

A STUDY OF THE CONTRIBUTION OF VARIABLES RELATED TO COMPANION
ANIMALS ON POSITIVITY

by

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B.A., Kansas State University, 2005
M.S., Emporia State University, 2007
Ed.S., Emporia State University, 2007

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Special Education, Counseling, and Student Affairs
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

The broaden-and-build theory posits that frequently experiencing positive emotions leads to broadened awareness and functioning, and over time, built resources. These resources function as reserves during difficult times. Considering recommendations for increasing positive emotions and findings regarding human-animal interactions, it is reasonable to expect that companion animals might function in a manner to increase positive emotions. Many people have companion animals, and they are a preventative, natural intervention without associated stigmas. Therefore, knowing more about how companion animals impact their humans has practical implications for mental health professionals. The current study investigated various aspects of human-animal interactions that are conceivably related to positive emotions (human-animal bond and amount of time spent with animal) in different configurations (people with and without companion animals; people with dogs, cats, and horses), while considering potential confounds (time spent with humans in connected interactions and time spent outside). Time spent in connected interactions with other humans is the only variable that predicted positivity, and this was only in people without companion animals. This is consistent with previous findings that interacting with other people is related to positive emotions.

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Dedication

To my parents, who always emphasized the importance of education. Going to college was assumed; the question was rather, “What are you going to do in college?”

To my husband, Andy, who made pursuing and completing this dissertation possible. He recently described a conversation he had with another spouse of a doctorate student. This person could not have said it better: the spouses work just as hard as the students, making it possible for the students to complete necessary requirements. Andy has been patient, understanding, and fully supportive as I have worked away time we could have spent together, quietly doing housework in the background and making sure I had good meals.

Finally, to my own dear companion animals, who have taught me life lessons that no human could have effectively imparted. My companions with whom the incomprehensible, mutual understanding and affection across species continuously leaves me in awe. Their positive influence has been so substantial that I had to find a way to further understand it during this capstone program requirement.

Chapter 1 - Introduction

Statement of the Problem

The broaden-and-build theory posits that positive emotions broaden awareness and functioning, allowing people to build resources, which serve as reserves during difficult periods (Fredrickson, 2013a). Likewise, positive emotions have been well substantiated in the research as extending to general functioning, so much that positive affect has been labeled “the hallmark of well-being” (p. 803, Lyubomirsky, King, & Diener, 2005). Elevated levels of positive emotion have been associated with numerous benefits in various domains of functioning. Considering recommendations to increase positive emotions and findings in the literature related to human-animal interactions and the human-animal bond, it is reasonable that companion animals function in a manner that increases their human companions’ positivity levels, and subsequently contribute to the broaden-and-build process. No studies are available that investigate the link between companion animals and positivity levels (Fredrickson, 2013a). It is similarly unclear about the specific factors that influence the relationship between companion animal and positive emotions. Furthermore, as Hallberg (2009) indicated, there is virtually no information in the human-animal bond scientific literature about horses.

Many people include companion animals in their families, and companion animals can naturally be incorporated into daily life activities. Companion animals are popular, and there are not stigmas attached to them, as there are with some interventions. These factors make them an attractive consideration for intervention. Moreover, they may be included in a preventative manner, which has been increasingly emphasized. Because the focus on the disease model in psychology has led to an understanding of pathology while neglecting understanding prevention, preventative methods require a shift from traditional services and systems. Knowledge of

current findings in positive psychology is central to effecting change (Terjesen, Jacofsky, Froh, & DiGiuseppe, 2004). Counselor educators and supervisors are in optimal roles to lead such paradigm shifts, through equipping practitioners with necessary information, including current research findings, during consultation and teaching efforts.

Significance of Study

The purpose of this study was to investigate if having companion animals is related to positivity, and if so, the influence of specific aspects of the human-animal bond. A quasi-experimental ex post facto study design (Campbell & Stanley, 1963) was utilized to quantitatively examine the relationship of having companion animals on levels of positivity and the relative impact of type of companion animal (dog, cat, or horse), bond with companion animal, and amount of time spent with companion animal. Potentially confounding variables that were considered include amount of time spent in connected social interactions with other humans (McIntyre, Watson, Clark, & Cross, 1991) and amount of time spent outside (Keller et al., 2005).

This study uniquely contributes to the scientific literature in multiple ways; authors have specifically indicated need for more information in several of the areas addressed in this study. It contributes to the positivity literature through examining the relationship between companion animals and positivity levels. It also contributes to the human-animal bond literature through investigating the impact of the amount of human-animal interaction (i.e., Jaspersen, 2013; Joye, 2011), the relative importance of specific factors related to the human-animal bond and horses' impact on humans (i.e., Hallberg, 2009; Hausberger, Roche, Henry, & Visser, 2008; Robinson, 1999), including information related to the therapeutic value of horse ownership (i.e., Robinson, 1999). Finally, while many researchers have designed their studies to focus on very specific

populations in need, Beck and Katcher (2003) stated that there are theoretical reasons to believe animals should benefit healthy humans, and as a result there is a need for research on healthy populations. This study sample consisted of a general adult population.

Research Questions

1. Are there relationships between human-animal bond (when human-animal bond refers to the relationship that results when humans and animals interact), time spent with companion animal (with companion animal referring to animals chosen for companionship), time spent in connected social interactions with humans, time spent outside, and positivity?
2. Does human-animal bond and time spent with companion animal predict positivity when time spent in connected social interactions with humans is controlled and time spent outside is controlled?
3. Does human-animal bond and time spent with companion animal predict positivity differentially for people with dogs, cats, and horses?
4. Does having companion animals predict positivity when time spent in connected social interactions with humans and time spent outside is controlled?

Hypotheses

1. Human-animal bond, time spent in connected social interactions with humans, time spent with companion animal, and time spent outside, respectively stated in predictive order of importance, differentially predict positivity.
2. Human-animal bond and time spent with companion animal predict positivity when time spent in connected social interactions with humans is controlled and time spent outside is controlled.
3. Human-animal bond and time spent with companion animal predicts positivity differentially for people with dogs, horses, and cats, stated in relative order of predictive importance.

4. Having a companion animal predicts positivity when time spent in connected social interactions with humans is controlled and time spent outside is controlled.

Definition of Terms

Human-animal bond. Refers to the relationships that form when humans and animals interact (Anderson, 2008).

Companion animal. Animals chosen for companionship. They do not have jobs; their guardians choose them because they “simply want to be with them” (Anderson, 2008, p. xxi).

Chapter 2 - Review of the Literature

The intent of this quasi-experimental ex post facto study was to quantitatively explore if companion animals are associated with increased positive emotions in their human companions, and subsequently if having companion animals is a viable recommendation for increasing positive emotions as part of the Broaden-and-Build Theory. To conduct this study, it was necessary to critically examine related scientific literature. The review of the literature was continuous throughout the study design and planning stage, data collection, data analysis, and synthesis of the findings in context of the literature.

This critical review of the literature explores six facets of the research literature to provide a context for, and basis of, this study:

1. Broaden-and-Build Theory: The Upward Spiral
2. Benefits of Positive Emotions: The Substance of Broaden-and-Build Theory
3. Increasing and Capitalizing on Positive Emotions
4. Human-Animal Bond
5. Benefits of Human-Animal Interactions
6. Connections between Positive Emotions and Human-Animal Interactions

Broaden-and-Build Theory, and the upward spiral inherent to it, justifies the importance of increasing positive emotions. Findings on the benefits of positive emotions inherently provide support for Broaden-and-Build Theory. Familiarity of recommendations to increase or capitalize on positive emotions reveals that companion animals have been omitted from this literature. Theories of the human-animal bond provide necessary background in conceptualizing the impact of human-animal interactions and the human-animal relationship. A review of the findings related to benefits of human-animal interactions illustrates what is known in this field. Finally,

drawing connections between the positive emotions literature and companion animals indicates that companion animals could increase positive emotions in their human companions, providing a basis for this study.

