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Dawn Colinan
Cognitively Informed Therapeutic
Relationships Between Dogs and
Humans

Abstract

Humans and dogs have been interacting and building relationship for what is thought to be tens of thousands of years. Within the last few generations, attention has been paid to the potential therapeutic effects of this relationship. Beneficial effects have been observed for many years. Recently, criticisms in methodology from primarily qualitative and anecdotal data have suggested that evidence is weak. Ethology, the study of animal behavior, is accustomed to experimental procedures. Typically studying wild species, ethology presents a fortunate opportunity to apply its rigorous scientific methodology to the therapeutic literature being critiqued. Ethology has evolutionary theory as its foundational principle, making cognitive, behavioral and evolutionary theory a superb comparative perspective. Additionally, investigation of potential negative effects has been largely unexplored to round out a well balanced investigation of existing dynamics. Investigation through controlled, experimental research from cognitive, behavioral and evolutionary theory of the underlying mechanisms involved in this relationship is compared with the more experiential and anecdotal findings from the therapeutic literature, to understand how the more recent cognitive research may help inform clinical social workers both of therapeutic interactions within mental health treatment, and also within the household. Beneficial effects have been found within the therapeutic literature, and complex relational dynamics have been identified within the cognitive literature to support the existence of a highly developed relationship.

**COGNITIVELY INFORMED THERAPEUTIC RELATIONSHIPS BETWEEN DOGS
AND HUMANS**

A project based upon an independent investigation,
submitted in partial fulfillment of the requirements
for the degree of Master of Social Work.

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2011

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Chapter I

Introduction

There has existed a bond between humans and dogs for thousands of years, though now at varying levels of interaction between 12,000 and 20,000 years ago (Miklosi, 2007). There are numerous theories attempting to account for the initial interest between the two groups. Some theories assert that it began with humans providing an opportunistic food source, along with wolves (the species from which dogs, or *Canis lupus familiaris* emerged) themselves becoming an intermittent food source for humans, followed by selection of those wolves who were more tame than the rest (Miklosi, 2007). Other theories point to even more substantial outcomes. One theory maintains that humans adapted to using wolves' superior olfactory skills at "orienting in the environment," resulting in nasal and oral structure changes "for more skilled production of speech sounds," (Miklosi, 2007, p. 96). Another asserts that human civilization itself was only possible as a result of this cooperation, owing all of sedentary life and agriculture to the initial herding skills of wolves (Shleidt & Shalter, 2003). Each of these theories contributes to an understanding of what happened thousands of years ago, and each of them is missing something. This relationship has developed since its early beginnings into something much more complex than a quick, easy snack. It continues to develop in many different ways.

As of 2007, statistics collected by the American Veterinary Medical Association (2007) place dog ownership in almost 40% of households, and cats in 32% of households. But each of these households is averaged to own almost 2 dogs (1.7 each), producing a total of over 72 million dogs living within U.S. households (AVMA, 2007). With the U.S. Census Bureau (2011)

recording just over 300 million people living in the U.S., there is one dog for every three people in the country.

The dollars involved are on a similar scale. The American Pets Product Association (APPA) (2009) estimates that in 2009, \$45.5 billion was spent on all pets in the U.S. (no breakdown of sales for each species was available). The APPA (2009) also estimate that “basic annual expenses” average over \$1400 for dog expenses. They also provide a 2010 Pet Products Trend Report, reviewing the most popular or new products on the market. The list is extensive: an increase in pet-friendly policies at hotels, with optional doggie packages providing pampering products for the pooches stay; an increase in access to pet supplies being sold at more retail stores, such as the Home Depot; “state of the art high-tech products,” from feeders to doggie doors to heated mats and beyond; products aimed at relaxation with spas and doggie massagers; and apparel and travel products two large industries of themselves, in addition to having a whole corner of the market now include environmentally friendly variations of many basic products, such as litters, toys and foods (APPA, 2009). There are also trends for large, well known companies who produce human products who have begun offering a pet line, including soaps, treats, toys, attire or food. Examples given are Paul Mitchell, Omaha Steaks, Origins, Harley Davidson and Old Navy (APPA, 2009).

The relationship continues to shift and change from that first relatively simple fire-side interaction. In addition to the strong emotional connection, people’s relationship with dogs has been commodified with endless products, many of which are meant to pamper, not simply care for. People include dogs in their ceremonies, create ceremonies for their dogs, and even construct elevated social statuses based on the presence and companionship of dog. A prime time television show on the reputable National Geographic Channel stars a man who is effective at

interacting with dogs, titled *The Dog Whisperer*, evoking notions of the performance of highly regarded skills. Dogs have so deeply penetrated people's lives, that the show for a time pursued shifting its focus to working with couples who were about to separate because of one partner felt the dog in their house was disruptive, and the other partner felt the dog was more important than their romantic relationship. Dogs are turned to for therapeutic healing, though they also find themselves clients in the mental health field, being diagnosed with anxiety disorders and prescribed medications. The complexity of the relationship has certainly grown. As a result of the expanded complexity of the human/dog bond, and the importance placed on it in our culture, expanding our understanding of this relationship is warranted.

Of particular interest within human-animal interactions is the therapeutic relationship. There are numerous studies available which promote a variety of health benefits to humans in multiple spheres. The three most commonly investigated areas of human/dog relationship benefits are physiological, psychological and emotional health benefits. Research has begun investigating the specifics of human-dog interactions, to understand from a cognitive behavioral perspective what evolutionary adaptations dogs and humans may have been making together over the years. Understanding the different components of behaviors and cognitions underlying each dog-human interaction may help to better inform our understanding not only of what the current therapeutic functions of this relationship are and how they work, but also of any potential future possibilities.

This theoretical investigation seeks to explore two theoretical points of view. The first is how the cognitive and behavioral research on human-dog interactions informs our understanding of the positive therapeutic qualities and processes of the dog/human relationship. The second focus area of this paper is to examine the potential negative qualities of the dog/human

relationship. This balanced view of the range of the dog/human bond will increase knowledgeable therapeutic intervention implementation and potential. As the research on therapeutic qualities is primarily interested in the ultimate benefits that result, cognitive behavioral research investigates the proximate underlying mechanisms at work. The juxtaposition of both of these perspectives provides a more comprehensive understanding of the processes within this relationship, both the extent of positive and negative qualities of current interactions, as well as potential future benefits. These observations will be useful to Clinical Social Work both by providing increased understanding of how dog therapy has been used to address unmet needs people may be experiencing, while informing mental health workers about the boundaries and limits that may emerge when considering dog related therapies for their clients.

In total, this will be an investigation into the effects of human interactions with dogs. Historical literature on the therapeutic qualities of these interactions will be reviewed, with criticisms explored and incorporated where possible, as well as recent follow up research to sharpen, or dismiss, the validity of research claims. Additionally, both positive and negative outcomes will be explored. The purpose of this study is to provide a balanced view of the literature and observations in the scientific field of the human/dog relationship, including both positive and negative effects. The majority of the research and information accessible about the relationship between dogs and humans is focused primarily on positive qualities. As most literature and knowledge is concentrated on positive effects, negative effects will be explored when possible.

Negative effects are particularly interesting to explore in this context, in light of the doubts raised about the quality, and therefore validity, of the abundance of historical literature. If

it is possible that dogs do not produce the sweeping increases in health that has been presumed for many years now, than what might be the function their interactions are serving? Are there any possible negative outcomes? The cognitive, behavioral and evolutionary literature will be compared here, in an attempt to access research which has traditionally more closely conducted and adhered to true experimental procedures and data. Chur-Hansen, Stern & Winefield, (2010) also observe how “causal mechanisms are unclear,” (p.141). Cognitive behavioral research may be able to compensate for both some of the less disciplined approaches, as well as identifying some of the causal mechanisms involved.

Chapter II

Literature Review

Before introducing material from the two main content areas of this thesis, it would be helpful to review some underlying concepts within each subject. Discussion will first address concerns surrounding the methodology of some of the therapeutic literature, while at the same time illuminating a rationale for the use of cognitive, behavioral and evolutionary theories as a reference perspective for existing therapeutic findings. The review will then move to discussion of the two broader concept areas, addressing multiple more specific concepts within each. The two broad content areas are cognitive, behavioral and evolutionary theory and therapeutic theory. Foundational evolutionary concepts of natural selection and fitness are discussed. Several other key explanatory concepts are included as well, such as ultimate and proximate causes. There are multiple different areas that have been identified as having beneficial therapeutic effects, some of which have been pursued extensively in the last thirty years or more. Within therapeutic practice and theory, impacts can be measured on physiological, psychological and emotional levels. An introduction to where the literature is generally focused in these areas will be provided.

Methodological Concerns

After thirty years of observation, and an abundance of information, something still seems to be uncertain about how, and therefore whether, companion animals produce health benefits for human counterparts. The supporting data and claims made over the years are today frequently referred to as inconclusive (Wilson, 2006; Walsh, 2009, Chur-Hansen et al., 2010, Serpell, 1991). Chur-Hansen et al. (2010) assert that the majority, if not all, of the research conducted for

companion animal health benefits has been inconclusive. “To date there are no rigorous, randomised double-blind controlled clinical trials to investigate the question of whether companion animals are beneficial for psychological or physical health, as would be expected for any other therapeutic intervention,” (Chur-Hansen et al., 2010, p. 141). They cite “weak research designs” (p. 141) and “failure to control for other influences” (p. 143) as the major flaws in the research, observing that “the majority of literature was anecdotal or descriptive in nature,” (p.144) as well as “cross-sectional”(p.141) and “biased”(p.141) (Chur-Hansen et al., 2010). As companion animals appear to frequently have such strong and personal emotional effects on the people in their lives, it may have made it easier for research to rely on its gut rather than disciplined scientific method.

Another review of the literature from Wilson (2006) assessed which assertions were made through rigorous scientific methods, and expounded on the status and difficulties facing investigations. Wilson (2006) explained that early on in the 1980’s, there was a recognition of these concerns, but that this “early call for evidence-based interventions has largely gone unheeded in [human-animal interaction] research,” (p. 501). Wilson (2006) goes on to describe some of the conclusions from early and more recent reviews. “The majority of studies on animal-assisted therapy fell into the category of hypothesis-generating studies. Few hypothesis-testing studies existed,” (p. 501) “reviews . . . found little research focused on evaluations of the therapeutic effectiveness of formal animal-assisted therapy programs,” (p.501) “sample sizes were often too small to support the conclusions drawn and methodology was flawed. The group concluded that there was inadequate evidence to support definitive conclusions regarding the health benefits of interacting with pets but pointed out many promising areas of research,” (p. 501). And finally, “[a]lthough samples were large enough, most were non-probability,

nongeneralizable samples. The limitation of the research was not the nonprobability per se but rather the inappropriate generalizations of results,” (Wilson, 2006, p. 501)

An invitational quote on the front page of the Delta Society’s website for “Health Benefits of Animals” from Dr. Edward Creagan, Oncologist at the Mayo Clinic reads: ““A pet is a medication without side effects that has so many benefits. I can't always explain it myself, but for years now I've seen how instances of having a pet is like an effective drug. It really does help people,”” (though the preceding commentary about gaps in the research evidence was listed first on the Delta Society’s list of resources for general health benefits of animals). This may be representative of a larger perspective towards this field, both in the approach to research, and now the resulting potentially partial accumulated working knowledge.

In a review of recent human-dog interaction literature from Wynne (2009), authors of fourteen reviewed studies refused to share their raw data:

The sharing of raw data is a principle enshrined by research funding organizations around the world . . . It is also a condition of publication in the majority of scientific journals . . . Nonetheless, the authors declined repeated requests for data. This failure to share impedes the progress of the field because it makes it impossible to draw additional conclusions from data sets that have already been collected. It also raises ethical issues because it leads to needless repetition of animal studies that have already been carried out. It is a sad comment on an otherwise vibrant, truly international, and intellectually diverse field of research.

The recent critical reviews of companion animal health benefits research seems to have encouraged the research to begin at the beginning, and return to basics. The literature seems to be

attempting to focus its gaze in order to strengthen its claims. A search of the literature using the criteria “dog ownership health” in the premier PubMed.gov medical database produces results confined mostly to the interaction of physical activity specifically. As a result of the recent call to increase validity of the evidence being reported, the earlier historical literature incorporated in the following investigation should be understood within this historical context of potentially containing these various flaws. Though, with such long term and widespread research in the area of human/dog interactions, it is likely that these benefits do exist, but simply have yet to be investigated from a critical, disciplined approach and likewise thoroughly and comprehensively understood.

Evolution

Darwin’s theory of evolution attempts to explain the processes through which life develops and is organized. The basic principles of evolutionary theory are that all life comes from a common ancestor, but that changes also occur (Milner, 2009; University of California, 2011). These changes occur on an individual level, but can only be observed in a population as a whole, and as such, give rise to new species over time (Milner, 2009; University of California, 2011). Both dogs and humans have undergone independent evolutionary adaptations throughout time. But considering the length of time they have coexisted, they likely also underwent adaptations in relation to each other. Understanding these adaptations will provide insight into the dynamics, and potential therapeutic capabilities, within this relationship.

Natural selection is one of the proposed mechanisms through which evolution is theorized to happen. Natural selection began by observing how there were many more offspring reproduced than can survive, and how there are great variations among each offspring (Milner, 2009). The variety comes from the variation in genetic traits (University of California, 2011).

Additionally, not every individual reproduces fully, so that those who do are able to pass on their genes more successfully, known as heredity (University of California, 2011). Within a population, certain traits of certain individuals will experience advantage, enabling these individuals to be the ones who reproduce more successfully, and over time, result in the selection of that trait within the group as a whole, an example of evolution (University of California, 2011). Any selection and resultant changes that occur are known as adaptations (University of California, 2011).

