Eng, B., & Kassity-Krich, N. (2006) Canine visitation (pet) therapy: pilot data on decreases in child pain perception. *Journal of Holistic Nursing*, 24, 51–57
- Sluss, A. (2012) The power of touch learned through nursing. *Nursingtogether*, http://nevada.campusrn.com/jobblog/the_power_of_touch_learned_through_nursing/
- Splinter-Watkins, K. L., & Calhoun, S. C. (1999) Benefits of therapeutic horseback riding: an effective occupational therapy intervention for persons with developmental disabilities. *Developmental Disabilities Special Interest Section Quarterly*, 22, 1–3
- Stasi, M. F., Amati, D., Costa, C., Resta, D., Senepa, G., Scarafioiti, C., Aimonino, N., & Molaschi, M. (2004) *Archives of Gerontology and Geriatrics*, 9, 407–412
- Stephenson, N. L., Weinrich, S. P., & Tavakoli, A. S. (2000) The effects of food reflexology on anxiety and pain in patients with breast and lung cancer. *Oncology Nursing Forum*, 27, 67–72
- Stewart, L. A., Dispenza, F., Parker, L., Chang, C. Y., & Cunnien, T. (2014) A pilot study assessing the effectiveness of an animal-assisted outreach program. *Journal of Creativity in Mental Health*, 9, 332–345

- Stringer, J., Swindell, R., & Dennis, M. (2008) Massage in patients undergoing intensive chemotherapy reduces serum cortisol and prolactin. *Psychoendocrinology*, *17*, 1024–1031
- Taghinejad, H., Delpisheh, A., & Suhrabi, Z. (2010) Comparison between massage and music therapies to relieve the severity of labor pain. *Women's Health*, *6*, 377–381
- Taylor, E., Maser, S., Yee, J., & Gonzales, S. (1993) Effect of animals on eye contact and vocalizations of elderly residents in a long term care facility. *Physical and Occupational Therapy in Geriatrics*, *11*, 61–71
- Triplett, J. L., & Arneson, S. W. (1979) The use of verbal and tactile comfort to alleviate distress in young hospitalized children. *Research in Nursing and Health*, *2*, 7–23
- Uvnäs-Moberg, K., Bruzelius, G., Alster, P., & Lundeberg, T. (1993) The antinociceptive effect of non-noxious sensory stimulation is mediated partly through oxytocinergic mechanisms. *Acta Physiologica Scandinavica*, *149*, 199–204
- Uvnäs-Moberg, K. (1997) Oxytocin linked antistress effects--the relaxation and growth response. *Acta Physiologica Scandinavica Supplement*, *640*, 38–42
- Vagnoli, L., Caprilli, S., Vernucci, C., Zagni, S., Mugnai, F., & Messeri, A. (2015) Can presence of a dog reduce pain and distress in children during venipuncture? *Pain Management Nursing*, *16*, 89–95
- Van Houtte, B. A., & Jarvis, P. A. (1995) The role of pets in preadolescent psychosocial development. *Journal of Applied Developmental Psychology* *16*, 463–479
- Verbeek, P., & de Waal, F. B. M. (1997) Post-conflict behaviour of captive brown capuchins in the presence and absence of attractive food. *International Journal of Primatology*, *18*, 703–725
- Viau, R., Arsenault-Lapierre, G., Fecteau, S., Champagne, N., Walker, C. D., & Lupien, S. (2010) Effect of service dogs on salivary cortisol secretion in autistic children. *Psychoneuroendocrinology*, *35*, 1187–1193
- Vormbrock, J. K., & Grossberg, J. M. (1988) Cardiovascular effects of human-pet dog interactions. *Journal of Behavioral Medicine*, *11*, 509–517
- Voropay, E. (2007) Animal therapy for humans. *Natural Health and Vegetarian Life*, *47*, 46–47
- Wahaj, S. A., Guse, K., & Holekamp, K. E. (2001) Reconciliation in the spotted hyena (*Crocuta crocuta*). *Ethology*, *107*, 1057–1074
- Weaver, A. (2003) Conflict and reconciliation in captive bottlenose dolphins, *Tursiops truncatus*. *Marine Mammal Science*, *19*, 834–846
- Weed, J. L., Wagner, P. O., Byrum, R., Parrish, S., Knezevich, M., & Powell, D. A. (2003) Treatment of persistent self-injurious behavior in rhesus monkeys through socialization: a preliminary report. *Contemporary Topics in Laboratory Animal Science*, *42*(5), 21–23

Weinrich, S. P., & Weinrich, M. C. (1990) The effect of massage on pain in cancer patients. *Applied Nursing Research*, 3, 140–145

Williams, N., & Watson, J. (2003) Use of behavior modification (clicker training) to facilitate handling and restraint and provide environmental enrichment in Göttinger minipigs. *American Association for Laboratory Animal Science Meeting Official Program*, 97

Wilson, J. H. (2001) Prolactin in rats is attenuated by conspecific touch in a novel environment. *Cognitive, Affective, & Behavioral Neuroscience*, 1(2), 199–205

Wood, B., Giles-Corti, B., & Bulsara, M. (2005) The pet connection: pets as a conduit for social capital? *Social Science and Medicine*, 61, 1159–1173

Wu, A. S., Niedra, R., Pendergast, L., & McCrindle, B. W. (2002) Acceptability and impact of pet visitation on a pediatric cardiology inpatient unit. *Journal of Pediatric Nursing*, 17(5): 354–62

Xiong, X. J., Li, S. J., & Zhang, Y. Q. (2015) Massage therapy for essential hypertension: a systematic review. *Journal of Human Hypertension*, 29, 143–151

Yaroshevsky, F. (1975) Self-mutilation in Soviet prisons. *Canadian Psychiatric Association Journal*, 20, 443–446

Yates, J. (1987) Project Pup: the perceived benefits to nursing home residents. *Anthrozoös*, 1, 188–192

PHOTO CREDITS

- Introduction › Greg Westfall
1 › Martha de Jong-Lantink
2 › godpasta
6, left › Wouter van Caspel
6, top › amro
6, bottom › Greg Younger
9 › SIM USA
11, left › Balaji Narayanan
11, right › Dmitry Rukhlenko
12 › James Maggs
14 › Harry Harms
15 › Evan Hambrick
16 › windzepher
17 › Erin Siffing
18 › Katya Smolina
20, left › Maria Pratt
20, right › abitiamo
21, top › Elaine
21, bottom › Vince Smith
23 › mrstam
24, left › Hinnam Saisuy
24, top › Joachim S Müller
24, bottom › Leif K Brooks
25 › Barry Crossley
26 › Viktor Reinhardt
27 › Bob Dodsworth
29 › Julia Kidd
31 › Mark Robinson
33 › BLM Idaho
34 › premasagar
36 › Teri Soares
38, top › alt rendo
38, bottom › Mike Jackson
40 › J Gazmen
43 › alia
45 › Naomi and Ben Buckland
47 › Jim Trotter
50 › Tomasz Markowski
51 › monkey business images
52 › Kate Dryer
53 › Glass
59 › MTSO fan
60 › 57 Andrew
61 › Diem Tien Le
64 › praline 3001