Broaden-and-Build Theory: The Upward Spiral

Positivity occurs when one's heart is opened by positive emotions, such as when feeling creative, playful or silly, connected with others, loved, peaceful, blessed, at one with surroundings, or awed by existence. Specific emotions that are frequently researched, that people have been found to frequently experience, and that have been linked with positivity include (in order of most to least experienced) love, joy, gratitude, serenity (or contentment), interest, hope, pride, amusement, inspiration, and awe (Fredrickson, 2013a). Fredrickson (2009) did not include happy because it is too vague, over used, and often other emotions are more accurate descriptors. Positivity is different from the absence of negative emotions (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Ostir, Markides, Black, & Goodwin, 2000).

Negative and positive emotions have contributed in an evolutionary manner to shape humans' current capacities. Negative emotions are designed to support survival in the moment through fleeing or fighting. Positive emotions work over longer periods of time, helping people build resources (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Fredrickson, 2001; Fredrickson, 2013a; Tugade & Fredrickson, 2004). This occurs because positive emotions (compared with constraining negative or neutral emotions) lead to briefly increased awareness that involves widened perceptions, thoughts, and actions (Fredrickson, 1998; Fredrickson, 2001; Fredrickson, 2013a). This "form of consciousness" (Fredrickson, 2013a, p. 15) opens people's minds and hearts, and leads them to be more receptive and creative (Fredrickson, 2013a). Based on Broaden-and-Build Theory, although positive emotions themselves are brief in duration, the

resulting changes in thoughts, actions, and physiological processes lead to enduring effects (Fredrickson, 1998; Fredrickson, 2001; Fredrickson & Branigan, 2005), which allow people to more easily handle life's unavoidable challenges (Fredrickson, 2009; Tugade & Fredrickson, 2004) through reserves of resources (Fredrickson, 1998; Fredrickson, 2001; Fredrickson, 2013a). Ultimately, the function of positive emotions through natural selection over millions of years is to build individuals' survival resources via expanded awareness, leading to more positive emotions, and creating an upward spiral that increases potential for survival (Fredrickson, 2013a). It is also through natural selection that humans have developed their current capacity for experiencing heartfelt positive emotion (Fredrickson, 2009).

Fredrickson (2000) specified that positive emotions can function hedonistically; people might pursue them simply because they feel good. However, due to the many benefits associated with positive emotions (see below), there are valid reasons to pursue them (Fredrickson, Mancuso, Branigan, & Tugade, 2000). It seems reasonable that regardless of people's purpose in pursuing positive emotions, if they genuinely experience positive emotion (Rosenberg et al., 2001), the resulting benefits could still be the same.

The Undo Effect: A Byproduct of Broaden and Build.

Positive emotions may also help people recover from the cardiovascular reactions associated with negative emotions. When one's heart beats faster in a situation perceived to be negative, positive emotions, as opposed to neutral or negative attitudes, have been found to calm people more rapidly (supported by Fredrickson & Levenson, 1998; Fredrickson et al., 2000; not found in Steptoe, Wardle, & Marmot, 2005). This is known as the undo effect, and it facilitates emotional regulation (Fredrickson et al., 2000). The undo effect is considered a byproduct of the broaden effect (Fredrickson, 2013a).

Benefits of Positive Emotions: Support for Broaden and Build

There is considerable experimental support for the broaden effect, and recent experimental support for the build effect (Catalino & Fredrickson, 2011). These resulting benefits can be broadly categorized as physical, cognitive, social, and psychological.

Physical Benefits.

Positive emotions have been associated with various health benefits. People with higher levels of positive emotion demonstrated improved immune system functioning (Davidson et al., 2003). They similarly reported fewer illness symptoms (e.g., signs of upper respiratory virus infection – Doyle, Gentile, & Cohen, 2006; specific symptoms of illness such as headaches, chest pain, congestion, and weakness – Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). Objective data indicated people with higher levels of positive emotions are at decreased risk for the common cold (Cohen, Doyle, Turner, Alper, & Skoner, 2003) and signs of upper respiratory virus infection (Doyle et al., 2006). They were also found to experience lower blood pressure (Fredrickson et al., 2000), and be at lower risk for disease including hypertension (Fredrickson, 2009; Smart Richman et al., 2005), strokes (Ostir, Markides, Peek, & Goodwin, 2001), and possibly diabetes (Smart Richman et al., 2005). Increased positive emotion was found to be associated with improved sleep (Bardwell, Berry, Ancoli-Isreal, & Dimsdale, 1999). Positive emotions served a protective function against general disease development (Smart Richman et al., 2005), with their broad-based role extending to diseases within cardiovascular, respiratory, and metabolic realms of health (Richman et al., 2005). Beyond moderate levels of mental health or the absence of mental health problems, high levels of positive emotion similarly appeared to serve as a protective factor against specific chronic conditions in which older adults are at higher risk (Keyes, 2005), and physical declines associated with late adulthood (Ostir et al., 2000).

Positive emotions were also linked with longer lifespans in most studies assessing this relationship (Danner, Snowdon, & Friesen, 2001; Moskowitz, 2003; Ostir et al., 2001; see Pressman & Cohen, 2005 for a compilation of all relevant published studies), in one study as much as 7.5 years (Levy, Slade, Kunkel, & Kasl, 2002).

Positive emotions were associated with higher levels of growth hormones (Brown, Sirota, Niaura, & Engebretson, 1993; Fredrickson, 2009). They were associated with lower levels of stress hormones (Fredrickson, 2009; Steptoe et al., 2005) and conversely, the release of “feel good” hormones such as dopamine (Ashby, Isen & Turken, 1999). Similarly, mirthful laughter was shown to beneficially impact chemically-based (i.e., neuroendocrine and stress hormones) stress responses in the body (Berk et al., 1989).

Recently, vagal tone, which has been identified as an index of autonomic flexibility (Kok & Fredrickson, 2010) and physical health (Kok et al., 2013; Kok & Fredrickson, 2015), has been linked with positive emotions. It predicted higher positive emotionality and social connectivity, which led to gains in autonomic flexibility or increased vagal tone (Kok & Fredrickson, 2010). More specifically, perceived social connectivity caused increased positive emotions, which increased vagal tone (Kok et al., 2013; Kok & Fredrickson, 2015). This supports the upward spiral hypothesis (Kok et al., 2013; Kok & Fredrickson, 2010; Kok & Fredrickson, 2015) discussed above, through building and accruing positive emotions, positive social connections, biological resources, and subsequently, improved health (Kok et al., 2013).

Cognitive Benefits.

Positive emotions have been shown to increase mindfulness, awareness of immediate environment (Fredrickson, 2009; Fredrickson & Branigan, 2005; Johnson, Waugh, & Fredrickson, 2010; Pyone & Isen, 2011; Rowe, Hirsh, & Anderson, 2007; Trick, Brandigampola,

& Enns, 2012), solutions generated in problem solving (Isen, Rosenzweig, & Young, 1991), and the ability to enjoy good moments when they occur. Positive emotions aided in cognitive modulation (Dreisbach & Goschke, 2004). Compared with negative emotions (Fredrickson & Joiner, 2002) or neutral states (Compton, Wirtz, Pajoumand, Claus, Heller, 2004; Fredrickson & Branigan, 2005; Pyone & Isen, 2011), positive emotions broadened thinking (Fredrickson & Branigan, 2005; Fredrickson & Joiner, 2002), which subsequently increased positive emotions, creating an upward spiral in well-being (Fredrickson & Joiner, 2002). This broadened thinking also (Fredrickson & Branigan, 2005) allowed people to think more inclusively (Bolte, Groschke, & Kuhl, 2003; Kahn & Isen, 1993), flexibly (Ashby et al., 1999; Bolte et al., 2003; Compton et al., 2004; Dreisbach & Goschke, 2004; Pyone & Isen, 2011), and to problem solve more creatively (Ashby et al., 1999), rapidly (Estrada, Isen, & Young, 1997; Isen, Rosenzweig, & Young, 1991), thoroughly (Isen et al., 1991), and at a higher level (Pyone & Isen, 2011), without neglecting details or practical information (Pyone & Isen, 2011) or engaging in hasty or superficial reasoning (Estrada et al., 1997). Data in one study suggested that optimism and confidence were not confounds (Bolte et al., 2003).