The advantage that an individual experiences over another from any of its traits, genetic or learned, is known as its fitness. The term fitness is relatively all encompassing compared to its strictly physiological meaning. It includes the ability of an individual “to survive, find a mate, produce offspring – and ultimately leave its genes in the next generation,” (University of California, 2011). An individual’s overall fitness can include certain traits or characteristics that are harmful to the individual in certain circumstances, but which for the purposes of finding a mate or reproducing are in the end more helpful than harmful, known as sexual selection (University of California, 2011). Those individuals who, at any one time depending on their environment, can accomplish the feat of passing their genes on more than another are considered to have higher fitness (University of California, 2011).

Two other concepts which are helpful as foundational principles in evolutionary theorizing are ultimate and proximate causes of adaptations and evolution. Ultimate causes refer to “evolutionary or ecological factors which have the potential to explain why some changes took place in the course of evolutionary time,” (p.11, Miklosi, 2007). Proximate causes “explain the mechanisms involved in the production of certain phenotypic traits,” (p.12, Miklosi, 2007). Phenotypic traits are those genetic traits which are observable, including its “morphology,

behavior or physiology,” which can be “affected by its genotype and its environment,” (Glossary section N-R, para 18, University of California, 2011).

The concept of fitness will be referred to, along with the broader concepts introduced before it, to try and identify from an evolutionary perspective the underlying mechanisms in the relationship between dogs and humans, including examination of the proximate and ultimate causes of evolutionary adaptations.

Researched Areas of Therapeutic Benefit

Within the therapeutic realm, physiological, psychological and emotional benefits have been active areas of research. These areas have been the primary foci of investigation into human-dog interactions and therapeutic benefits. The body of this theoretical comparison will begin by reviewing this more traditional area of research, and then move on to the more recent cognitive, behavioral and evolutionary perspective. This section will provide a brief introduction to the broad therapeutic areas of research and where the literature is generally focused.

General physiological, psychological and emotional impacts. The Center for Disease Control (2010) endorses benefits in these three areas, listing decreases in blood pressure, cholesterol and triglyceride levels, as well as the ability to decrease “feelings of loneliness,” and provide “opportunities for socialization.” Opportunities for socialization can be seen as a positive feedback loop, as it can both be indicative of and help maintain psychological health. The Delta Society (2011) compiles an extensive array of research to support understanding of the different benefits occurring across the spectrum of health fields, and even further divides the benefits among three different age groups: children, adults, seniors, and a fourth group, families, and provides a comprehensive listing of research resources for each group.

For children, self esteem, responsibility, respect, physical activity, and “significant improvements in treatment procedures of a child suffering from an ailment,” (Delta Society, 2011) are a few of the broad beneficial areas (Vidovic, Vlahovic, Bratko & Bratko, 1999; Melson, 1990; Yorke, 2010). For adults, decreases in blood pressure, anxiety and stress levels occur, as well as provide a parental nurturing experience for those people without children, along with adults also seeing marked improvements when pets are present for healing experiences (Kale, 1992; Antonacopoulos, Nikolina & Pychyl, 2010). Seniors who interact with pets are observed to have less frequent minor doctors visits, have lower blood pressure and cholesterol, as well as increased physical activity and socialization (Cybele, 2007; Motooka, Koike, Yokoyama and Kennedy, 2006).

Attachment. Additionally, one of the more widely explored psychological concepts within human/dog interactions is attachment. Bretherton (1992) summarizes the origins of attachment theory from Bowlby and Ainsworth’s work, explaining attachment figures represent protection and security. They provide a sense of safety as a secure base from which an individual feels safe to explore their physical and emotional environment (Bretherton, 1992). With such a big, complex and often dangerous (if only perceived so) world to experience, it is advantageous to an inexperienced toddler to have somewhere safe to return to in their treacherous beginning travels. The characteristics of attachment behavior include secure base, safe haven, proximity maintenance and separation distress (Bretherton, 1992). Dogs are often interpreted as providing their human companions with such characteristics as unconditional love and acceptance, mimicking that of a secure base, and a secure attachment. People also attempt to have dogs provide them, almost literally, with some amount of emotional and physical safety, with their use

as guard dogs. Attachment theory will be one of the primary concepts used to explore the psychological impacts of dog/human relationships.

Transitional objects. The concept of transitional objects has been explored similarly to attachment. Although not investigated quite as much within the human-companionship animal interaction literature as attachment, human-companionship animal interactions have been examined for their potential experiences as transitional objects. The transitional phase is “an intermediate state between a baby’s inability and his growing ability to recognize and accept reality,” (Winnicott, 1971). Winnicott refers to these experiences as “illusions.” It is the transition between a solely subjective reality to one which includes an objective reality. At this transitional point, the infant is “becoming able to accept difference and similarity.” The object in part represents the breast, but not simply a physical replacement, but also a symbolic representation of mother.

Required for the infant to be capable of experiencing a transitional object or activity is the “good-enough mother.” Without this, the infant cannot “develop a capacity to experience a relationship to external reality.” The good-enough mother is someone who actively adapts to the infants needs, initially almost entirely. This person also necessarily decreases the amount of their response to the infants needs as times goes by, as is naturally representative of imperfect human relationships. This is experienced as a failure of the person to be the good-enough mother, and the decrease in adaptive response should correspond to the infants increase in tolerance with frustration for failure.

In the beginning, with near perfect adaptive response, the illusion is created that the person’s breast (or bottle) is “part of the infant.” The infant cannot comprehend anything more complex. The goal is to eventually disillusion the infant through decreased responsiveness,

though, again, this is not possible without first developing a secure illusion. The infant first believes they are creating the breast, it appearing at the right time and place that they need it. This establishes a “subjective phenomenon.” Now the infant transitions between understanding objects subjectively as their creation and one they experience objectively, through reality testing.

This experience “makes objects real . . . hated as well as loved.” Healthy function would be characterized by the infant being disturbed by a relationship which is too close, making it resemble magic, and seem unreal, as a hallucination. Important is the agreement that the question will never be asked: “[d]id you conceive of this or was it presented from without?”

Winnicott’s (1971) original hypothesis described how, first, infants quickly begin using their fists and thumbs to satisfy their “erotogenic . . . instincts” with their mouth. Secondly, he describes how infants subsequently begin playing with dolls, and that their mothers “expect them to become, as it were, addicted to such objects,” (Winnicott, 1971). His hypothesis begins by stating there is a relationship between the two activities. Essentially, this is a transitional period, and children use an object or activity to aid them in transition.

Winnicott theorizes that this experience begins with the initial activity of a baby sucking their thumb and/or caressing their face with their fingers (which I believe he is trying to insinuate that the baby’s fingers is even an intermediate step towards introducing external objects, resembling an external object, towards integrating objective reality.) From thumb sucking/finger stimulation, the issue will become “complicate[d],” by the infant introducing an actual external object, such as the corner of a blanket or a napkin, or their first babbling noises. This phase will begin between 4-12 months. The infant will begin recognizing and introducing “other-than-me” objects. The object or activity is not quite “part of the infants body,” but is not completely separate either (there is a connection here to these objects or phenomena being representative of

the mother's breast). This object or activity becomes their one and only fail safe tool at calming their anxiety, and often used at bedtime to facilitate sleep.

Mother's often do not in any way change this object, such as by washing it, seemingly understanding that this would disrupt the infants experience of the object, and that it "may destroy the meaning and value." There is no difference observed in the type of objects boys and girls use initially. Sometimes the mother is the transitional object herself, but the example Winnicott uses to illustrate this demonstrates unhealthy function of over-dependency on the mother. At the end of the transitional period, the object sort of dissipates, physically and psychically. It is not absorbed as an internal object; it is not repressed, mourned or forgotten. "It loses meaning . . . spread out over the whole intermediate territory between 'inner psychic reality' and 'the external world as perceived by two persons in common', that is to say, over the whole cultural field." Healthy function is seen as characterized by a growing repertoire of interest in different objects, and regression to an earlier object or activity is seen as unhealthy.

As transitional objects are proposed to facilitate such an important and critical process, both in early childhood and later in life, it would useful to be informed of how dogs may be functioning in this activity, in healthy or unhealthy ways.

Taken together, cognitive, behavioral and evolutionary concepts will be investigated, along with therapeutic theories and practices, in an attempt to investigate how the proximate cognitive and behavioral processes involved within interactions between humans and dogs might better inform mental health practices of the ultimate therapeutic qualities which have evolved from this complex, long standing partnership.

Chapter III

A Biological, Psychological and Practice Review of Therapeutic Effects

For the purposes of this paper, therapeutic qualities will include all Animal Assisted Interventions (AAI), made up of either Animal Assisted Activities (AAA) (where the animal is selected for through certain criteria) or Animal Assisted Therapies (AAT) (provided through a professional therapist). The therapeutic qualities reviewed here will encompass those activities and interactions investigated in the literature to have beneficial effects, regardless of the context. Additionally, the term “companion animal” is referred to currently in the literature, as well as here, to mean animals which provide companionship, instead of the more traditional meaning of assistance dog.

Physiological Effects

Physiological benefits have been associated with the presence of companion animals for some time now. Health benefits range from preventative habits to methods of healing. Benefits to health have been primarily recognized with cardiovascular health and blood pressure benefits. Improvements in stress and anxiety levels are also historically well recognized and have physiological implications, but will be discussed in the following psychological section for their associations. Current research will be reviewed, alongside criticisms where available, as well as historical studies.

Physical activity. Although the activity levels of domestic dogs in different households and throughout the world surely varies, dogs are equipped with the physiological resources to, and likely do, engage in more physical activity day to day than the average human nowadays. Although domesticated for thousands of years now, most dogs still retain bodies and instincts

developed and adapted over evolutionary time to hunt prey. As dogs are prepared for more physical activity than their average human companion might be today, and are often willing to ask for and encourage such activity, the increased physical activity which may accompany human companionship with dogs has been pursued as one of the main areas of investigation for its therapeutic health benefits. Increased physical activity has multiple different indirect health benefits, with impacts to cardiovascular health as another area of particular significance, focused on in the following section.

A body of research has found support for physical activity increasing with the presence of dogs in the household. Hoerster et al. (2011) surveyed people to determine who was meeting American College of Sports Medicine/American Heart Association physical activity guidelines, outlined as: “US adults are encouraged to perform moderate-intensity physical activity for at least 30 min/day at least 5 days/week, vigorous intensity physical activity for at least 20 min/day at least 3 days/week, or a combination of these,” (p.33). Researchers found that 64% of people with dogs in a household met these guidelines, while only 55% of people with no dogs in the household met the guideline (Hoerster et al., 2011). For those with dogs, they observed three primary contributing factors to the increase in physical activity: “dog encouragement of dog walking (when the dog in some way encourages walking, as opposed to the person feeling obligated), walking obligation, and dog-walking self-efficacy,” (Hoerster et al., 2011). In their study, companion dogs provided not only an incentive to physical activity, but three incentives, which would seem to be potentially capable of making a significant difference in providing motivation for people to be physically active (Hoerster et al., 2011).

In some places, weather can increase the difficulty of being physically active outside. Lail, McCormack and Rock (2011), in a study conducted in Australia, have more recently found

evidence to support that ownership of a dog not only increases the amount of both walking and other recreational physical activity than not owning a dog, but the increase in physical activity is sustained across the seasons, year round. Additionally, dog owner respondents reported, on average, 30 minutes per day of walking, meeting the recommended daily activity levels.

Households with many family members across generations may respond differently to dogs, both individually and together. Salmon, Timperio, Chu, Veitch, (2010) surveyed families and monitored children's movements with accelerometers to observe how the presence of a dog might influence activity levels. They observed many family members had increased activity levels, though not all (Salmon et al., 2010). To begin with, 41% of children who owned a dog did not walk their dog at all, and 32% reported never or rarely walking their dog as a family," (p. 264). "Overall, dog ownership was not significantly associated with the odds of mothers or fathers meeting physical activity recommendations," (p. 267), but "dog ownership was significantly associated with children's frequency of total walking per week,"(p. 267). Two age groups of children and parents participated. They found increased levels of physical activity in some and not others of both individuals and different combinations of pairs (Salmon et al., 2010). Many of these activity levels were significant compared against those levels of people without dogs, though did not reach the standard activity guidelines mentioned above.

Other studies have focused on particular family structures, from particular roles within that family. Koontz (2009) surveyed single mothers with and without companion animals to measure and compare per self report a variety of health areas, including both physiological discussed here, as well as psychological reviewed below. Although there were no significant differences between those with and without companion animals in their self reported health assessments, single mothers with companion animals were significantly more likely to utilize

physicians, and were significantly less likely to use prescription medications, after age and income were controlled for (Koontz, 2009).

Physical activity from interaction with companion animals in the elderly has emerged as an area of focus among therapeutic animal interaction proponents. The effects of interactions with companion animals among Japanese elderly has been studied repeatedly recently, offering current findings, though of a particular population. Oka and Shibata (2009) surveyed adults about their experience with companion animals and physical activity. People who owned a dog engaged in moderate to vigorous physical activity significantly more than people who did not own a companion animal (Oka and Shibata, 2009). They engaged in significantly more walking and experienced significantly less sedentary time, and were “1.5 times more likely to meet the physical activity recommendation” (p. 412) than either other group (Oka and Shibata, 2009).

Although there is much research which provides findings to support increases in physical activity, many are per self report and cannot be verified, and others don't carry substantial results. Cutt, Giles-Corti, Knuiiman and Burke (2008) asserted in their critical review of the literature, on effects to health and physical activity, that the supporting evidence was lacking. In general, only half of dog owners were physically active with their dogs, and whether this was at recommended levels of 150 min per week, to contribute to improving population activity levels, was yet undetermined (Cutt et al., 2008).