Positive emotions allowed people to see the big picture and to literally have expanded peripheral vision (Fredrickson, 2009; Fredrickson & Branigan, 2005; Rowe et al., 2007; Wadlinger & Isaacowitz, 2006 – when viewing highly positively emotionally valenced stimuli), attentional flexibility, and cognition (Johnson et al., 2010). This expanded functioning led to increased creativity (Rowe et al., 2007). This has been demonstrated across various contexts (Ashby et al., 1999). A noted side effect was potentially increased distractibility to novel stimuli (Dreisbach & Goschke, 2004). However, studies conducted differentiating low and high-approach motivated positive affect demonstrated that high-approach-motivated positive affect

decreased global attention compared with low and neutral conditions (Gable & Harmon-Jones, 2008).

Positive emotions also helped people utilize negative information more effectively. People experiencing positive emotion used negative information adaptively by attending to it, especially when threatening, and ultimately when relevant and advantageous (e.g., self-relevant health-related information – Aspinwall & Brunhart, 1996; Ragahunathan & Trope, 2002). They did so in a more open manner, interpreting the information with fewer biases (Reed & Aspinwall, 1998). Positive emotions also shifted thinking to be more future-oriented when beneficial (Pyone & Isen, 2011).

Furthermore, students demonstrated higher math performance (male students with learning disabilities completed more math problems accurately) and reported higher self-efficacy in math after positive mood induction, compared with the control condition characterized by neutral mood induction (Bryan & Bryan, 1991). Doctors demonstrated more careful case consideration, better case integration (e.g., when given small gifts), and quicker problem solving (Isen et al., 1991). Business managers with higher positivity showed more careful and accurate decision making (Staw & Barsade, 1993).

Social Benefits.

Positive emotions have been found to lead to increased social support (Fredrickson et al., 2008). Consistent with this, positive emotions (happiness in this particular study) were associated with higher levels of trust in others, compared to when people are sad, and furthermore, angry (Dunn & Schweitzer, 2005). Also, expressing the positive emotion gratitude not only increased positive emotions in the person expressing the gratitude (Emmons &

McCullough, 2003), it also increased positive perceptions of the relationship for the person to whom the gratitude was expressed, up to six months later (Algoe, Fredrickson, & Gable, 2013).

Social benefits and resilience have been found intertwined. Those with higher levels of positive emotion were more open, and therefore accessed and accepted social network resources during trying times. These connections refueled and further opened people's hearts and minds (Fredrickson, 2009).

Improvements in social functioning have occurred because positivity is viewed as attractive. People who present as happy had stronger connectivity with others, more friends, and stronger social support networks than people perceived as less happy. Positive emotionality was contagious and forged social connections (Lyubomirsky, King, & Diener, 2005), these connections became even stronger when positive events were shared and subsequently received in a supportive manner (Gable, Reis, Impett, & Asher, 2004). Positive emotions helped people feel more connected to important people in their lives (Fredrickson, 2009), even in cultures in which higher levels of togetherness is the norm (research by Ahalya Hejmadi in India, Keiko Otake in Japan, and Fredrickson, as described by Fredrickson, 2009). Furthermore, positive emotions facilitated self-other overlap, which led to more complex understanding of the other person. This happened quickly even in new relationships (Waugh & Fredrickson, 2006). Positivity (e.g., in the form of joy and humor) has also reduced barriers (i.e., racial bias), in effect helping people feel an increased sense of oneness to other people, including those unfamiliar to them (Johnson & Fredrickson, 2005). A sense of oneness increased people's willingness to help others (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997), and not surprisingly, positive emotions increased citizenship behaviors (i.e., problem solving beyond what was required in the task at

hand; Isen, Rozenweig, & Young, 1991). Similarly, positivity and trust fed off each other: positivity increased trust in others, which in turn increased positivity (Burns et al., 2008).

Business managers with higher positivity showed better interpersonal skills (Staw & Barsade, 1993), and also influenced increased positivity in group members which resulted in better coordination among members and decreased effort required to complete work tasks (Sy, Côté, & Saavedra, 2005). Along similar lines, business professionals who negotiated in a cooperative and friendly manner obtained the best deals (Kopelman, Rosette, & Thompson, 2006).

Psychological Benefits.

Psychological benefits have included increased optimism, open-mindedness, acceptance, (Fredrickson, 2009), mindfulness, purpose, (Fredrickson et al., 2008), and more effective emotional regulation (Tugade & Fredrickson, 2004). Positive emotions contributed to better emotional regulation, which led to improved control of the experience of positive emotions, allowing better use of them (Ong, Bergeman, Bisconti, & Wallace, 2006). Similar to increased open-mindedness and acceptance, positive emotions were associated with higher levels of variety-seeking behavior (Kahn & Isen, 1993). Many of these psychological benefits have been associated with increased positive feelings (Fredrickson et al., 2008; Fredrickson, 2009). The relationship is bidirectional; the effects of increased positivity led to even higher levels of positive emotion (Fredrickson, 2009), life satisfaction, and decreased depressive symptoms (Fredrickson et al., 2008). Positive emotions provided benefit above and beyond the actual experience of the positive emotion (Ong et al., 2006).

Experiencing transcendent positive emotions was linked with increased spirituality, possibly through beliefs of benevolence in people and meaning of life (Van Cappellen, Saroglou,

Iweins, Piovesana, & Fredrickson, 2013). Extending this, religiosity led to increased well-being, and self-transcendent positive emotions (specifically awe, love, gratitude and peace) were a significant mediator in this relationship (Van Cappellen, Toth-Gouthier, Saroglou, & Fredrickson, 2015). Not surprisingly, people who perceived themselves to be more cheerful reported higher job satisfaction and experienced a lower likelihood of unemployment (Diener, Nickerson, Lucas, & Sandvik, 2002).

Positive Emotions and Resilience.

Additionally, those with higher levels of positive emotion have been found to be more resilient (Fredrickson, 2009; Tugade & Fredrickson, 2004), and the more positive emotions people experienced, the more their resilience grew (Burns et al., 2008; Cohn et al., 2009), which in turn yielded increases in positive emotion (Burns et al., 2008). While small amounts of negative emotion were adaptive (Lyubomirsky, King, & Diener, 2005) when utilized to deal with immediate negative situations (Tugade & Fredrickson, 2004), excessive and inappropriate negative emotion led to harmful effects in functioning (Fredrickson, 2000; Rein, Atkinson, & McCraty, 1995). Higher-than-average positivity fueled quick rebounding after adverse situations. Although resilient people have experienced frustration and anxiety, they simultaneously experienced positive emotion (Fredrickson, Tugade, Waugh, & Larkin, 2003; Hart, Vella, & Mohr, 2008; Stein, Folkman, Trabasso, & Richards, 1997; Tugade & Fredrickson, 2004). Resilient people were initially just as affected by negative events, but they demonstrated “exquisite emotional agility” (Fredrickson, 2009, p. 109; Waugh, Wager, Fredrickson, Noll, & Taylor, 2008), recovering affectively more quickly (Waugh, Wager et al., 2008) and more completely (Waugh, Fredrickson, & Taylor, 2008) from adverse events. They spent their energy in the present moment rather than worrying about what could happen, overgeneralizing, or

overreacting. They were quick to differentiate between good and bad, and they had confidence in their ability to cope with whatever may happen (Fredrickson, 2009).

Positive emotions increased broad-minded coping (coping that involves broadened thinking), and broad-minded coping increased positive emotions, thus influencing each other and leading toward improved well-being (Fredrickson & Joiner, 2002). Furthermore, resilient people found positive meaning in negative situations (Fredrickson et al., 2003; Hart et al., 2008; Stein et al., 1997; Tugade & Fredrickson, 2004); this was mediated by positive emotions (Hart et al., 2008; Tugade & Fredrickson, 2004), and extended to overall well-being (Affleck & Tennen, 1996; Davis, Nolen-Hoeksema, & Larson, 1998; Stein et al., 1997).