One study found, based on self report, that there were no health benefits associated with companion animals. Staats, Sears and Pierfelice (2006) surveyed University professors to examine their experiences of companion animal interactions and health and happiness. Resulting from people's self reported assessments, there were no correlations between pet ownership and

health, although owning a companion animal was significantly correlated with the belief that the dog's benefitted health (Staats et al., 2006).

Cardiovascular health. Measuring cardiovascular health is another way of assessing potential physiological therapeutic health benefits accessed through companion animal interaction. Increased physical activity, discussed above, can be a large contributing factor to cardiovascular health. From decreased blood pressures and lower heart rates (Anderson, Reid & Jennings, 1992), to increased relaxation (Todd-Schuelke et al. 1992), or unknown reasons for extended periods of living following major illness (Freidmann, Katcher, Lynch and Thomas, 1980), interactions with dogs have been observed to have a variety of therapeutic effects on human health.

One of the founding studies on the impacts of companion animal interaction for cardiovascular health was of the healing properties after hospitalization from coronary disease. Freidmann et al. (1980) found people who owned pets were more likely to live through the year following a discharge from a hospital for coronary disease, even after controlling for health benefits associated with increased physical activity from animal caretaking. Though this study was noted to have “been criticized by Wright and Moore (1982), and, as yet, these studies have apparently not been replicated (Hart 1989)”, (Serpell, 1990).

Parker et al. (2010) also criticized Fredimann's studies (the original 1980 and the follow up 1995). Parker et al.'s (2010) final outcome was in opposition to Freidmann's, finding that “pet owners were more likely to experience a death or readmission following their hospitalization, after controlling for key psychosocial and medical covariates,” (p. 65). Parker et al. (2010) began by criticizing Freidmann's (1995) research for initially making claims within the abstract that were later unsupported within the results, such as “pet ownership,”(p. 66)

along with social support, found to be “significant predictors of survival,” (qtd. in Parker et al., 2010), but then later report that “there was no association between ‘pet ownership’ and survival,” considering dogs and cats together (Parker et al., 2010, p.66). Further analysis within Freidmann’s (1995) study found an array of associations among specific contexts. Parker et al. (2010) reviewed how “dog owners were more likely . . . to be alive at 1 year than those who did not own dogs ,” (p. 66), but “there was a nonsignificant trend for more deaths among cat owners,” (p. 66) and when incorporating “physiological and psychosocial variables, survival was increased in those owning a dog and decreased in those owning a cat,” (p.66) but then “this trend for cat owners was no longer significant when social support was added to the model,” (p.66).

One of the few long term and experimental studies conducted was by Serpell in 1991. The study was conducted over 10 months. The control group had no companion animals, but the experimental group were people who had previously been without companion animals, and obtained them during the beginning of the study, unlike most other studies. This study had positive results. Serpell (1991) monitored health status, physical activity and “psychological well-being” (p. 717). Significant decreases in minor health problems were reported, and general health reportedly increased among dog owners, as well as a “dramatic” (p. 719) increase in recreational walks (Serpell, 1991). The results were less impressive for cat owners (Serpell, 1991). To date this study is considered one of the more reputable studies and has withstood criticisms over time.

Another of the founding studies on physiological effects was done by the Baker Institute, the leading Australian heart and vascular disease research center. This 1992 study included 5,000 survey participants, and found that, from over 400 people who owned dogs and over 400 people who owned cats, among other animals, those who owned animals were tested to have

“significantly lower triglyceride and cholesterol levels as well as lower systolic blood pressure readings,” (Anderson et al. 1992). The study could find no confounding variables, aside from those which should have decreased the likelihood of healthy benefits, such as the increase in use of alcohol and take-out food among animal owners (Anderson et al., 1992).

A more recent investigation found positive results among the activity of cardiovascular health processes. Allen, Blascovich and Mendes (2002) compared cardiovascular responses across a number of different human and/or animal interactions, and found positive support for the presence of companion animals:

Relative to people without pets, people with pets had significantly lower heart rate and blood pressure levels during a resting baseline, significantly smaller increases (ie, reactivity) from baseline levels during the mental arithmetic and cold pressor, and faster recovery. Among pet owners, the lowest reactivity and quickest recovery was observed in the pet-present conditions. (p. 727)

Other studies have explored different types of interactions between people and dogs for therapeutic physiological benefits. Todd-Schuelke et al. (1992) measured petting as a relaxation technique to compare it with other relaxation techniques, to determine if interacting with dogs helped improve hypertension. Todd-Schuelke et al. (1992) found only marginal improvements for hypertension in petting dogs as an alternative relaxation method. Significant results were found only with peripheral skin temperature, but not with blood pressures, although it was considered how blood pressure rates can be influenced by comorbid conditions, and therefore skin temperature “may be a more sensitive indicator of relaxation.” Even still, the increases in temperature indicating relaxation were a 2F increase, in contrast to increases of 3F and 4F found

with other techniques (Todd-Schuelke et al., 1992). Charnetsky, Riggers & Brennan (2004) also investigated the benefits of petting, on potential effects to immune system functioning. Three groups either pet a dog, pet a stuffed animal dog or sat comfortably (Charnetsky et al., 2004). With positive results, Charnetsky et al. (2004) found significant increases in the immune systems primary antibody only within the group who pet a dog.

Altogether, there are a number of physiological processes and impacts that have been studied to determine if there are helpful, therapeutic effects resultant from human interactions with dogs. Positive results have been found over the years, though there have been criticisms along the way as well. Most studies seem to surface findings that companionship from dogs helps increase physical activity levels. And even though the causal evidence may not have yet been clearly identified for how companion animals help prevent, heal and extend life in older age, again, findings seem to at least always be trending towards positive results. Attention will now shift to psychological impacts of companion animal interactions, with a variety of different effects reviewed first, moving to a more specific areas of attachment and transitional objects afterwards.

Psychological effects. People connect and engage with dogs not only on a physical level, but also psychologically and emotionally, as evidenced by the words and efforts of adoration commonly observed from people to animals. This is also exemplified nicely by the simple, ubiquitous gesture shared frequently on a daily basis between dogs and humans: the kiss. What the dog's experience of this gesture has as of yet only been speculated, but this demonstrates more clearly the emotional and psychological component of the relationship for humans.

A body of research surrounds the psychological impacts of human-animal interactions. There are several studies on attachment behaviors with dogs (Kurdek, 2009; Noonan, 2008; Topal, Miklósi & Csányi, 1998; Prato-Previde, Custance, Spiezio and Sabatini, 2003), and several others exploring dogs as transitional objects (Wilkes, 2009; Noonan, 1998). Studies have been conducted with many different populations, and across many different psychological areas of need and contexts. Some studies focus on demographics of the human companion, such as age, while other studies focus on the experience of people navigating the management of their internal experiences and society's external responses to them, such as experiencing developmental disabilities or HIV. These studies are reviewed collectively in the following section, as there is overlap among various variables, so that creating discreet sections would either be artificial or create redundancies. Other areas of human psychological processes affected by animal companion interactions have been under observation for longer periods, such as attachment and transitional objects, and are discussed in distinct sections.

The calming and anti-anxiolytic therapeutic benefits of animals was one of the first observations investigated in companion animal research. These were first explored with measures of physiological impacts on processes such as blood pressure and heart rate, as discussed above (Friedmann et al., 1980; Allen et al., 2002), but has more recently been investigated through behavioral symptom manifestation (Hoffman et al., 2009; Lang, Janson, Wertenaue, Gallinat & Rapp, 2010).

In a sample of people experiencing Major Depressive Disorder hospitalized with acute depression, visitation with dogs was used as an experimental method to reduce anxiety. All those who interacted with a dog on a daily basis were assessed with significantly less anxiety, which

did not occur with those who did not visit with dogs (Hoffman et al, 2009). Hoffman et al. discussed the potential significance of these results:

Our finding is not only statistically highly significant, but also clinically important. Recent discussions about the clinical effectiveness of antidepressant drugs have evolved partly based on a meta-analysis of Kirsch et al. [3], who showed that complete data sets including unpublished data revealed an overall effect of new-generation antidepressant medications below recommended criteria for clinical significance. Moreover, meta-analyses of antidepressant treatment trials show benefits that are statistically significant but of marginal clinical significance [21]. Even concerning the “most invasive” treatment of depression, electroconvulsive therapy, several authors claim that there is no study demonstrating a significant difference between real and sham therapy at 1 month post-treatment . . . Alternative treatments provide at least a placebo benefit and produce fewer side effects. (p. 141)

Within the same hospital, an additional study was conducted observing the anxiety reducing effects of dogs with schizophrenic inpatients during interview assessments. Similar results emerged, with people accompanied by dogs in their interview later assessed with less anxiety than people interviewed without the presence of a dog (Lang et al., 2010). Lang et al. (2010) commented both on the potential inferences to be made of symptom reduction and treatment in experiencing schizophrenia, as well as this and further research:

Finally, although the results provide evidence for an immediate effect after a single session of animal-assisted therapy on state anxiety, further controlled and randomised

studies are needed to replicate the finding and to determine the biological mechanisms underlying these anxiolytic properties of interaction with dogs.

Animal-assisted activities may well help to offer a familiar environment and an empathetic form of interaction with patients with psychotic disorders. The presence of dogs in treatment settings might inspire psychotherapeutic strategies and encourage motivation of patients and therapists. (p. 126)

Depression can affect anyone at anytime. Over sixteen percent of people living in the U.S. will experience depression at some point throughout their lives (NIMH, 2010). One of the behavioral symptoms of depression is isolating behavior. Companion animals may not be met with the same disregard as other people to those suffering from depression, and may offer a critical opportunity for companionship and symptom alleviation that would otherwise not exist.

Although older adults are less likely to experience depression than younger adults (NIMH, 2010), older adults are at increased risk for experiencing isolation and loneliness. Using dogs for companionship among the elderly is one of the purposes for companion animals that has been studied for some time now. Hart (2006) presents on the benefits of animal companionship, reviewing Garrity, Stallones, Marx and Johnson (1989), who found decreased depression levels among elderly with companion animals experiencing grief compared to people without companion animals (as cited in Hart, 2006). Hart (2006) recalls the study:

Among elderly people in one study who were grieving the loss of their spouses, within the previous year and who lacked close friends, a high proportion of individuals without pets described themselves as depressed, whereas low levels of depression were reported by those with pets. (p. 81)

Hart (2006) noted that there were no differences found in health status among the participants, and added a critical thought, that “[p]eople who seek out animal companionship may be more skilled in making choices that maintain their own well-being,” explaining that there are certain characteristics of resilience and competence that may be reflected by the choice to live with a companion animal (p. 81).

Hart (2006) also discusses the potential socializing effects of companion animals. Hart (2006) cites multiple studies observing increased social interactions in the company of animals, including: Haughey, Milne and Elliot (1992) finding “improved social interactions among residents and staff” (p. 83) with elderly psychiatric inpatient women, and also in Kongable, Buckwalter and Stolley (1989) among visits with Alzheimer’s patients (as cited in Hart, 2006). Another study found companionship and social support to be correlated with interactions with companion dogs among elderly. Nagasawa and Mitsuaki (2010) surveyed elderly men to examine their past experiences with dogs. Their significant findings occurred within the group of elderly men who had increased experience with dogs: those who had owned a dog at a younger age, as well as had more dogs throughout their lifetime (Nagasawa and Mitsuaki, 2010). They found that the elders with more experience scored higher on companionship and social support experience scales (Nagasawa and Mitsuaki, 2010). Nagasawa and Mitsuaki (2010) discussed their results:

The results showed that the [more experienced] group obtained higher scores than the [no experience] group in the Companionship factor, and higher than the [less experienced] group in the Social Support factor (Table 3). The first experience of dog ownership for the [more experienced] group was when they were around 9 years old. It is said that when a child is around 10 years old, social development is progressing and that children in

middle childhood were most affected by interaction with pets (Levinson 1978). These results suggested that the experiences of dog ownership in childhood may contribute to building a positive attitude toward human relationships. (p. 381)

Another group of people who experience end of life concerns similar to the elderly, such as loneliness and depression, though sometimes for a longer period of time, are people suffering from chronic illness. Gorczyca et al. (2006) address the potential for companion animals to play a role in palliative care for people suffering from AIDS or other chronic illnesses. “Persons with AIDS may perceive a companion animal as a family member and a direct source of emotional support, which is particularly important for someone who may feel isolated and perhaps neglected,” (Gorczyca et al., 2006). Gorczyca et al. (2006) refer to several studies that have found support for therapeutic benefits of companion animal interaction for people suffering with AIDS or other chronic illnesses. Carmack (1991) investigated the therapeutic benefits of companion animals among people with AIDS, finding reductions in both feelings of isolation as well as perceived stress (as cited in Gorczyca et al., 2006). “Stress reduction can, in turn, improve immune system function. Because animals require affection and companionship, they can enhance feelings of being needed and valued,” (Gorczyca et al., p. 315). Siegel, Angulo, Detels, Wesch and Mullen (1999) also found supportive results, observing that companion animals were correlated with decreased depression among men with AIDS compared to men without companion animals (as cited in Gorczyca et al., 2006).

Similar to chronic illness and aging, disabled people also at increased risk for experiencing isolation and depression. Though this is one instance where using the assistance of animals is no longer challenged, for physical and medical disabilities. Disabled people often

experience a double injury from their disability; not only do they need to compensate for the ability they do not have because society is not sufficiently adaptable, but they also can be isolated from other people and activities simply because of this failed expectation. “Loss of hearing is an invisible disability that limits communication and predisposes people to feeling isolated and lonely, but a dog serves as a full-time companion,” (Hart, 2006, p. 82) Hart (2006) speaks to both the absence of an ability others share, as well as feelings of isolation from expectations of functioning, citing her earlier work in this area:

Although animals cannot participate in complex conversational interchange, they are conversational partners that respond behaviorally to the statements and moods of their human companions. They also facilitate socializing within the neighborhood more than is anticipated prior to having a hearing dog (Hart et al., 1996). People with impaired hearing who had a hearing dog rated themselves as less lonely after receiving their dogs and also were less lonely than those who were slated to receive a hearing dog in the near future. (p. 82)

Another group which experiences disadvantages similar to people with physical disabilities are children experiencing developmental delays. Though assistance from dogs is not recognized as a formal treatment for this experience. In a longitudinal study spanning four years, the use of animals was introduced as a treatment method with children receiving special education services. Katcher and Teumer (2006) found that for children who had trouble focusing on the external environment and could become fixated on their internal experience, changing their external environment to include animals, on a farm, helped most children engage more with

the external environment. Katcher and Teumer (2006) discussed their findings of decreases with internal fixations:

The atypical factor score decreased from school to farm in all categories of students observed except those with autism. That decrease indicates that in the presence of the farm, children are more attentive to their environment and less encapsulated in their own world. As a result, they are more amenable to instruction and learning and have a higher capacity for social interaction. (p. 238)

Katcher and Teumer (2006) go on to address the insignificant results from autistic children:

there is no evidence that AAT produces any substantial improvement in the behavior of children with autism that persists over time and is manifest outside of the treatment context. This negative conclusion is not remarkable, as most of the treatment programs using AAT have been very short duration, and autism is a lifelong disorder that requires extended and persistent treatment. This study reports the largest number of autistic students studied with a well-accepted and standardized test measurement. Moreover, the students studied were observed for 1 year. We observed a small but statistically significant positive effect of the program on autistic children. (p. 239)

As noted earlier, younger adults are more likely to experience depression, with a 12-month prevalence record showing that “18-29 year olds are 200% more likely to have experienced depression” than adults over the age of 60 years old (NIMH, 2010). Hart (2006) goes on to cite Folse, Minder, Aycock and Santana (1994), a study in which college students with depression received Animal Assisted Therapy and were assessed with less depression afterwards than other students without AAT, but noted that, interestingly, “the AAT in

conjunction with the group psychotherapy was no more effective than the control, whereas the AAT alone was associated with a reduction in depression,” (p. p.82). Another study explored aggression among school age children. Long (2009) compared measures of aggression from those receiving an Animal Assisted Therapy to those receiving therapy without animal assistance, in adolescent boys and girls of elementary, middle and high school age. Long (2009) found that adolescents receiving AAT scored lower on the Achenbach Child Behavioral Checklist and had fewer In School Suspensions. Within the experimental group, fewer Serious Incident Reports were reported, and overall, boys seemed to respond stronger than girls to the intervention (Long, 2009).

Koontz’s (2009) survey of single mothers with and without companion animals measured perceived levels of stress reduction or alleviation, social support and attachment with companion animals. Outcomes primarily did not support the claim that companion animals help to buffer stress (Koontz, 2009). There were no significant differences between mothers with and without companion animals and their perceived levels of stress (Koontz, 2009). And although there was a positive correlation between perceived attachment and social support, attachment did not correlate with lower levels of stress (Koontz, 2009).

There is clearly a wide range of both investigated as well as potential areas of influence that companion animals may be able to have in providing therapeutic psychological benefits for humans. Symptom reduction was experienced among depression and anxiety. Anti-anxiolytic effects were observed everywhere from inpatient settings to intake appointments, and depressive symptoms were reduced among everyone from young adults to the elderly. The experience of depression was also alleviated in people suffering from chronic illness and disabilities. Interaction with animals was observed to help people with developmental delays turn their

attention from being focused inward and shift towards interacting more with their external environment at school. The following sections will review the effects on the psychological processes of attachment and transitional objects specifically.

Attachment. One of the primary processes measured within attachment is the proximity of one individual to another. Attachment processes seem a fitting area of investigation between people and dogs, as people with companion animals often are in close proximity to one another throughout the day, including bringing animals to accompany them to different places and sleeping in the same bed together. Attachment processes have therefore become a well studied area between human and companion animal interactions. There have been mixed results.

A replication of Ainsworth's original Strange Situation experiment provided some supporting evidence for attachment behaviors between humans and dogs, though not extensive. Prato-Previde et al. (2003) investigated attachment bonds and behavior on the part of the dog. She replicated Ainsworth's original strange situation experiment closely with a dog and their owner, with the addition of another period when the dog was left alone in the room with the clothes of both their owner and a stranger. They had multiple findings, most supportive and some not. Dogs were more likely to interact with a stranger when their owner's were present, and presented attachment behaviors such as proximity seeking (waiting by the door for their owner), were more eager, and for longer, in greeting their owners than strangers, and made contact for longer and more frequently with their owner's clothing than with strangers' (Prato-Previde et al., 2003). The dogs seemed to explore more with their owners there, but it also seemed as though this was because the dogs were growing disinterested and trying to find something new to do more than anything else (Prato-Previde et al., 2003). Prato-Previde et al. (2003) clarify their results as cautionary:

Our results clearly indicate that the dog–human relationship is an affectional bond, but our evidence that it conforms to an attachment is not entirely conclusive. The order effects inherent in Ainsworth’s procedure meant that we could find only one positive indicator of the secure base effect, namely, the fact that the dogs would play with the stranger in the presence of the owner, but not in his or her absence. (p. 251)

Topal et al. (1998) conducted a similar experiment, finding significantly increased interactions with strangers with owners present, and increased exploration, though Prato-Previde et al. (2003) caution against these results as well:

the conclusions drawn in the previous study by Topal *et al.* were premature and that further research is needed to gain a better understanding of the nature of the dog–human bond and to test specifically for secure base effects. (p. 251)

The processes of attachment were investigated through survey by Kurdek (2009). With almost 1,000 respondents, Kurdek (2009) looked at the spectrum of attachment processes among a general population of participants. Kurdek (2009) began by focusing on the dog’s role of providing safe haven, anticipating it would be the least common participatory characteristic of the four required from Ainsworth’s theory of attachment figures, including: proximity maintenance, separation distress, and secure base, given dogs’ “cognitive, verbal, and behavioral limitations in actively removing sources of distress” (Kurdek, 2009, p. 440). Kurdek (2009) expected from a previous study he conducted (Kurdek, 2008) that proximity seeking would be the most salient characteristic of the relationship. He additionally sought out the frequency of this behavior within a family context, to determine if people were more likely to turn to various prominent familial relationships in times of emotional stress, or to dogs. Lastly, he attempted to

capture what might account for the variability of some people utilizing their relationship this was and others not. Kurdek's (2009) described his results:

Characteristics of both owners (being male, widowed, highly involved in the care of the dog, and uncomfortable with self-disclosure) and dogs (strongly meeting owner's needs regarding relatedness) heightened the likelihood that dogs were turned to rather than some humans. It is concluded that some owners develop attachment bonds with their pet dogs. (p. 439)

People rated their dogs as effective at performing all four attachment functions, but they rated them highest at providing proximity maintenance, and lowest at safe haven (Kurdek, 2009).

People were also more likely to turn to their partners before dogs, but more likely to turn to dogs instead of their mother, father, brother, sister, best friend or children. Among people who cared most for their dogs, self disclosed the least, or reported high scores of relatedness with their dogs (for example, "When I am with my dog, I feel loved and cared about"), all three groups rated their dogs as the primary attachment figure instead of any other human relationship (Kurdek, 2009).

Other studies exploring the components of attachment processes have found similar findings. Kwong (2008) explored attachment among disabled people and assistance dogs, to find the "attachment processes of safe haven and secure base," as well as "caregiving appeared to be an equally important dynamic," (p. 2669). Endenburg (1995) also found security as a primary component to the perceived reason for human-companion animal relationships. In looking at attachment, Endenburg (1995) found that companion animals provide "a sense of security," and in addition, "the most important reason given for having a companion animal was

companionship,” (p. 86). Of the different animals reported in the survey, such as birds and rodents, and cats and dogs, people reported the highest attachment with cats and dogs (Endenburg, 1995). Ramon, Slater and Ward (2010) surveyed residents of a small rural town in Texas to investigate knowledge and attachment of companion animals. “Higher attachment was associated with being a woman and having no children in the household,” (Ramon et al., 2010, p. 251). They also found that only people between the ages of 25-44 kept companion animals, and out of over 400 responses, people increasing in age between 45-54 had the least amount of knowledge of animals (Ramon et al., 2010).

In a survey of people’s lived experiences of attachment processes to companion animals, Staats et al. (2006) surveyed University professors to explore how people were interacting with animals, as well as what were the perceived reasons and benefits for keeping such company. Responses to Staats et al. (2006) suggested that the majority of people with companion animals “spent significant amount of time touching or within arm’s length of their pets,” (p. 1886). There were no correlations between duration of proximity and self reported health assessments, though there was a small effect size for inverse correlations between proximity and being male and the current quality of work life (Staats et al., 2006). Staats et al.’s (2006) survey also found differences in reasons for companion animals between men and women.

Women were more likely than men to keep pets for social support, to help them get through hard times, or because they would be lonely without the pet. Men were more likely than women to keep pets for more pragmatic reasons such as to keep active, because the pet served a useful function, and because they were keeping the pet for others. (p.1887)

They further stratified respondents into two groups, with the result that people who were more alone were significantly more likely to have companion animals based on reasons for social support (Staats et al., 2006). Additionally, Staats, Wallace and Anderson (2008) conducted a follow up study, finding similar results:

Results indicated that avoidance of loneliness was the most frequent reason for owning pets among both students and middle-aged community members. This result is consistent with the view that animals provide social support and companionship to humans at various stages of the life cycle. Suggesting an emergent feature of the human-nonhuman animal bond, both groups selected, “the pet helps keep me active” as the second-most common reason. Older women reported a greater belief in the health-giving benefits of pet ownership than did younger persons or men. (p. 279)

Another study investigated attachment through exploration of the idea that “people resemble their pets,” though approached here through personality, with sophisticated concepts that sought to identify both resemblances as well as any corresponding connections that may exist. Woodward and Bauer (2007) investigated the interpersonal complementarity and attachment of people with “companion animals,” (dogs and cats). Woodward and Bauer (2007) assert that complementarity is the central force of interpersonal behavior, using the circumplex model, consisting of eight different personality characteristics (dominant, submissive, friendly, and hostile, and interactions thereof) to describe this interaction. Complimentarity is achieved when an individual’s interpersonal style corresponds to that of a close other (correspondence) (Woodward & Bauer, 2007). Woodward and Bauer (2007) then connect this idea to the human-animal relationship, explaining “there seems to be a reciprocal relationship between the needs of the owner and the dispositional characteristics of the pet,” (p. 174). There was a significant

interaction for people's personality types and the "personality type" of the pet they preferred, either dog or cat, resulting in people who preferred dogs to seek less hostile and more submissive pets, and people who preferred cats to seek more hostile and less submissive pets (Woodward & Bauer, 2007) Additionally, they found variables describing variation within the human population, with women maintaining greater attachment and complementarity to dogs and cats than men (Woodward & Bauer, 2007).

It is also possible that there are certain experiences or circumstances that may attract people to the companionship of animals more than others. Brown and Katcher (2001) explored a particular correlation between mental health and pet attachment. The study investigated whether people who report pet attachments have correlating disassociative behavior. This was a replication of Brown and Katcher's (1997) original experiment. The study found positive correlations for both people with pet attachments experiencing disassociation, and also that clinical levels of disassociation were more likely found with people who had higher rates of attachment than those with lower rates (Brown and Katcher, 2001). Brown and Katcher (2001) make inferences about the potential correlations found:

One possible explanation is that high levels of dissociation usually correlate with childhood abuse. A history of abuse by people could predispose a person to mistrust humans. Relationships with companion animals could serve as a safe substitute for relationships with people or as a bridge to begin relating to others. Furthermore, having an attachment to a companion animal could allow an individual to feel more secure and learn to trust. Learning to trust is one of the most important building blocks of human relationships.

Imaginative involvement or fantasy proneness (both correlates of dissociation) may be two elements contributing to the ability to relate deeply to animals . . . Similar to play, fantasy can be engaged in for the sheer enjoyment of it, which often is seen spontaneously in childhood . . . Hilgard (1974) refers to the ability to become intensely absorbed in these activities as a partial dissociation, where the immediate concerns of life fade into the background . . . This altered state may have health-enhancing effects in the same way as hypnosis or relaxation. This could be one of the underlying mechanisms producing the stress-reducing effects of companion animals. (p. 35-36)

Burnett (2009) surveyed adults to examine “attachment-related avoidance features of adults, the strength of the bond with a pet for those individuals and the subsequent psychological benefit of the human–animal bond, specifically related to depression,” (p. ii). Burnett (2009) found both a significant relationship, as well as a positive correlation with avoidance features, depression, and attachment levels:

Participants with high levels of attachment-related avoidance features identified a higher level of depression and a higher level of pet attachment than individuals with low levels of attachment-related avoidance features, and as attachment-related avoidance features increases, both the level of depression and level of pet attachment also increase. (no p.)