Not surprisingly, high levels of positive emotion (Fredrickson, Tugade, Waugh, & Larkin, 2003; Ong et al., 2006; Tugade & Fredrickson, 2004) and the ability to integrate positive and negative events (Ong et al., 2006) have characterized high-resilient personalities. Openness, which also resulted from positivity, was also key to higher levels of resilience, since it allowed people to see the big picture, be present in the moment, and appreciate whatever good is present. In a study conducted with older adults, positive emotions provided respite during times of ongoing stress, and they prevented delays in recovering from subsequent stressors (Ong et al., 2006).

Flourishers.

“Flourishers” are people with both the absence of mental health problems and the presence of good mental health (Keyes, 2005; Keyes, 2007). They have been found to regularly feel cheerful and satisfied with life, and they function well socially (Keyes, 2007). A detailed study conducted by Catalino and Fredrickson (2011) utilized various measures, including questionnaires to evaluate the presence of negative and positive mental health and cognitive

resources, and the Day Reconstruction Method (entails reconstructing one's day by reporting experiences throughout the day in episodes, then answering specific questions about the events and experienced emotions). Flourishers experienced more increases in positive emotion in response to pleasant daily experiences than nonflourishers in all activities measured except exercising, for which flourishers and nonflourishers demonstrated similar levels of increases in positive emotion. The higher positive gains that flourishers experienced over time were also associated with higher levels of two areas of mindfulness: observing and nonreactivity to inner experience. These findings specifically support the Broaden and Build Hypothesis (Catalino & Fredrickson, 2011). Considering that flourishers were found to comprise less than 20% of the population (Keyes, 2007), and considering the benefits associated with regular high levels of positive emotion, interventions to increase positive emotion are in dire need.

Raising Levels of Positive Emotion

Clearly, positive emotion has been associated with numerous beneficial effects. Positivity has both produced and reflected success in life, consistently across various measures of success including marital satisfaction, increased earnings, and better health (Lyubomirsky, King, & Diener, 2005). Lyubomirsky, Sheldon, and Schkade (2005) proposed that genetics account for 50% of happiness, circumstances 10%, and intentional activities 40%. As a result, they suggested that activity choice can substantially and sustainably impact happiness, and more so than changing one's circumstances. Similarly, in a study by Catalino, Algoe, and Fredrickson (2014), people were actually happier when they intentionally engaged on a regular basis in activities associated with positive emotions. These findings underscore the importance of considering activity choice in increasing positive emotions.

Prerequisite Information: The Nature of Positive Emotions.

While choosing activities to increase positive emotion may seem simple, there are caveats. As such, before discussing how to increase or capitalize on positive emotions, it is necessary to understand some specifics about how positive emotions function.

The Hedonic Treadmill.

If a desirable activity is done the same way repeatedly, then people may adapt, stripping the activity of its beneficial effect on happiness. This is referred to as the “hedonic treadmill” as addressed as part of Adaptation-Level Theory (Brickman & Campbell, 1971). Part of intentionally engaging in activities to increase positive emotion involves variation in routine, including such factors as timing, location, and how the activity is completed (Lyubomirsky, Sheldon, & Schkade, 2005).

Focus on Positive Emotions, Not Happiness.

Additionally, overemphasizing happiness and having unrealistic expectations for happiness in positive events led to decreased levels of happiness due to disappointment in one’s own feelings (Mauss, Tamir, Anderson, & Savino, 2011). So then, the focus needs to be on evoking positive emotions, which then result in happiness, rather than focusing on happiness itself.

Emotions Cannot Be Forced.

Another caveat is that emotions cannot be forced (Fredrickson, 2000). Forcing smiles or positive words is similarly insufficient. If unaccompanied by heartfelt emotion, these attempts may contribute to adverse health effects such as coronary risk that is similar to what anger has caused for men with coronary problems (Rosenberg et al., 2001). Fredrickson (2009) concluded that while excessive hostility and anger can lead to life-threatening illnesses (Williams &

Williams, 1993), it appears insincere positivity also can kill. Ultimately, heartfelt emotions are the key component in positivity (Fredrickson, 2009). This is consistent with findings that over time, disconnected positive emotion was associated with higher levels of depression and lower levels of well-being (Mauss, Shallcross et al., 2011). Along these lines, self-inducing positive emotion was more effective than external methods at boosting immunosuppressants within the body (i.e., salivary immunoglobulin; Rein et al., 1995).

Dose Response.

Positive emotions typically only last for minutes at a time (Fredrickson et al., 2008), and at most for 24 hours (McIntyre et al., 1991). However, making even small, consistent (e.g., daily) adjustments to positive emotion has led to substantial change over time (Cohn & Fredrickson, 2010; Fredrickson & Branigan, 2005; Fredrickson et al., 2008). Also, with consistent positive emotions, people experienced growth in resources even if they also experienced substantial negative emotions (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009).

Further, over time people benefited more efficiently from positive emotion, meaning even smaller doses of positivity produced similar or more impactful results (Fredrickson, 2009; Fredrickson, 2013a). For example, in a meditation study (i.e., Fredrickson et al., 2008), people who meditated some over a three-month period exhibited higher levels of positivity than those who did not, even if they had not meditated within a proximal timeframe to measurement. Positivity measures were even higher when people had meditated recently, but regardless the effects were enduring beyond the immediate timeframe and even increased over time. It is also notable that the people in this study were novice meditators (Cohn et al., 2009). In a follow up study a year later, those who continued to meditate maintained initial gains and continued to

experience high levels of positive emotions. Those who did not continue independently meditating after the intervention maintained the resources they built during the intervention (Cohn & Fredrickson, 2010).

The Positivity-Negativity Balance.

Since negative emotions have been found to be more salient than positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), it is important to minimize negativity. While most moments are at least somewhat positive (Cacioppo, Gardner, & Bernston, 1999; Diener & Diener, 1996), the duration of heartfelt positive emotion tends to be relatively short (Fredrickson et al., 2008; McIntyre et al., 1991). Overanalyzing good dampens the positive emotion associated with it, as does trying to explain why good happened. As such, people's reliance on thinking in part makes positive emotions fragile. Therefore, it is especially important to optimize moments of positivity, "coaxing" them to last longer. It is similarly important to create more positive moments, increasing the overall amount of positivity experienced. People may do this with adjustments to how they appreciate or frame experiences or through activating thoughts or acting in ways that elicit positive emotions (Fredrickson, 2009).

Increasing and Capitalizing on Positive Emotions.

Fredrickson (2009) indicated that while it is not possible to will emotions, it is possible to turn on positive emotions almost at will by turning on positivity "levers." Fredrickson (2000) also recommended utilizing interventions that capitalize on the effects of positive emotions. Sharing positive events when conversing with others increased their impact on positive affect (Fredrickson, 2000), above and beyond the impact of the positive event itself. Perceived control after positive events also served to prolong positive affect beyond the event (Langston, 1994).

Express Regard for Others.

Expressing regard for others, in various forms such as spending money on others (Dunn, Aknin, & Norton, 2008) or random acts of kindness (Lyubomirsky, Tkach, & Sheldon, 2004, as cited in Lyubomirsky, Sheldon, & Schkade, 2005) increased positive emotion. Counting acts of kindness for a week also led to increases in positive emotion (specifically, happiness and gratitude). People who acted kindly not only experienced increases in positive emotion, they also experienced more positive memories (Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006).

Note that in committing random acts of kindness, timing may matter: committing five acts over various days did not have a significant impact on positive emotion; however, committing five acts in a single day did. Being kind not only increased positive emotion, it also facilitated increased awareness of kindness, creating an upward spiral in both positivity and kindness. Fredrickson (2009) recommended that being kind regularly is important, but timing should be sporadic enough for the acts to feel meaningful.

Express Gratitude.

Expressing gratitude also increased positive emotions (Emmons & McCullough, 2003). As with kindness, Fredrickson (2009) recommended genuinely appreciating and expressing gratitude regularly, but not so frequently that it becomes monotonous and is no longer heartfelt. Consistent with broaden and build's upward spiral, and as mentioned under "Social Benefits," expressing gratitude not only increased positive emotion in the person expressing the gratitude (Emmons & McCullough, 2003), it also increased positive perceptions of the relationship for the person to whom the gratitude is expressed, up to six months later (Algoe et al., 2013).

Interact with Other People.

Interacting with other people is an essential aspect of increasing positive emotion since it is closely associated with increased positive emotions (McIntyre et al., 1991). In a study by McIntyre and colleagues (1991), long social interactions were not required for significantly increased positive emotion. Based on these findings, the researchers concluded that relatively short (e.g., lunch, 20 minutes to become acquainted with someone new), frequent social interactions might be the most realistic and effective in increasing positive emotions.

Furthermore, in another study, extraverts experienced higher levels of positive emotion due to increased social interactions, as opposed to higher levels of positive affect causing increased social interactions (Srivastava, Angelo, & Vallereux, 2008). This again is consistent with choice of activities in affecting happiness (Lyubomirsky, Sheldon, & Schkade, 2005), though to derive benefit interactions need to be genuine (Rosenberg et al., 2001).

Set Realistic Goals and Pursue Them.

Setting goals was associated with increased positive emotion, when the goals were a good fit for the person, and when they were actually pursued and maintained. Sometimes activities that were not immediately enjoyable also led to happiness in the longer term (e.g., studying for an important exam), if the person found meaning in the activity (for an extensive review of setting goals and happiness see Lyubomirsky, Sheldon, & Schkade, 2005).

Exercise.

Exercising has been clearly established as a method of increasing positive emotion. In a study by Reed and Ones (2006) acute aerobic exercise was shown effective when at longer durations (less than 60 minutes) of low intensity levels (e.g., brisk walking), and also at shorter durations (less than 30 minutes) of moderate intensity levels. Resulting increases in positive

emotion lasted up to 30 minutes after finishing exercising (Reed & Ones, 2006). Additionally, Hogan, Catalino, Mata, and Fredrickson (2015) found that exercising was associated with higher levels of positive emotion, and subsequently, psychosocial resources. Conversely, sedentary behavior was associated with lower levels of positive emotions and psychosocial resources.

Spend Time Outside.

Furthermore, spending time outside (30-45 minutes or more) when the weather is nice and clear (67 degrees Fahrenheit on average; high barometric pressure) and in the spring was related to more positive mood. As temperature increased in the spring, so too did mood. However, as summer approached and temperatures became even warmer, mood decreased, especially in climates in which summers are hot. Also, spending less than 30-45 minutes outside had the opposite relationship as spending more time outside in the spring – cooler temperatures were associated with improved mood. The researchers of this study suggested this may be due to people wishing to spend more time outside on nice days and being unable to do so, or nice weather may make indoor activities feel mundane. They also suggested that spring was associated with improved mood, even though fall is characterized by similar temperatures (and even slightly more preferred temperatures when considering the 67 degrees Fahrenheit average), because people found relief from cold winter weather and were returning to baseline mood levels. The researchers reported that findings in this study are similar to the few studies that have investigated weather and positive emotions (Keller et al., 2005).

Relaxation Therapies.

Fredrickson (2000) discussed relaxation therapies, a known method of effectively addressing problems associated with negative emotions in life (e.g., anxiety, hypertension, among others). She proposed that these therapies are effective at addressing negative emotion,

because they increase positive emotion, specifically contentment. Likewise, mindfulness is also inherent to some relaxation therapies, and the effects of mindfulness involved many similarities to the cognitive qualities of contentment. While the two are distinct, mindfulness set the stage for contentment to occur. Fredrickson (2000) suggested that relaxation therapies, through evoked contentment, might also function beneficially through eliciting the undo effect and building resilience.

Meditation, specifically loving-kindness meditation, has been found effective in increasing positive emotion (Fredrickson et al., 2008; Johnson et al., 2009; Johnson et al., 2011), including in populations with schizophrenia in which negative affect has been challenging to effectively treat (Johnson et al., 2009; Johnson et al., 2011). Loving-kindness meditation is also unique in that it has been found to “outpace the hedonic treadmill effect” (p. 1045, Fredrickson et al., 2008). The hedonic treadmill predicts that people adapt to desirable activities over time when the activities are repeated in the same manner, therefore requiring increased novelty for similar amounts of positive emotion (Brickman & Campbell, 1971). Quite the opposite has been found with loving-kindness meditation: larger gains were actually found with time (as described above under “Dose Response”; Fredrickson et al., 2008).

Engage in “Flow” Activities.

Engaging in “flow” activities – activities in which people are so engaged that they lose a sense of time – should theoretically increase positive emotion. Fredrickson (2011) likened flow to play. It is intrinsically motivating. Infants observed during play demonstrate mirthful laughter, which implies the experience of positive emotion (Fredrickson, 2011). Further, Fredrickson (2011) also drew connections to the literature indicating likelihood that curiosity and learning increase positive emotion.

It is reasonable that there are many other methods of increasing positive emotion that have not yet been investigated and/or supported by research findings. Anecdotal accounts abound of the positive impact of companion animals. It is therefore reasonable that companion animals function in a manner that leads to increased positive emotions in their humans. However, the impact of companion animals on positive emotion was not located in the research literature. This leads to a review of the relevant literature of how animals have a beneficial impact on their human counterparts. Because the human-animal bond is central to the closeness that results between human and companion animal, it is reviewed first. Benefits of human-animal interactions, and how these may be linked to findings regarding positive emotions follow.

Human-Animal Bond

Bonds occur within the context of relationships; therefore, a relationship is necessary for a bond to occur. Anderson (2008) argued that for any relationship to be successful, certain factors must be present. Minimally, those in the relationship must “like each other, trust each other, enjoy shared activities, express affection in mutually acceptable ways, and support each other emotionally” (p. 30). She concluded “by almost any assessment from various biological, psychological, or social theories, our interactions with companion animals indeed satisfy the basic criteria for a relationship” (p. 31, Anderson, 2008).

Human-Animal Bond (HAB) Theories.

Irvine (2004) asserted “any one-factor explanation is bound to fail, largely because our relationships with animals have meant so many different things over time” (p. 7). Overarching theories of the HAB include the biophilia hypothesis, social support theory, and self psychology. Other ideas closely related to HAB theories include the biological basis of the HAB and

attentionis egens. Beck and Katcher (2003) argued that the biophilia hypothesis and social support theory in reality tend to be complimentary.

Biophilia and Biological Explanations.

The biophilia hypothesis (Wilson, 1984) refers to an innate, biological desire to associate with nature, specifically other humans or animals (Anderson, 2008; Daley Olmert, 2009). There are various biological processes that aid in understanding the HAB. Limbic resonance refers to common brain structures in mammals, including the limbic brain, which is the area of the brain primarily responsible for feeling (Anderson, 2008; Grandin & Johnson, 2009; Shambo, 2013). The limbic brain allows animals to read and respond to human emotional states (Anderson, 2008).

Daley Olmert (2009) discussed mirror neurons (Blakeslee, 2006; Daley Olmert, 2009) and the mere exposure effect (Daley Olmert, 2009) as initially bringing humans and animals together. Mirror neurons allow humans to understand other's intentions through feeling rather than thinking and provide information about others' thoughts, feelings, and actions (Daley Olmert, 2009). The mere exposure effect is a fondness that results subconsciously from repeated exposure and has been found in all species studied. Its results increase when associated with positive experiences (Panksepp, 1998). Daley Olmert (2009) suggested that through understanding animal behavior and intentions and repeated exposure leading to a fondness for animals, it is possible that over time humans began interacting with animals.

Uvnas Moberg (2003) discussed oxytocin as responsible for ongoing interactions between humans and animals. When interacting with each other, including caring for others or being cared for, mammals (including animals and humans) are essentially "rewarded" through the positive effects of oxytocin. Interactions are enjoyable, which facilitates further interactions,

and subsequently a bond forms (Uvnas Moberg, 2003). “In oxytocin, we find the primary genetic ingredient of a general system of attachment that can support a phenomenon such as biophilia” (p. 32, Daley Olmert, 2009).