Attachment has been observed from many angles, with everything from replication of Ainsworth’s original experiment, to survey questionnaire. There have been mixed results, some supportive, some inconclusive, and many providing partial results. Attachment processes have been observed occurring in young adults, adults, and older adults, disabled, or people with particular circumstances, such as women with no partner or children. People experiencing mental

illness were also found to maintain particular attachments with companion animals, such as people who experience disassociation or depression and avoidant behaviors. Companion animals provide everything from emotional support, to social support, to providing physical affection and companionship against loneliness, and an overall sense of security. They were even found to compliment people's personalities. Although it is likely known to many experientially that attachment processes operate within the relationship between humans and dogs, it is now, at least beginning, to find corresponding scientific evidence as well.

Transitional objects. Similar to attachment theories, another perspective through which the relationship between people and companion animals has been explored is as transitional objects. Ellen Noonan (1998) in her theoretical discussion of how pets may be utilized as attachment figures, therapists, or transitional objects, suggests that animals are used in a variety of ways to become extensions of oneself. Noonan (1998) postulates how domesticated animals are often discussed as resembling their owner's appearance, but that often their personality will be reflected in the animal. In this way, people have projected onto animals either the characteristics they have, or those they wish they had or did not have. Noonan (1998) also discusses how people will relate to their animals through object relations, and it has been observed that people will project their emotions onto animals (Wilkes, 2009).

Another hallmark characteristic of Winnicott's (1971) transitional object is that it is a self-soothing object. The transitional object will invariably reduce anxiety and provide a sense of calm. Wilkes (2009) interprets how it is used as a tool in managing anxieties to separate from the caregiver, and suggests that when this separation process is not successful in childhood, adults "remain attached to various transitional objects. These offer a sense of security." McNicholas and Collis (2006) suggest that animals mimic the experience of being cared for by a caregiver,

possibly resembling the preliminary stages of the transitional period for infants before they begin the separation process for those whose process was not complete. Projection of emotion, combined with a sense of being cared for, would suggest that “animals offer emotional support, affection and unconditional love in ways similar to transitional objects,” (Wilkes, 2009).

Katcher (2000) interprets Winnicott’s transitional objects and relationships as an event where “a child or an adult takes the attributes of a purely subjective object, a fantasy object, and projects them onto some real entity in the external world,” (p. 120). Katcher (2000) goes on to suggest that “ [t]hroughout our entire lives, our animals are there as transitional objects, being what we imagine them to be, serving as vehicles for projecting those admirable traits that we find so lacking in fellow human beings,” (p. 10).

Although not studied from controlled, experimental procedures, inference from experiential observation provides support for the intimate experience of companion animals acting as transitional objects for humans. Given the evidence which exists for attachment processes between humans and companion animals, it is not unlikely that humans and animals would be engaging in this transitional activity as well.

Practice

Therapists are poised to both implement informed treatment, as well as witness the lived experiences and effects of people and their interactions with companion animals. Therapists are not only on the front lines of treatment, but also have a knowledge base of psychological processes that may inform their understanding of the effects of companion animal interactions, both within the household and within treatment.

The world of Animal Assisted Therapy seems to be unorganized. Consensus seems largely lacking among both the psychological processes understood to be working as underlying

mechanisms of companion animal interactions, and also the treatments put forward as effective (Born, 2008; Wilkes, 2009; Risley-Curtis, 2010). Therapist knowledge of Animal Assisted Interventions also varies widely (Risley-Curtis, 2010). Born (2008) conducted interviews with Animal Assisted Therapists to explore what potentially helpful qualities exist in the human-animal relationship within an Animal Assisted Therapy. Born (2008) found there were many similar qualities in both relationships with counselor and animal assistant, including Trust and a Sense of Safety, Acceptance, Empathy, and Respect. Wilkes (2009) conducted in depth interviews with Psychologists using animals within their practices to investigate what ways animals were shaping the therapy experience. Four themes emerged: enhanced therapeutic alliance/relationship enhanced therapeutic environment, enhanced professional practice, and creating a sense of sacredness. “The therapy animals seemed to provide the trust and safety needed for clients to work within the transitional space and that the animals may act as transitional objects for some clients,” (p. vii) and they may be “extremely helpful in providing a sense of safety for traumatized clients and could act as catalysts, especially with defensive and/or detached clients,” (p. viii) (Wilkes, 2009).

Risley-Curtis (2010) surveyed a sample of Social Work practitioners to explore their experiences with practice and the human-companion animal bond (HCAB). Risley-Curtis (2010) was interested in understanding what practitioners on average know of this bond, its beneficial effects in and out of treatment, and other information, such as the correlation between animal abuse and other forms of human abuse. Risley-Curtis (2010) summarized their results:

Although it appears that the participants in this study have some knowledge of both the negative and positive aspects of the HCAB, the vast majority of social work practitioners in this study are not including companion animals in their practice. Especially concerning

are the findings that only one-third ask about animals at all in assessment and that only 12 percent of the whole sample ($n = 1,649$) ask clients about animal cruelty. Many are not including companion animals in their practice because they have not been educated or trained to do so.

An alarming finding is that of those who are including animals in their practice, most are doing so without the necessary training or education. (p. 43).

The majority of people, 77 percent, do not include animals in their interventions, with 96 percent of people reporting they have not had training or education to do so, while two thirds of responders did not include questions about any type of animals in their intake interviews (Risley-Curtis, 2010). Even more “alarming”(p.43) to Risley-Curtis (2010) was that 82% of people who did utilize companion animal assistance reported they also had no formal training. Most people reported not including companion animals because of a lack of training, with 79 percent of people wishing they knew more (Risley-Curtis, 2010).

All in all, there has been a wide variety of therapeutic effects investigated in the relationship between humans and dogs. This began with the more concrete, easily recognizable and measurable physiological effects. Physical activity and cardiovascular health have been forerunners of such benefits. The majority of results provide supportive evidence for increased physical activity, as well as stabilizers of cardiovascular health.

Psychological effects have gained more attention, with focus on such processes as attachment and symptom reduction for everything from developmental delays to loneliness. More often than not, attachment processes were observed at least in partial among most studies, and there are many significant findings for alleviation of stress or depression from a variety of

circumstances, such as chronic illness with AIDS, disabilities, or women living alone without partners or children. Though all of these results have experienced criticisms for different reasons, including consistency of findings, or methodological concerns, the abundance of research and findings points invariably to great activity occurring between humans and dogs, but maybe the need exists to refine the methods and practicing of capturing these activities scientifically.

In an effort to offset some of the criticisms which have increased recently of the scientific literature investigating the effects of companion animal interactions with humans, cognitive, behavioral and evolutionary theory has been able to translate their work from research of wildlife back towards a species they have full access to. The full access to study participants and the more controlled, experimental approach typical and familiar in this field partners well to combat some of the criticisms of anecdotal findings, which are inherently inappropriately generalized to circumstances outside of what can be verified. The cognitive, behavioral and evolutionary field has seized the opportunity to see what they can uncover in this area of great activity.

Chapter IV

Cognitive, Behavioral and Evolutionary Observations of Dog-Human Interactions

This chapter will present findings from a cognitive, behavioral and evolutionary perspective of the dynamics in the relationship between humans and dogs. A variety of processes have been investigated, and the following chapter is organized into sections of visual communication, acoustic communication, personality, and attachment. These topics will be introduced further, as well as the benefit to undertaking research from a perspective which is more familiar with experimental procedure with animals, to help balance the concerns which have arisen from qualitative or anecdotal research.

There are multiple spheres within dog behavior and human-dog interaction from the cognitive, behavioral and evolutionary perspective which are applicable to therapeutic research and practice. Research has been conducted on dog personalities, attempting to investigate the back and forth flow of responses based on innate characteristics of each the dog and the human involved within a relationship. Each dog has its own characteristics and personality, and each human as well. This research can help inform these complex interactions with an abundance of variables to navigate. Research exists around socialization processes of domestic animals, and can help families and providers in assuring optimal comfort between all parties. Even helping people to learn handling and treatment preferences and techniques can be important in optimizing therapeutic experiences within both the household and the office.

Research has also begun exploring communication between humans and dogs. This helps to not only navigate effective communication, but also reflects the close relationship

between the two species, illuminating the depth and cooperative, adaptive growth this relationship has undergone. This illustrates both the length of time it would have taken for such adaptations to occur, but also just how significantly beneficial this relationship is for both parties, compelling each to remain engaged for thousands of years. Both visual and acoustic forms of communication have been studied from multiple perspectives. Attachment can also be touched on here. Though maybe not so much to elaborate conceptual understanding, cognitive and behavioral evolutionary research is, again, capable of being controlled and manipulated, and able to reveal supportive evidence with less subjective bias, potentially increasing validity of the more common, well established anecdotal findings.

The assessment of the therapeutic companion animal interaction literature as potentially inconclusive helped biology and Ethology, the study of animal behavior, to recognize this was a field of opportunity. The field of biology could offer precisely what was lacking and criticized within the existing therapeutic research: controlled, quantitative, experimental observation (Miklosi, 2007). While Ethologists often have their gazes turned towards the wild, undomesticated representatives of animal life, as they seemingly would have been thought of as less understood than domestic animals, and therefore a greater opportunity for discovery, both the growing complexity and the ensuing popularity of the human-dog relationship offered a chance for ethologists to turn their attention a little closer to home (Miklosi, 2007). Researchers form hypotheses and perspectives which can be controlled and manipulated experimentally, to produce reliable, replicable results and information. With one of Ethology's primary foci the biological basis of behavior, and the underlying mechanisms involved (Pongracz, Molnar & Miklosi, 2010), cognition and behavior, from an evolutionary perspective, are all on the table for investigation.

True experimental investigations in the context of dog-human interactions is not widespread throughout the world currently. One of the leading sources of information comes from the Family Dog Project, a research group, out of Eötvös Loránd University, Department of Ethology, in Budapest, Hungary. In 1994, they were “the first research group dedicated to investigate the evolutionary and ethological foundations of dog-human relationship,” (Family Dog Project, 2009). Much of the following information comes from their research team. They explain their theoretical positions on their Family Dog Project (2009) internet site, indicating their attention to evolutionary and mechanistic processes that allows them to approach their investigations from an experimental design:

Due to their domestication the dog became one of the most successful mammals in the last 20-40.000 years of biological evolution. Compared to its living ancestor the wolf, dogs are now more wide-spread on the Earth and live in far greater number. This achievement can be very likely attributed to the fact that the dog has joined to live in the human niche which allowed him access to new resources of food and protection.

However this change in the evolution of the dog could have not been achieved without changes in the behaviour that made it able to adapt to the human social environment.

Sharing their environment dogs interact with the humans in many ways and living in such a complex social environment is cognitively challenging. It is widely accepted that the adaptational demands of the highly organized social life have led to special socio-cognitive abilities in dogs.

Statements such as “[i]nstead of reporting a list of anecdotes researchers need to find well controlled methods to reveal the cognitive mechanisms that may operate in the dogs’ mind,” and

“[d]espite the increased interest, at present there is neither standard methodology nor standard terminology in dog personality studies, therefore we had to work out our own methodology,” further explain their critique of the existing literature and commitment towards building a stronger body of scientific research to reference and build upon (Family Dog Project, 2009).

Additionally, negative effects of companion animals are largely uninvestigated. Chur-Hansen et al. (2010) highlight half a dozen recent studies producing results with negative outcomes. Archer (1997) brings a critical eye to the relationship between dogs and humans through an evolutionary perspective. Archer (1997) asks why humans maintain such relationships, when in theory today’s relationships provide no benefits toward survival, and divert the human's resources away from survival and reproductive purposes, or fitness, which is understood as the purpose of all actions from an evolutionary perspective. Archer (1997) hypothesizes that dogs have evolved to manipulate people into caring for them, actually engaging infantilizing behavior, and providing an opportunity for anthropomorphic projection. "These mechanisms can, in some circumstances, cause pet owners to derive more satisfaction from their pet relationship than those with humans, because they supply a type of unconditional relationship that is usually absent from those with other human beings," (Archer, 1997, pg 237).

Beverland, Farrelly, and Ching Lim (2008) propose that "[d]esire for status or control" may encourage some people to purchase "designer pets," and theorize such behavior as "the dark side of pet ownership." Carrying from a different field, Ahuvia, Batra, and Bagozzi (2009) talk of the "love of things," considering how the purchases and ownership of objects becomes a central mechanism for internal representations of the self, which could be translated to this topic

from both respects of dog ownership, as well as the recent increased commoditization of dogs and accessories for them.

Communication

Communication is a fundamental process among living things. It is an essential component of cooperative behavior. As with any long standing relationship, the specifics of interactions are many and complex. The dog-human relationship has grown over many years and likely contains subtlety and detail within its communications that allows both parties to express and receive much information, an especially promising concept when properly understood and approached practically. Following are three content areas explored within the research of how dogs and humans communicate: acoustic, visual and social cognition.

Visual communication. Although humans have five senses, they seem to rely primarily on sight and sound above the remaining three of taste, touch and smell. Sight is often referred to as taking the leading role, with common statements such as “I have to see it to believe it,” or “I’m a visual learner.” Indeed, the structure of the human eye is so complex, Darwin initially considered its existence could not be explained by evolution alone, and was potentially the sole development in life which provided evidence to discount his theory (Ellis, 2010). Information is not only gathered from inanimate matter or passive methods, but people have developed complex methods of actively communicating information visually, in everything from the complex system of both facial and body language, to the written word, to art. There are multiple methods of visual communication that have been explored within human-dog interactions. Also, some visual communications are also considered social cognitive abilities. The social cognition form of communication overlaps with visual communication, in that the processes involves a dog seeing a cue within a social context of a human companion. A distinction is made between the two

categories of responding to a visual cue of seeing food within a container and seeing a human point to food within a container, to emphasize the level of connection and developed cooperation between humans and dogs.