Social Support Theory and Attentionis Egens.

Social support theory is based on the various health effects shown in research to result from human-animal companionship (Beck & Katcher, 2003). While companion animals have been shown to positively impact their human companion on health measures, most of these effects are immediate and short lived. The longer-term health effects associated with animals are related to the social support they provide. Well-being has long been linked with social support, and loneliness and isolation have long been known to cause extreme pain (Serpell, 2010).

Similarly, the need for attention and related attention-seeking behavior is normal in species with advanced, developed social systems; however, attention needs and related behavior is typically discussed when it becomes pathological. Attention needs become pathological when extreme withdrawal occurs or when need for attention and related behavior is excessive.

Odendaal (2000) used the Latin term *attentionis egens* to refer to normal attention needs and related behavior, in order to distinguish this normal need from pathological. Odendaal (2000) believed that human-companion animal interaction is successful because it fulfills *attentionis egens* for both the human and the companion animal. The more a companion animal demonstrates need for attention or social behavior, the stronger this bond may become. When human and companion animal demonstrate similar needs and related behaviors for attention in the relationship, this is considered a social symbiotic relationship (Odendaal, 2000).

Self Psychology.

Self Psychology is part of the psychoanalytic school of thought, but it does not include Freud's sexual drives (Anderson, 2008). Two primary tenets of self psychology are self and selfobject. The self is a core psychological aspect of personality that provides the person with feelings of well-being, self-esteem, and cohesion, when the self is confirmed through the environment. Selfobjects are the fulfilling psychological responses to "objects" in the environment that meet these needs of influencing or confirming the sense of self. Often this is done through affirmation, calming, soothing, or "responses" resulting from the selfobjects. An important distinction is a person, animal, object, idea, or experience that fulfills these environmental needs are not the actual selfobject. Rather, the psychological response they evoke which fulfills the sense-of-self needs are the selfobjects. For example, if an animal calms an anxious person and helps maintain their sense of self, then the calming effect is the selfobject rather than the animal. It is based on the person's perceptions of the animal (Brown, 2004).

Furthermore, self psychology asserts that humans have three basic selfobject needs (Anderson, 2008; Brown, 2004), and problems develop when these needs are neglected at any point during one's life, but especially during critical periods of early development. A person feels understood, appreciated (Anderson, 2008), affirmed, and recognized (Brown, 2004) when mirroring selfobject needs are met. When idealizing selfobject needs are met, a person feels proud, worthwhile, attached, emotionally stable (Anderson, 2008) or accepted (Brown, 2004). When Alterego Needs are met, people identify with others. For example, when a human returns home after a long day at work and says, "I am so happy to be home," and his/her dog or cat runs and "excitedly" greets him/her, the human feels understood and appreciated, meeting Mirroring Needs. When a human successfully teaches a dog a new trick, this could meet Idealizing Needs.

When a human tiredly sits down and dozes off, and his/her companion animal joins by sitting nearby also dozing, this could meet Alterego Needs. Note that it is not the animal's actual intentions that matter, but rather the person's perceptions (Anderson, 2008).

Companion animals are not believed to prompt structural changes within one's personality as humans or a psychotherapist could (Anderson, 2008; Brown, 2004). Rather, they are believed to serve as selfobjects (Brown 2004), fulfilling all three of self psychology's three needs (Anderson, 2008), thereby maintaining or restoring one's sense of self (Brown, 2004).

Animals as Companions.

Before delving into the research findings on the benefits of companion animals, discussion of animals as companions follows. This provides a context for the benefits humans experience from their companion animals.

Cats and Dogs as Companions.

Many with companion animals consider them to be family. In fact, Beck and Katcher (1996) cited that more than 70% or around 87% of people consider their companion animals to be family. Anderson (2008) cited 75% of people with dogs consider their dogs to be part of the family, and 50% of people with cats consider their cats to be part of the family. Williams and Williams (1993) shared that on average, people with dogs spend 150 minutes daily with their dogs, and people with cats spend 86 minutes daily with their cats. At the University of Pennsylvania Veterinary Clinic, 99% of patients reported talking to their companion animals; 80% reported talking to them as if they are human, and more than 30% reported confiding in their companion animals (Beck & Katcher, 1996).

Although dogs are the most popular type of companion animal, cats outnumber dogs because often people have multiple cats (Anderson, 2008). Douglas (2005) studied differences

in behavior between cat and dog owners as related to owner attachment to the animal. She found that dog owners who reported higher attachment were more likely to include the dog in family activities and provide activities for the dog, such as taking the dog on walks and involving the dog in training activities. Cat owners who reported higher attachment were more likely to provide the cat with gifts/treats, and the cat tended to spend more time in close proximity to the owner. These findings were unrelated to whether the animal lived inside or outside. Due to her findings indicating clear differences in behavior between cat and dog owners, Douglas explicitly recommended that any studies of human-animal bond should differentiate between cat and dog owners in data analysis.

Horses as Companions.

While there are inherent differences between horses as companion animals and the more traditional cats and dogs as companion animals, statistics revealed that 80 percent of people with horses consider them family members even though they do not live in the house (Anderson, 2008; Beck & Katcher, 1996), and more than 70% of adolescents with horses reported confiding in their horse (Beck & Katcher, 1996). This is consistent with or higher than with other types of companion animals. As Hallberg (2009) stated, “Oddly enough, in the multitudes of books written and research projects conducted in the field of human-animal bonding, the work of horses seems to have gone virtually unaddressed.” (p. 43). According to Anderson (2008), while cats and dogs are the most prevalent companion animals, “...horses are complex, majestic creatures with an impressive social life and profound emotional reactions” (p. 61-62). Many people have horses because they like to ride and do not consider them companions; to these people horses are simply livestock (Anderson, 2008). Anderson (2008) indicated she believes that these people are missing a wondrous opportunity. Those who choose horses as companions

have been found to do so for the social interactions (Anderson, 2008), including the cooperation that results from mutual affection. Though more research is needed to confirm the nature of the human-horse relationship, it has been described as comparable to the relationship of two people engaging in a mutually enjoyable activity, involving mutual feelings of trust, respect, and affection. Similarly, owner survey results suggested that the emotional bond between horse and rider is more important than the horse's functionality (Mills & McNicholas, 2009).

Note, however, that most horses are not purchased solely as companions. Caring for a horse involves a great deal of expense (Grandin & Johnson, 2009; Jones, 1983; Mills & McNicholas, 2009), time (Jones, 1983; Mills & McNicholas, 2009), and more safety risk than with most companion animals (Mills & McNicholas, 2009). Most purchase horses to fulfill a specific goal, such as to ride recreationally or to show. Riders may be differentiated as “the achiever”, who is primarily concerned with achieving excellence in their equestrian discipline; “the relater”, who is mostly concerned about their relationship with their horse; and a third type is mostly concerned about riding as an exciting sport (Jones, 1983).

It is important to realize that while achievers may be primarily focused on achieving excellence with their horses, this does not mean that they do not love their horses. In reality, achievers likely experience closer bonds with their horses than relaters due to their intense, ongoing training together, which allows them to communicate at a level that casual riders or people with companion horses rarely experience (Jones, 1983). In fact, even riders who ride very competitively have described close emotional bonds with their horses, resulting from the mutual high levels of communication and confidence required for success (Mills & McNicholas, 2009; Papows, 2011).

Benefits of Human-Animal Interactions

Because the literature on companion animals tends to be grouped by cats and/or dogs, and horses are addressed separately, research findings for more traditional companion animals (e.g., cats and dogs) will be addressed first, followed by findings related to horses.

Findings on the Benefits of Interacting with Cats and Dogs.

There have been a variety of terms used for animal-assisted activities and animal assisted therapy, including but not limited to pet therapy, pet-assisted therapy, and animal-facilitated therapy (Marino, 2012). Animal-assisted therapy (AAT) involves licensed professionals delivering services incorporating an animal as part of goals associated with a treatment plan, whereas animal-assisted activities (AAA) incorporate animals in activities to benefit humans but less specifically so (Marino, 2012). The most common animals serving in these activities are dogs and horses, targeting disorders ranging from general psychological difficulties, depression, anxiety, and developmental disabilities to infectious disease (Marino, 2012). They are believed to provide benefit through mental and physical stimulation, with effects that are physical and motivational in nature (Marino, 2012).