One large area of investigation has been of visual pointing gestures from humans to animals. One of the more well known studies involving interaction of other animals and human gesturing is the study of the horse Clever Hans. Clever Hans was presented with complex information, such as arithmetic or German language tasks, and was thought to be able to understand and answer questions posed to him. A panel of thirteen interdisciplinary experts intervened to determine the validity of these claims. It was discovered that Clever Hans was simply observant of subtle gestures from his entirely unaware owner that would cue him to answer correctly with the stomp of his hoof.

Since this study was such a striking example of flawed ‘cause and effect’ interpretation, studies have attempted to be careful with their implementation and interpretation. Though there can still be difficulty with both, and interpretation of cause and effect remains controversial (Miklosi and Soprin, 2006). Miklósi, Polgárdi, Topál and Csányi (1998) conducted one of the first experiments with dogs and human pointing gestures. Miklosi et al.’s (1998) results found evidence that dogs “utilize pointing, bowing, nodding, headturning and glancing gestures of humans as cues for finding hidden food. Dogs were also able to generalize from one person (owner) to another familiar person (experimenter) in using the same gestures as cues.” A beginning concern of this study was to determine whether dogs were learning to use the signal during these testings, as discriminative learning, or whether dogs have learned over an extended period of time the meaning of the signal, as communication. Communication would indicate “extensive experience gained through earlier communicatory interactions with companions,”

(Miklosi et al., 1998, p. 119). Miklosi et al. (1998) suggest their findings support communication, citing earlier works demonstrating discriminative learning with trials of pointing gestures being three times or more as close to the object as in their trial, and that:

in contrast to all other previous studies, the cue was no longer being presented when the dog began its approach to one of the baited containers, and therefore the gestural cue could not be used as a discriminative stimulus during approach. (p.119)

Miklosi et al. (1998) also had a mixture of learning processes revealed within the study, as glancing was something that each dog began unable to utilize, but learned by the end of the trials. This left the researchers wondering whether dogs not only utilize the gestures themselves, but if they also have “some understanding of the attention and/or mental states of others” underlying the gesture (Miklosi et al., 1998).

In response to a study comparing chimpanzees and infants’ abilities to use human gesturing, Soproni, Miklósi, Topál, Csányi, (2001) again tested dogs’ use of gesturing, to rate their level of skill compared with chimpanzees and infants. Soproni et al.’s (2001) findings suggest:

It seems that dogs, like children, interpret the test situation as being a form of communication. The hypothesis is that this similarity is attributable to the social experience and acquired social routines in dogs because they spend more time in close contact with humans than apes do, and as a result dogs are probably more experienced in the recognition of human gestures. (p. 122)

Soproni et al. (2001) conclude that the “adequate responses given by the dogs to human gestures may reflect both evolutionary preadaptation to the human environment and the individuals’

extensive experiences in interpreting human signs,” (p. 125-126) supporting the fulfillment of parameters set discussed in Miklosi et al.’s (1998) initial study.

Another experiment tested dogs’ ability to see or smell rewards against human gesturing, in order to further support for gesturing as communication. Dogs responded to smell and sight of rewards alone, but also responded to pointing at an incorrect choice when coupled with the visual or olfactory cues (Szetei, Miklósi Topál, and Csányi, 2003). Dogs chose the correct choice more often when people pointed to the incorrect choice when they saw the reward placed than when they only were able to smell where the reward was placed (Szetei et al. 2003). Szetei et al.’s (2003) results maintained support for visual communication with dogs:

These results give further support for the hypothesis that dogs regard the pointing gesture as being a communicative act about the placing of the food, but they do not rely on this gesture blindly and they can modify their behavior based on visual experience related directly to the hiding of the food. Further, contrary to general expectations dogs rely in this situation, only to some degree on olfactory cues.

To further distill the concept that this interaction is pronounced within the dog-human relationship due to their extended interactions, Miklósi et al. (2003) now compared dog abilities to wolf abilities. If all within their species did not command the same abilities, then these special skills cannot be attributed to genetics within the species overall, but may be attributable to the genetic changes through domestication. Next, they would need to control for socialization by rearing both wolf and domestic dog pups in the same manner. Miklosi et al. (2003) took two groups of canines, of domestic dogs and wolves, to see how each would respond to human gesturing, or lack thereof. Miklosi et al. (2003) found that socialized wolves were able to respond

to human gesturing, but reasoned that this could be “explained by simple associative learning that was attenuated by previous experience with humans; that is wolves had many opportunities to learn that the human hand is often associated (e.g., at feeding occasions) with the presence of food.” Therefore, they assembled a task that would require the canines to not only access a simple association, hand equals food, but understand more complexly that they could approach the human for communication of answers to a task, aside from one simple associated visual. In asking dogs to perform an unsolvable task, dogs looked back at humans for assistance, the same amount that wolves did not (Miklosi et al., 2003). Miklos et al. (2003) proposed:

Based on these observations, we suggest that the key difference between dog and wolf behavior is the dogs’ ability to look at the human’s face. Since looking behavior has an important function in initializing and maintaining communicative interaction in human communication systems, we suppose that by positive feedback systems (both evolutionary and ontogenetically), the readiness of dogs to look at the human face has led to complex forms of dog-human communication that cannot be achieved in wolves even after extended socialization. (p. 763)

Similarly, in the unprecedented study from Novosibirsk, Siberia, where foxes have been bred in captivity for over 45 years, researchers found that those foxes which were selected for their tameness and fearlessness, as likely would have been the artificial selective pressures during early domestication, showed increased abilities to understand human gestures (Hare et al., 2005).

Hare et al. (2005) describe some results from this research:

We show here that fox kits from an experimental population selectively bred over 45 years to approach humans fearlessly and nonaggressively (i.e., experimental

domesticated), are not only as skillful as dog puppies in using human gestures but are also more skilled than fox kits from a second, control population not bred for the tame behavior (critically, neither population was ever bred or tested for their ability to use human gestures). (p. 226)

It appears that dogs are able to differentiate human commands. In their study, Virányi, Topál, Gácsi, Miklósi and Csányi (2004) went on to investigate whether dogs are aware of where humans are focusing their attention. In testing whether dogs would either follow a command or pursue food among an array of scenarios with different human attentional gazes, dogs fared better when humans' attention was focused on them instead of something else or nothing at all, although "dogs showed intermediate performance when the Instructor was orienting into 'empty space' during the re-played verbal commands. This suggests that dogs are able to differentiate the focus of human attention," (Viryani et al., 2004, p. 161).

A further refinement of this concept was undertaken by observing different groups of dogs who have either phenotypic advantageous skeletal structure or behaviors than other dogs to humans' attention. Gácsi, McGreevy, Kara and Miklósi (2009) found that from dogs bred to work in sight of humans, dogs that work out of sight of humans, "mongrels," and dogs bred to either have better facial structure to increase visual acuity, that there were significant differences given the phenotypic advantages. Gacsi et al. (2009) suggest:

After controlling for environmental factors, we have provided evidence that at least two independent phenotypic traits with certain genetic variability affect the ability of dogs to rely on human visual cues. This finding should caution researchers against making simple

generalizations about the effects of domestication and on dog-wolf differences in the utilization of human visual signals. (p. 31)

Researchers have also begun tracking the very eye movements of dogs to interpret their attention and awareness. Guo, Meints, Hall, C., Hall, S. and Mills (2009) took left gaze bias, the known tendency of adult humans when looking at an upright human face to first look towards the right side of someone's face and then look across towards the left side of their face, and investigated this activity in dogs. To do so, Guo et al. (2009) also measured and compared this activity in infants and rhesus monkeys, as well as dogs. Guo et al. found that infants practice this same eye movement, but also towards different objects, different species, and when they are positioned in different orientations, indicating that this tendency may be innate, with adaptations towards throughout the lifespan. Rhesus monkeys gazed left towards human and monkey faces, while dogs did so for humans only, excluding dog or monkey faces or objects (Guo et al., 2009). Guo et al. (2009) discuss:

The ability to extract information from human faces and respond appropriately could have had a selective advantage during the process of domestication, especially as the emotional content of these faces may be of immediate adaptive behavioural significance. Indeed, recent studies have shown that the owner's right hemiface (left hemiface from viewer's perspective) can express a range of emotional expressions more accurately, and more importantly, can express specifically the negative expression of, evoked anger, more intensely . . . As the LGB directs the viewer's attention to this side of face image, it could help the viewer detect and recognize biologically important information more quickly and precisely in faces of functional significance. (p. 415)

Some of the authors from the previous study went on to examine whether dogs could differentiate between pictures from different objects and human and dog faces. Dogs were found to gaze longer at newly introduced (instead of repeated) pictures of human faces and objects, but gazed longer at repeated pictures of dog faces (Racca et al., 2009). Racca et al. (2009) proposed multiple ideas for implications, requiring further study to confirm:

A possible explanation of our results could . . . be that dog faces are more complex than human faces to encode for dog observers . . . In our study, the first stimulus presented in the familiarisation phase and the familiar stimulus presented in the test phase were not identical (same face/object but different picture) in order to avoid a discrimination based simply on contrast/brightness similarities. Thus, it could be possible that dogs detected the difference between the first and the familiar stimulus for dog faces but not for human faces. Finally, the discrepancy of dog preferences between dog and human faces could also correspond to a different social response towards conspecifics versus humans in dogs or to differential exposure to conspecifics and humans. (p. 531).

Acoustic communication. It would probably be difficult to discern whether people rely more heavily on sight or sound. Similar to the complexity of the eye, human language is immensely complex. Some psychological theories even purport that language has become maladaptive: “knowledge can be both nonverbal and verbal, but the kind that creates such difficulties (and wonders) is based on human language,” though this is meant to include any “symbolic activity,” both visual and auditory, (Hayes, Strosahl & Wilson, 1999, p. 10). This theory suggests that the process of meaning and information being conveyed symbolically has evolved to such an extent that people operate based on their internal thought processes alone, and

no longer refer to the external world to inform their experiences (Hayes et al., 1999). Although this idea includes auditory and visual symbolic communication of information, people seem to rely heavily on auditory communication. Within the therapeutic field, talking is the heavily favored form of communication, though not the sole communicative activity. Both auditory communication and language seem ubiquitous processes among people, and understanding how this process is developing between dogs and humans may potentially assist each party in more effective communication and understanding within the household and therapeutic treatment, as well as demonstrate to what extent the relationship has already developed.

Before exploring human-dog interactive communication, some general distinctions have been observed in dog barking communication characteristics among dogs themselves, although they have not been studied with scientific rigor (Pongracz, Molnar, Miklosi, 2010). For instance, “some breeds do not (or only rarely) show any propensity to bark (for example, the Basenji, Chow–chow, Shar-pei), whereas others bark excessively,” (Pongracz et al., 2010, p. 143). Pongracz et al. (2010) recognize how within breed descriptions, it is common for barking characteristics to be described, while some breeds have likely been bred for specific barking patterns, such as those used for hunting:

The importance of characteristic forms of barking is even mentioned in some dog breed standards. For example, the official Fédération Cynologique Internationale (FCI) breed standards state for the Transylvanian Hound (FCI241): ‘when he finds a fresh scent, he yaps with a whining sound; during the hunt giving tongue to the scent, his barking is resounding, high pitched and ringin’. (p. 143)

Although such statements have not been produced through controlled, experimental observation, these results would seem similar to the large body of anecdotal qualitative data found within most of the human-dog interaction literature, based on many years of intimate interactions.

Pongrácz, Molnár, Miklósi, Csányi, (2005) theorize from an evolutionary perspective on what conditions would have made it favorable, or allowed for increased fitness, for communication to begin between humans and dogs:

We think that there are at least two key conditions that changed dog barking to an effective communicative signal between dog and human: First, domestication processes have resulted in dogs that are more dependent on humans, making them more human oriented (Miklósi et al., 2003; Miklósi, Topál, & Csányi, 2004). Second, humans have selected for dogs that bark reliably and in accordance to certain behavioral and emotional situations. (p. 144)

The first task at hand in exploring auditory communication between humans and dogs from a controlled, experimental method would be to find evidence to suggest that there is in fact purposeful messages being sent, received, and eliciting a response. Starting with dogs and barking, this could be measured in one of two ways: either by identifying consistency of barking across different contexts, or by measuring responses of the receiver (Pongracz et al., 2010).

Dog barks have been found to be situation specific (Yin, 2002; Pongrácz et al., 2005; Pongracz et al., 2010). Yin (2002) found that domestic dog barks did vary within different contexts. Between three situations, of disturbance, play or isolation, dogs' barks varied on acoustic measures, across six different breeds and developmental environments (Yin, 2002). Different dogs barked the same at different situations. Additionally, research has found evidence

that different species communicate in the same way sometimes, with dogs following these recognized patterns, lending support to evidence of meaningful communication. Yin (2002) compares the findings from her study with other studies which attempted to generalize communication patterns across species:

These changes in mean frequency and duration with context are consistent with Morton's motivation-structural rules, which state that birds and mammals use harsh, low-frequency sounds in hostile situations and higher frequency, more tonal sounds when they are approaching in a friendly or appeasing manner (Owings & Morton, 1998). The results are also consistent with McConnell's (1990) findings that short, rapidly repeated sounds correlate with increased motor activity . . . Overall, the differences indicate that the acoustic structure of barks does vary predictably with context. (p. 192)

Yin's (2002) findings of acoustic variations within different context scenarios (friendly, hostile, etc.) matched both a standardized measurement of general variations across different species of vocal messaging frequency from Owings & Morton (1998), and varying rates and speeds of vocalizations from McConnell (1990) (as cited in Yin, 2002).

The acoustic distinctions measured between barks within different contexts have so far been found to follow a pattern of lower frequency barks for hostile situations and higher frequency barks for other situations, including friendly or isolative (Pongracz et al., 2010).