Because the distinctions are not always clear cut between types of interventions (Marino, 2012), and this study evaluated incidental benefits of bonding with or spending time with one's companion animal(s), general benefits of human-animal interactions are discussed to lend a better understanding of the benefits that could naturally occur in the human-companion animal relationship. Human-animal interactions, which are any interactions that occur between humans and animals, will be emphasized. Other literature that is relevant to understanding the human-companion animal relationship is included.

Meta-analytic Study Findings.

Authors in two meta-analytic quantitative reviews and one qualitative review included peer-reviewed AAT and AAA studies to assess findings about effectiveness of AAT and AAA. The authors found that most studies were not eligible for inclusion in the quantitative review due to such factors as research designs that did not meet minimum standards (Marino, 2012), inadequate sample sizes, and inadequate data to calculate effect sizes. Additional challenges include AAT is typically utilized concurrently with more traditional therapies; therefore, it is difficult to determine the component that effects change in AAT. The differences between AAA and AAT were also not clear across studies (Marino, 2012). In the qualitative review, Marino (2012) concluded that in one of the strongest studies, findings were similar in reduced loneliness for live dog and robotic dog treatments, suggesting that a live dog is not necessary for decreasing loneliness.

Overall, both quantitative reviews and the qualitative review found effects of AAA and AAT to be “moderate at best” (Marino, 2012, p. s149), with many studies characterized by such methodological weaknesses that it was not possible to make a determination if AAA and AAT approaches are effective, and more specifically if a live animal is required for benefits to occur (Marino, 2012). Reviews of specific study findings follow.

Physical Benefits.

Numerous benefits have been associated with companion animals, including generally better health (Barker & Wolen, 2008) or fewer minor health problems (Friedmann & Son, 2009), decreased stress responses (Allen, Blascovich, Tomaka, & Kelsey, 1991; Friedmann & Son, 2009; Odendaal & Meintjes, 2003), decreased blood pressure (Anderson, 2008; Odendaal & Meintjes, 2003), decreased cholesterol levels (Anderson, 2008), better recovery from

cardiovascular disease including decreased mortality after one year (Friedmann, Katcher, Lynch, & Thomas, 1980), minimized development/progression of chronic illnesses (Friedmann & Son, 2009), and prevention of acute health conditions such as seizures and panic attacks. Dogs have also specifically been shown to warn of impending health conditions (Anderson, 2008). Finally, studies also indicated that children with cats and/or dogs in their home are less likely to have allergies (if two pets are present), are less likely to experience diarrhea, nausea, and vomiting, and that the animals may actually help “buffer” children from illness (p. 134, Anderson, 2008). As Daley Olmert (2009) commented, “Pets may not be pills, but it turns out they are very strong medicine” (p. 192).

Psycho-Social Benefits.

The benefits of human-animal interactions appear to be many and multiple faceted for a variety of populations. Some areas of benefit may prevent or reduce other difficulties or be linked with additional benefits. For example, as noted below, pets reduce loneliness, and loneliness is linked with a variety of detrimental experiences (Black, 2012). Therefore, a variety of outcomes may indirectly occur through specific benefits.

Some findings have indicated that human-animal interactions may provide even more positive outcomes than the support of other people. For example, companion animals were linked more strongly to social support and reduced depression in older women than human social support (Krause-Parello, 2012). Also, self-reported anxiety and biological markers of anxiety decreased more when a therapy dog visited patients with heart failure than when a human volunteer visited (Anderson, 2008). Finally, interpreted as the result of animals being non-evaluative, women completing challenging tasks in the presence of their companion dogs

showed lower stress responses and higher performance on the challenging task than did women completing the task in the presence of a chosen human companion (Allen et al., 1991).

Levinson, a forerunner in using animals as therapeutic agents, described pets as “most important to a wholesome emotional development” (p. xviii, Levinson & Mallon, 1997). Therapeutic benefits have been noted, even when interacting with animals in a typical (i.e., not therapy) context (Irvine, 2004). Companion animals have similarly been linked with improved psychological well-being. Specific psychological benefits include reduced levels of anxiety (Anderson, 2008), depression (Anderson, 2008; Krause-Parello, 2012), isolation (Anderson, 2008), and loneliness (Anderson, 2008; Black, 2012; Krause-Parello, 2012); improved coping with stressful life events such as divorce and grief; improved psychological well-being through feelings of unconditional acceptance that companion animals provide; and increased feelings of competence, autonomy, and self-esteem (Anderson, 2008). In one study, people with companion animals felt more attractive, possibly due to their animals responding positively to them, and impacting their self-views (Irvine, 2004). Similarly, companion animals improved people’s perceptions of situations, including the people in the situations (Friedmann & Son, 2009). Finally, companion animals are believed to offer security in an unpredictable world (Irvine, 2004), serving as a source of constancy (Beck & Katcher, 1996; Heath & McKenry, 1989).

Animals can facilitate beneficial behaviors. Barker and Wolen (2008) indicated the importance of investigating mediating variables in the benefits of human-animal interaction. Caring for and interacting with companion animals has been shown to increase exercise levels (Anderson, 2008). Dogs and cats have been shown to facilitate social interaction, including more frequent and longer interactions (Irvine, 2004; Messent, 1983). The addressed physical and

emotional needs and life skills learned during inmate-animal interaction programs in prisons also leads to reduced recidivism rates and associated costs (Strimple, 2003).

Animals function as social supports, considering many regard them to be part of the family, talk to them as they would another person, and confide in them (Beck & Katcher, 2003). As Friedmann and colleagues described (p. 310, 1980), “Pets are a source of comfort that can be scheduled on demand of the owner, in almost any quantity, without bargaining or supplication.” For some people, animals may function as a primary social support (Anderson, 2008), though they have also shown to increase social interactions with people (Irvine, 2004; Messent, 1983), which are a type of human social support (Beck & Katcher, 2003).

Finally, Anderson (2008) believed as companions who are unable to read, write, and talk, animals are optimal confidantes. For some, and especially children (Anderson, 2008) and the elderly (Anderson, 2008; Krause-Parello, 2012), companion animals may be their most substantial source of social support. A critical part of social support is simply emotional disclosure, which has been shown to improve immune system functioning, grade point average, and mood, and decrease doctor visits (Anderson, 2008). Along these lines, animals have been demonstrated to be nonevaluative companions, while human friends are evaluative companions, giving animals a unique advantage over human companions (Allen et al., 1991).

General Information on Benefits.

While extensive benefits in human-animal interactions, especially with companion animals, have been documented, it does not necessarily require much for animals to benefit humans. Simply being with a dog has shown reduced blood pressure and stress (Barker & Wolen, 2008). Petting a dog has also been found to reduce blood pressure (Barker & Wolen, 2008; Odendaal & Meintjes, 2003) and stress hormone levels (Odendaal & Meintjes, 2003).

These responses imply a calming or relaxation effect. Owners simply looking into their dogs' eyes experienced increased oxytocin levels (conference presentation by Nagasawa, as cited by Daley Olmert, 2009), and oxytocin has been shown to lead to calming effects (Uvnas Moberg, 2003). It is likely that the oxytocin released as a result of these interactions is responsible for these subsequent physiological calming-related effects (Odendaal & Meintjes, 2003; Uvnas Moberg, 2003).