Pongracz et al. 2010 explains:

A comparison of data from Yin (2002) and Pongrácz et al. (2005) shows some striking similarities (Tables 2a and b). Although the contexts of recording and the analysed parameters differ to some extent, it is noticeable that in both studies dogs from various

breeds used the lower frequencies when a stranger arrived at the house, and emitted high pitched barks when left alone. Similarly, both studies showed that the duration of single barks was longest when a stranger arrived at the house where the dog lived. These similar results from two independent investigations indicate that dog barking has reliable acoustic features that are specific to particular contexts or inner states. (p.145)

A computer was also used to attempt recognition of different dogs barking the same at different situations, potentially decreasing subjective bias and increasing validity of communicative pattern findings (Molnár et al., 2008). Based on a bank of recorded barks from different individuals within a single breed, computer software was able to differentiate newly recorded barks occurring in different situations, as well as which individuals they were coming from (Molnar et al., 2008). Though not of direct relevance to human-dog relationships, there has been little to no investigation into intra-species (dog-dog) communication (Pongracz et al., 2010).

The next step in the process would be to identify activity at the other end of the communication signal. A few studies have attempted to further investigations of communication by measuring the receiver's responses to messages sent by dogs: what do people hear? Pongracz et al. (2005) found evidence supporting human ability to interpret distinct messages from dog barking. Dog barks were recorded from one breed, among six different scenarios replicating different emotional states, such as hostile or friendly. Across three different human groups listening to the prerecorded barks from these different scenarios, those who owned the same breed dog, those who owned a different breed dog, or those who had never owned a dog, people were able to identify the emotional state of barks similarly across all groups, regardless of their

prior experience, as well as identify the corresponding context scenario of barks “high above chance level,” Pongracz et al., 2005). Pongracz et al. (2005) concluded:

Our results from the two experiments showed that (a) independent from their previous experiences with dogs, human listeners scored the emotional content of barks in similar manner and accuracy; and (b) the emotional ratings were in accordance with expectations knowing how the specific situations could affect the emotions of dogs (i.e., vocalizations of dogs attacking a stranger in the garden or performing schutzhund training were given high scores of aggressiveness, or the vocalizations of dogs left alone and tied to a tree were given high scores of despair). Further, we found evidence that (c) the emotional content as judged by humans correlates with particular acoustic parameters of a given bark, but (d) we did not find a major difference in the accuracy of categorization between the performance of the listeners on the basis of their previous experiences with dogs; (e) human listeners categorized more accurately those situations for which they found the emotional content less ambiguous (stranger, schutzhund, alone, and play), but (f) listeners could categorize over the chance level the majority of the barking situations on the basis of listening only to the vocalizations. (p. 142).

There have been few studies exploring this interaction. Pongracz, Molnar and Miklosi (2006) conducted an additional study, similar to the one above, but focused more on the acoustic parameters of dog barking, by creating artificial barks electronically. They combined concepts from the previous studies mentioned of Yin (2002) and Molnar et al. (2008), where barks were measured for their acoustic qualities to identify if dog barks matched patterns of acoustic signaling known in other species, which correspond to certain context scenarios and emotional

states, and included here people's identification of them, similar to their previous study. They also had similar results to their previous study:

We found that humans with different levels of experience with dogs described the emotional content of the bark sequences quite similarly, and the extent of previous experience with the given breed (Mudi), or with dogs in general, did not cause characteristic differences in the emotionality scores . . . These findings show that dog barks function as predicted by the structural–motivational rules developed for acoustic signals in other species, suggesting that dog barks may present a functional system for communication at least in the dog–human relationship. In sum it seems that many types of different emotions can be expressed with the variation of at least three acoustic parameters. (p. 228-229)

Molnár, Pongrácz, Dóka, Miklósi (2006) went on to investigate whether humans were able to identify individual dogs from their barks. Owren and Randall (2003) found in studies with other species that some vocalizations are easier to identify individuals with than others, owing the difference to “pure tonal (less noisy) sounds provide more cues for vocal tract filtration (and therefore individual discrimination) compared to atonal, more noisy sounds (like dog barks),” (as cited in Molnar et al., 2006). Molnar et al. (2006) wanted to determine if dog barks were too “chaotic” to differentiate individuals. Their findings were in agreement with the previous study; people were unable to reliably identify individual dogs through their barks (Molnar et al., 2006). Though there was one parameter Molnar et al. (2006) found which helped:

Discrimination between individuals was more successful when listeners were listening to low harmonic-to-noise ratio (HNR) barks. The contexts in which barks were recorded

affected significantly the listeners' performances: if the dog barked at a stranger, listeners were able to discriminate the vocalizations better than if they were listening to sounds recorded when the dog was separated from its owner. (p. 76)

They further concluded: “[i]t is rendered probable that the bark might be a more efficient communication system between humans and dogs for communicating the motivational state of an animal than for discrimination among strange individuals,” (Molnar et al., 2006, p. 76).

Most recently, Molnar et al. (unpublished data) began exploring identification of barks with younger children (as cited in Pongracz et al., 2010). Pongracz et al. (2010) reference this study, discussing findings that:

children as young as 5- years-old show some ability to categorise the three most basic types of dog barks (aggressive, fearful, playful) and can associate them with the expected inner states. The children's responses reach the level found in adults by the age of 8 years. (p. 145)

Another publication in progress investigates the ability of dogs to understand human language based on the change in inflection which usually accompanies human conversation towards dogs. This is the same concept as parentese, commonly exhibited with infants. Horowitz (2009) makes reference to this subject in her book *Inside of a Dog: What Dogs See, Smell and Know*. “Dogs, too, respond with alacrity to baby talk—partially because it distinguishes speech that is directed at them from the rest of the continuous yammering,” (Horowitz, 2009).

Personalities

Understanding how dogs may respond to particular characteristics of humans, including demographics or behavioral patterns, can better inform what dogs may work well with each

human or setting, or understand the relationship which exists within any given pair or context. There are trends that have been identified between demographics and character traits of both people and dogs within particular relationships (Kubinyi, Turcsan & Miklosi, 2009; Kotrschal, Schöberl, Bauer, Thibeaut & Wedl, 2009, Wan, Kubinyi, Miklósi, Champagne, 2009). Some examples of demographics which have been studied include age, sex, and personality characteristics and behaviors of both people and dogs, as well as neutered status and training experiences of dogs, and household information, education, and time spent with dogs for people.

In two studies, dog and owner characteristics and personality traits were compared. In a standout study, Kubinyi et al. (2009) surveyed over 14,000 German speaking dog owners, with two questionnaires, one of demographics of themselves and their dog, and one of personality characteristics of their dog. Of a twenty four item scale with descriptors for dog behavior, Kubinyi et al. (2009) were able to identify four primary personality traits: calmness, trainability, dog sociability and boldness. They validated these findings with an earlier study by Jones and Gosling (2005) who had similar results (as cited in Kubinyi et al., 2009). From these results and others, there is support for a few general findings: Younger dogs are less calm; Neutered dogs are less calm (nervous, though not bold); Dogs with more daily human interactions are more calm; Owners with more experience have dogs that are more calm, and dogs with more training are more calm (Kubinyi et al., 2009; Bennet and Rohlf, 2007). Dogs who train better had similar influences: Younger dogs, those who had more training, and those with more daily interactions were more trainable (Kubyini et al., 2009; Bennet and Rohlf, 2007; Kobelt, Hemsworth, Barnett, Coleman, 2003). Dogs are more sociable when they are younger, have more daily interaction, have less people in the household, and are female (Kubyini et al., 2009; Bennet and Rohlf,

2007). Dogs are most bold when they are young, and male (Kubyini et al., 2009; Bennet and Rohlf, 2007).

This study was then followed by an additional study, which compared owner reports of German Shepherds from Hungary with owner reports from the U.S.A. about their “dog-keeping practices” and their dog’s behavior (Wan et al., 2009). Wan et al. (2009) had both differential and mixed results:

Owners from the USA were more likely to keep their dogs indoors during the day . . . and at night . . . to report that their dogs were kept as pets . . . and to engage their dogs in a greater number of training varieties . . . Owners from the USA rated their dogs more highly than owners from Hungary on the confidence . . . and aggressiveness scales. (p.206).

There were no differences found with how much time owners spent with their dog each day, how old dogs were when gotten, or how many dogs they had previously, signifying experience (Wan et al., 2009).

Kotrschal et al. (2009) surveyed, videoed and tested saliva for people with male dogs, and found that there are differences with people’s interactions with dogs and their sex, as well as their behavioral characteristics:

Owners who scored highly in neuroticism . . . viewed their dogs as social supporters and spent much time with them. Their dogs had low baseline cortisol levels, but such dyads were less successful in the operational task. Owners who scored highly in extroversion . . . appreciated shared activities with their dogs which had relatively high baseline cortisol

values. Dogs that had female owners were less sociable–active . . . than dogs that had male owners. (p. 383).

This study was then followed by another to investigate if there were either human or dog behavioral characteristics correlated with how long a dog would stray from their owner. Dogs stayed closer to people who scored higher on a neuroticism scale, and dogs who scored highest on “vocal and aggressive” scale stayed away the most (Wedl, Schöberl, Bauer, Day & Kotrschal, 2010). They found similar results with gender, where dogs approached female owners less often than males (Wedl et al., 2010).

There is also research investigating genetic basis of phenotypic personality behaviors, including activity and impulsivity (Hejjas et al. 2007a), attention deficit (Hejjas et al., 2007b), and social impulsivity (Hejjas et al., 2009). This information can be helpful not only to inform interactions of humans with dog behavior, with implications for both household and treatment provision, but also with research into human personality traits and psychiatric disorders.

Attachment

Attachment behaviors, similar to much of the human-dog interaction literature, have been studied primarily anecdotally. There has also been multiple attempts to study such behaviors experimentally. Some stem straight from Mary Ainsworth’s Strange Situation itself. Overall, findings strongly support evidence that attachment exists at different levels between dogs and humans (Serpell, 1996; Topal et al., 1998; Prato-Previde, 2003)).

Before reviewing attachment through experimental procedures, there is an investigation into artificial selection that has an interesting contribution to attachment processes. Dog breeding has occurred for centuries, and a variety of different physical and behavioral traits have been

selected for intentionally to create dogs for different human purposes. Less is known about characteristics that may have been selected for in the initial domestication process. From the extraordinary study with foxes bred in captivity over 45 years, there is evidence to support that one of the initial traits selected for during the domestication process was tameness, and that this tameness was exhibited through juvenile traits (Trut, Plyusnina, & Oskina, 2004). Trut et al., (2004) explain these implications:

Our data showed that genetic reorganization of fox behavior toward tameness resulted from a later postnatal development of fear response to alien stimuli. This response is the upper limit of the sensitive period of socialization. In other words, selection for domestication involves primarily genetic systems affecting rates of behavioral development. (p. 652).

Young dogs are less fearful, more tame, and therefore, young, juvenile traits would be favored. Attachment bonds are formed during early development, so selection for persistence of traits exhibited in early development of dogs would have important implications for attachment processes.

Experimental procedures replicating the Strange Situation were successful in producing behaviors resembling attachment processes laid out in the aforementioned experiment and ensuing theory. Topál et al. (1998) found dogs exhibited behaviors with it's owner analogous to a secure base, and "could be categorized along the secure-insecure attached dimensions of Ainsworth's original test" (p. 219). Topal et al. (1998) further explained:

The observed attachment behavior of adult dogs toward owners is presumably the result of 10,000 years of domestication. During this time, dogs' dependency was increased by

artificial selection, and thus long-lasting, caregiver-receiver relations between humans and dogs could be formed by way of socialization during an individual's life. Another possible explanation for the attachment behavior could be a tendency on the part of human breeders to select dogs that behave in social situations similarly to humans, especially children. The result of such a process is the domesticated dog that simulates many human (infant) behavior patterns such as attachment.

Gácsi, Topál, Miklósi, Dóka, and Csányi (2001) replicated this study within a rescue shelter, with dogs at increased risk for concerns with attachment processes. Within a relatively short period of time of some dogs becoming familiar with some people and other dogs remaining unfamiliar, dogs who had become familiar with people when later approached by both familiar and unfamiliar people exhibited attachment behavior such as contact seeking with familiar people and less contact with unfamiliar people (Gacsi et al., 2001). The specific response of the handled dogs toward the handler fulfilled the operational criteria of attachment. In shelter conditions, the remarkable demand for social contact with humans may result in rather fast forming of attachment even in adult dogs,” (Gacsi et al., 2001, p. 423).

Topal et al. (2005) then conducted this study with dog pups and wolf pups that were raised from birth by human hand, and dog pups that were raised by their mother, to determine if differences were environmental or genetic. As expected, when tested at four months old, the hand raised and mother raised pups were more responsive to the familiar person than the wolf pups were (Topal et al. 2005). Topal et al. (2005) elaborate on the observed behaviors:

This suggests that the attachment behaviour system is activated upon separation from the owner but not the stranger (standing by the door upon separation and following the owner

leaving the enclosure), and upon reunion with the owner (increased proximity and contact seeking). This characteristic selective responsiveness to the owner supports the view that both adult dogs and puppies show the same patterns of attachment towards their owners (p. 1372). . . Regarding the evolutionary emergence of dog–human attachment our results suggest a significant effect of domestication in the form of species-specific differences between wolves and dogs. The comparative analysis of the subjects’ behaviour towards human participants in the experimental situation shows that, even after extensive socialization, wolves do not show patterns of attachment to humans comparable to those observed in pet dogs of different rearing conditions. (p. 1373)

Wedl et al. (2010) conducted a study with an element of the Strange Situation, testing proximity of dog to owner, though did not replicate it fully. Wedl et al. (2010) had multiple findings within their study:

We found that the dog approached the owner more often when the owner considered it as being a social supporter. In contrast, owners who considered their dog as being a partner and companion seemed to support independent behavior in the dog. In fact, their dogs were less orientated towards them and approached them less often . . . Dogs which frequently approach their owners may be insecurely attached. However, it could also be argued that independent behaviour may suggest a secure attachment (Ainsworth, 1969; Topál et al., 1998). When owners considered their dog as being a partner for shared activities, their dog approached them less often and spent less time in proximity to them. This could be suggestive of secure attachment, but further work would be required to fully substantiate this assertion. Owner personality may affect owner behaviour in a way

that either supports or inhibits social attraction in dogs. For example, owners scoring high on neuroticism may mainly regard their dogs as being a social supporter (Kotrschal et al., 2009) and thus, will frequently interact with them and reinforce spatial closeness with their dogs. (p. 498)

The combined evidence above points to, from only a single perspective of cognitive, behavioral and evolutionary theory, an abundance of support for attachment processes in humans with dogs, through observed experimentation.

Chapter V

Discussion

How Cognitive, Behavioral and Evolutionary Research Informs the Therapeutic Research on Dog-Human Interactions

As suggested throughout, the findings from the research on therapeutic qualities and benefits from human interaction with companion animals to date seems, at best, to show a promising opportunity to examine causal and mechanistic findings. Research to date appears to sometimes be wishful and biased work that some seem to think produces less than vigorous results. Some researchers have criticized the methodological flaws (Wilson, 2006; Walsh, 2009, Chur-Hansen et al., 2010; Serpell, 1991) that, following this review, are hard to refute or ignore.

The existing dog/human research appears to be fraught with limitations that. Sometimes this is due to a lack of appropriately developed controlled, experimental design, and other times findings are exaggerated. Hart (2006) reviewed a study exploring decreased depression levels from companion animal interaction among the elderly who had lost a spouse, commenting that people who keep companion animals may be demonstrating an increased capacity to care for themselves better. By recognizing the beneficial effects of dog companionship, and demonstrating proactive behaviors by obtaining a companion animal to assist them in maintaining better health, these people may be proactive about maintaining a certain quality of health in many aspects of their lives, or be more resilient, independent of their interactions with dogs. And ultimately, they may be able to report lower levels of depression. This criticism

would suggest a cautionary representation of results as an anecdotal study, and would call for a controlled, rigorous trial to determine causation.

Other results have been marginal, and may potentially be exaggerated in their significance. Hoerster et al. (2011) attempted to investigate whether increases to physical activity were associated with a living with a dog, and whether people were meeting standardized guidelines for maintaining a certain quality of health. Dogs were associated with providing a statistically significant amount of more people with meeting physical activity guidelines, though when the percentages of people who were exercising at recommended levels are compared, 64% with dogs to 55% without dogs, does not appear to be a particularly large difference.

Others have found similarly seemingly marginal results. Lail et al. (2011) found that dog walking not only provided an incentive for physical activity, but that it was sustained throughout the year, across weather variations of different seasons in Australia, even in inclement weather. But when looking at the results, it was unclear whether this was asserting that 30 minute exercises were occurring daily, or only that they lasted 30 minutes when they did occur, though weekly averages did run above 210 minutes weekly (30 minutes/day x 7 days), at 213 min/week in the summer, and actually increasing to 253 min/week during the winter (as well as recording decreased activity levels with non owners during the winter). And though Lail et al.'s (2011) study was longitudinal, without it being a controlled experiment, they were still unable to determine what would have made for the increase in walking in winter months. They postulated that people could spend more time engaged in recreational activities instead of walking during the summer, or that people may let their dogs loose in the yard instead of walking during the summer (Lail et al., 2011).

Other studies have come up with marginal results from the beginning. Salmon et al. (2010) observed interaction with dogs and their impacts on physical activity within the family household, to determine individually or together what benefits might exist. Salmon et al. (2010) observed:

In this study, however, dog ownership was associated only with additional physical activity among mothers, while dog walking as a family was positively associated with physical activity among both mothers and fathers and with meeting physical activity guidelines among mothers. (p. 269)

Taken together, with almost half of children not walking their dog at all, and increases not consistently meeting standard activity guidelines, these results seem reminiscent of Cutt et al.'s (2008) criticisms mentioned above that the supportive evidence for correlations to increased physical activity was lacking. The general findings were only half of dogs owners were physically active with their dogs, and it was still unclear if this was at recommended levels of exercise.

Other studies have found confounding results, and have been critical of unreliable claims. Parker et al. (2009) found that "pet owners were more likely to experience a death or readmission following their hospitalization, after controlling for key psychosocial and medical covariates," (p. 65), and criticized Freidmann's founding studies, saying initial claims were later unsupported within the results, and that associations were more context specific than suggested. These seemingly delicate results, only showing significance when compartmentalized among particular pets or circumstances, or trending towards and finding significance for increased risk of death at times, seems to be another example of the potentially precarious research considered acceptable, frequently understood as "common knowledge" currently.

The same methodological concerns arise among the research investigating psychological processes within companion animal interactions. Often anecdotal, the reliability of the results is cautionary, and therefore the ability to generalize the results to broader populations is similarly questionable. Prato-Previde et al. (2003) conducted a controlled experimental procedure, but obtained cautionary results nonetheless for attachment processes. They attempted to replicate Ainsworth's original Strange Situation. "Our results clearly indicate that the dog-human relationship is an affectional bond, but our evidence that it conforms to an attachment is not entirely conclusive," (Prato-Previde et al., 2003, p. 251). Prato-Previde et al. (2003) even caution against other's studies, when others will not:

the conclusions drawn in the previous study by Topal *et al.* were premature and . . .
further research is needed to gain a better understanding of the nature of the dog-human bond and to test specifically for secure base effects. (p. 251)

Other studies did not seek to replicate Ainsworth's experiment exactly, and have asserted supporting evidence for attachment processes in different contexts (Kurdek, 2009; Kwong, 2010, Endenburg, 1995). Others found only marginal results or when compartmentalizing contexts, such as finding increased attachment among women, and with no children within the house (Ramon et al., 2010). Staats et al. (2006) found people spent much time within arm's length of their companion animals, only a portion of how attachment is measured, but no associations between this one component of proximity and of self reported health status, as well as finding marginal results among particular contexts (male, proximity, quality of work life).

Though when considering investigation of attachment processes, it may be useful to remember the culturally bound nature of the original theory to interpret the inconclusive results. One example that is often referenced is the difference in attachment processes between the U.S.

and Japan. In observing attachment processes in Japan as they are understood from the U.S., people from the U.S. might conclude that children are overly attached to their parents. Might it be that there is a different attachment process occurring between humans and dogs? And that people probably won't find the human-human attachment processes working there, but people may find some other unique process happening. Or, perhaps this is a process which is just beginning to be shared in depth between humans and dogs, and has potential, but is not yet fully formed.

Other investigations have looked at associations among different mental health concerns, beginning by attempting to identify vulnerable populations that may have an increased likelihood for turning to companion animal interaction, regardless of determining the effects of such interactions. Brown and Katcher (2001) found correlations between people experiencing dissasociative symptoms and their attachment to companion animals. These findings bring to light one particular instance in which certain mental health experiences result in increased attachment to animals. It is unlikely that this would be an isolated instance: more likely, there is a broad range of mental health risks that would make people likely to turn to companion animals for comfort.

It is even more difficult to conduct controlled experimental procedures for psychological processes occurring among humans and dogs than it is for physiological interactions, and so not surprisingly, the results among psychological observations seems similarly inconclusive. As a result the current evidence seems split, at times showing support and at other times finding flaws within the research, finding no support, or finding support to the contrary.

The work found within practice would seem to be an accurate representation of the mixed consensus found in the literature. Some believe Animal Assisted Activities are effective in some

treatments, others disagree (Katcher & Teumer, 2006). There is also variation among how people believe animals are effective in treatment (Born, 2008; Wilkes, 2009). Most people don't include animals in their interventions, or even in their assessments, and almost all who don't utilize Animal Assisted Interventions (AAI) report no training (Risley-Curtis, 2010). More potentially problematic is that of those who do attempt AAI, the majority here also do not have training to do so (Risley-Curtis, 2010). It seems reasonable to understand that the world of practice would be a reflection of the uncertain results within the scientific field of what the effects are of these interactions.

For all of the confusion which has surrounded the anecdotal and cross-sectional research, which makes up most of the therapeutic companion animal interaction literature, ethologists, through the use of cognitive, behavioral and evolutionary theories, have tried to re-orient methods to provide reliable, generalizable results from controlled, experimental procedures.

People have declared for years that they have a special connection with their dogs, and that their dogs talk to them and communicate with them. The cognitive research has now provided controlled experimental findings to support the presence of communication between the species. This indicates both a current interdependency as well as the long established connection necessary to create this level of relationship functioning.

Pongracz et al. (2005) proposed two variables that would have operated to allow dogs to have increased fitness, increasing their chances at survival, from establishing lines of communication between humans: an increased dependency on humans, and an artificial selection by humans towards dogs that communicated more effectively. Much of the experimental procedures have included either isolating acoustic parameters of dog barks to identify communicative patterns, or observing the receiving end of the signal, to determine if meaningful

messages have been interpreted. Context specific patterns of communication have been found (Molnar et al., 2008; Yin, 2002; Pongracz et al., 2005). Reducing dog barks to their essential acoustic parameters, and attempting to have people identify their meanings, furthers scientific support for meaningful communication between dogs and humans. Receivers are also able to identify message meaning (Pongracz et al., 2005; Molnar et al., 2006). It seems that both parties have, at least preliminarily, demonstrated reliably that they are attempting to transmit and receive messages purposefully. This again illustrates both the depth of present connection within this relationship, as well as the length of time required to develop such cooperative behavior.

It was noted that people may have been instrumental in communicative behaviors by artificially selecting through breeding for dogs that barked more reliably (Pongracz et al., 2005). People likely artificially selected for many characteristics through breeding. One additional behavior potentially selected for, that also is communicative gesture, is dogs' propensity to pay attention to and follow the human gaze. It has been shown that not only are dogs paying attention to the gaze of their human counterpart (Viranyi et al., 2004; Miklosi et al., 2003), and that dogs show some attempt at reading facial expressions, demonstrated through left gaze bias (Guo et al., 2009), but it has also been shown that wolves do not engage in these behaviors (Miklosi et al., 2003). This again adds supporting evidence to the overall cooperative behavior, communicative abilities, and depth of relationship between humans and dogs.

In investigating artificial selection, there is evidence to suggest through the long term artificially selective breeding program of wild foxes that one of the primary behavioral characteristics selected for by humans was tameness (Hare et al., 2005). This tameness would have been exhibited in younger foxes, making the selection of tameness stem from juvenile traits. This is an interesting concept, considering the theories of infantilizing, suggesting that

people engage in interactions with their dogs in a way that resembles the relationship between a parent and their child (Topal et al., 1998; Archer, 1997). Selecting dogs for their tameness may have also selected for other juvenile traits resembling infant behavior, such as engaging the parent in playful activity, and also made it possible for people to engage in infantilizing behavior. This could have been done intentionally, with the initial purpose of making dogs more appealing as animals are in the beginning stages of development, or it could have been a byproduct of other selection criteria to make adult companionship easier.

Two other studies had findings that potentially point to either selection for or engagement in infantilizing behaviors. Kubinyi et al.'s (2009) findings that sociability was also found in younger dogs, potentially another characteristic either chosen for initially or afterwards opportunistically from juvenile traits. As a result, this could also be involved with infantilizing type behaviors, also suggestive of attachment behaviors exhibited during development. And Horowitz (2009) suggests that dogs respond to people talking with their dogs in the same way they would talk with their infants, known as parentese. It is difficult to imagine tribal men and women from thousands of years ago speaking to the dogs in the village in such a manner; somehow this behavior seems like it may have begun manifesting more recently. If so, it would pose an interesting question as to why such behaviors and dynamics are being pursued now.

Overall, it is difficult to discern what precisely is occurring, except to say that there is an undeniable question, and proposed hypothesis, that humans and dogs are interacting in a more developed way than any other two species, and that researchers are maybe still in the learning curve of understanding how to demonstrate this scientifically. Understanding how people have shaped the dynamics in the relationship between dogs and humans may offer some insight into potential areas of psychological need that people may be experiencing, and be of assistance to

Clinical Social Workers providing mental health services. By identifying characteristics of dogs that may be more favorable to humans than others, understood by having been selected for by people throughout time, Clinical Social Workers may gain insight into ways that people may have turned towards companion animals to seek relief from mental illness. And although there is abundant research exploring therapeutic and beneficial effects of the relationship between humans and dogs, potentially negative effects have not been investigated with any near frequency. This places clinicians in a position to have to carefully consider both their recommendations to include companion animals in treatment, as well as interpreting and understanding their clients' interactions with companion animals within the household.

The sheer persistence of this relationship, over tens of thousands of years, is testament alone to the existence of some beneficial effects at play here, it may just be more complicated than initially thought to isolate such interactions to determine and define them. It may also be that these relationships are in this moment undergoing substantial changes and growth as well, enabling people to see potential without yet being able to scientifically measure phenomena at a larger scale. But the relationship does persist, and it provides Clinical Social Workers practicing within human relationships an opportunity, and a responsibility, to both understand as well as engage with people on a level that has at least been overlooked, if not misunderstood. With such an obviously active area of interaction for people, the relationship between dogs and humans promises to provide an ongoing source of information and opportunity for investigation of relational dynamics with people for many years to come.

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