Human-animal interactions have been found to benefit various populations, including children (Anderson, 2008) and adolescents (Black, 2012), such as juveniles with behavior problems (Anderson, 2008), in the child development process (Endenburg & van Lith, 2010; Melson, 2003), and possibly in self-care children. Self-care children are children who “supervise” themselves while their parents are working; researchers have identified them to be at increased risk for experiencing “fearfulness, loneliness, social isolation, boredom, and emotional stress” (p. 311, Heath & McKenry, 1989). Additionally, elderly people (Anderson, 2008; Krause-Parello, 2012) have been found to benefit from human-animal interactions, including people in long-term care facilities (Behling, Haefner, & Stowe, 2011) and people with dementia (Barker & Wolen, 2008; Kramer, Friedmann, & Bernstein, 2009; Richeson, 2003). Specific populations also found to be positively impacted include mental health populations (Anderson, 2008; Souter & Miller, 2007), people with physical health ailments (Anderson, 2008; Friedmann et al., 1980), and people who are incarcerated (Anderson, 2008; Strimple, 2003). People receiving palliative care also appear to benefit (Engelman, 2013; Geisler, 2004), as well as possibly military populations (Cronk, 2012). While many studies have focused on very specific populations in need, and justifiably so, Beck and Katcher (2003) stated that there are theoretical

reasons to believe animals should benefit healthy humans, and as a result research needs to also focus on healthy populations.

Consistent with limitations noted in the meta-analytic reviews described above, human-animal interaction studies typically demonstrate limitations such as insufficient sample sizes, lack of randomization, conflicting results, and tend to be difficult to replicate (Anderson, 2008). Most are descriptive in nature and lack controls to determine causality of the results (Barker & Wolen, 2008). While many studies demonstrate benefits, some do not (e.g., Jaspersen, 2013). Confounding variables may account for some of the variability when conflicting results occur (Barker & Wolen, 2008). Also, an ongoing question is how much human-animal interaction is necessary for benefits to occur (Jaspersen, 2013; Joye, 2011). Researchers recognize the difficulties inherent in these types of research studies and the need for continued studies (Anderson, 2008). Finally, Beck and Katcher (2003) warned that while companion animals have been shown to benefit people in many studies, they have also been linked with decreases in health and morale. Therefore, companion animals as interventions should be chosen with consideration to the specifics that research has demonstrated and individual factors.

Findings on the Benefits of Human-Horse Interactions.

Most research on horse-human interactions has focused on how humans impact horses, including such topics as horses' perceptions and cognitive processing (e.g., Hanggi & Ingersoll, 2009; Murphy & Arkins, 2007; Peerstrup Ahrendt, Winther Christensen, & Ladewig, 2012; Proops, McComb, & Reby, 2009; Stone, 2010), communication (e.g., Lemasson, Boutin, Boivin, Blois-Heulin, & Hausberger, 2009), horses' reactions to humans (e.g., Fureix et al., 2009; Hausberger & Muller, 2002; Lansade & Bouissou, 2008), horses' reactions to different techniques or situations imposed by humans (e.g., Goodwin, McGreevy, Waran, & McLean,

2009; Krueger, 2006; Whitaker, Goupil, Roy, Merciat, & McGahie, 2011), management factors (e.g., Christie et al., 2006; Geor, 2005; Hartmann, Sondergaard, & Keeling, 2012; Holland, Kronfeld, & Meacham, 1996; Kane, 2012; Sigurjonsdottir, Van Dierendonek, Snorrason, & Thorhallsdottir, 2003), behavior problems (e.g., Hausberger, Gautier, Biquand, Lunel, & Jago, 2009), understanding and preventing injury to humans (e.g., Abu-Zidan & Rao, 2003; Ball, Ball, Kirkpatrick, & Mulloy, 2007; Bixby-Hammett, 1987; Christey, Condie, Nelson, Rivara, & Smith, 1994; Egli, Exadaktylos, Inden, & Zimmermann, 2002; Moore, Millar, Mastuda, & Buckley, 2003; Nelson, Rivara, Condie, & Smith, 1994), or a combination of the aforementioned (e.g., Chaya, Cowan, & McGuire, 2006; Fureix, Bourjade, Henry, Sankey, & Hausberger, 2012; Hausberger, Bruderer, Le Scolan, & Pierre, 2004; McGreevy, Oddie, Burton, & McLean, 2009; Sankey, Richard-Yris, Leroy, Henry, & Hausberger, 2010; Visser et al., 2003; Winther Christensen et al., 2012), most with the goal of improving conditions for horses, including working more effectively with horses. These approaches are very logical considering deficient management conditions can impair the human-horse relationship (Hausberger et al., 2008), and relationship is considered the most important factor in safely working with horses (Hausberger et al., 2008 & McBride & Mills, 2012). Though studies are becoming more prevalent in the last decade on the human-horse relationship, (Hausberger et al., 2008), there is continued need for more research on various aspects of the human-horse relationship (Hallberg, 2009; Hausberger et al., 2008; Robinson, 1999), including the therapeutic value of horse ownership (Robinson, 1999). The little research involving horses' impact on humans tends to focus on the impact of interventions for children with autism (e.g., Bass, Duchowny, Llabre, 2009; Gabriels et al., 2012; Jenkins & DiGennaro Reed, 2013; Ward, Whalon, Rusnak, Wendell, & Paschall, 2013) and psychotherapeutic interventions (e.g., DeZutti, 2013), most notably with trauma populations

(e.g., Shambo, 2013). As with other human-animal intervention studies, inconsistencies in methodology, measurement, and type of intervention cause difficulty in being conclusive about the effects of equine interventions. However, findings in a recent study by Pendry, Smith, and Roeter (2014) revealed significantly lower cortisol levels, implying significantly lower stress levels, in school-aged children who participated in a weekly after-school equine-facilitated learning intervention, compared with children in the waitlisted group, which is consistent with findings in a study in which heart rate decreased in humans who stroked horses, suggesting stroking horses decreases tension in humans (Hama, Yogo, & Matsuyama, 1996).

Considering the limited research on horses and humans, of related interest is animal-assisted interventions involving work with farm animals. One study reviewed attitudes of farmers and mental health professionals regarding animal-assisted interventions involving work with farm animals for people with psychiatric diagnoses. Results showed that both believed animal-assisted interventions involving work with farm animals could offer benefits in addition to work with companion animals, though farmers demonstrated significantly more positive attitudes than the mental health professionals (Berget, Ekeberg, & Braastad, 2008). Another study evaluated levels of depression, state anxiety, and self-efficacy in people with clinical depression who participated in a farm-animal assisted intervention. Results showed increased self-efficacy over the course of the study and decreased levels of depression and state anxiety when performing “challenging and complex work tasks” (p. 498, Pedersen, Nordaunet, Wilhelm Martinsen, Berget, & Braastad, 2011). Simply interacting with the animals or performing simple tasks did not yield significant effects.

Anecdotal Accounts of Benefits of Human-Animal Interactions.

Anecdotal accounts abound on the positive impact animals have on humans. A very limited number of examples follow to personalize and provide some depth to the cited quantitative findings. Due to the limited number of quantitative studies on horses as companions, anecdotal accounts of horses are emphasized. These examples are far from exhaustive and certainly not representative of the positive emotional benefits people perceive from interactions with companion animals.

Incarcerated Males Train Therapy Dogs and Derive Benefit.

Curry (2008) conducted a case study of incarcerated males training therapy dogs. The incidental benefits the inmates experienced from working with the dogs are notable. Ninety-six percent of trainers indicated positive emotional outcomes, defined within the study as “strong, positive, emotional feelings inmates trainers experienced as a result of working with the dogs in the training program” (p. 100). She identified the following positive emotional outcome themes: social support, sense of pride, feelings of giving back to society, increased patience, improved self-esteem, and a humanizing element. The only negative emotional outcome theme identified was giving up the dog once training commenced.

Woman Gets Horse, Goes off Prozac.

A woman boarding her horse at a local stable reported that after she got her horse, she no longer needed Prozac, because her horse fulfilled her mental health needs (anonymous for privacy reasons, personal communication, August 10, 2012).

“A Girl Who Doesn’t Fit in Anywhere Else Finds a Sense of Belonging...

... on the back of a horse” (p. 72, Smith, 2013). Gwen has various diagnoses, including but not limited to attention deficit disorder, dyslexia, apraxia, and developmental dyspraxia.

These have made her different from her peers in general interactions and also at school where she requires special classes and modifications. Her mother signed her up for various activities, such as tennis, gymnastics, and dance; all were “disastrous” for her. With horseback riding, Gwen did not feel frustrated or have bad experiences as she’d previously had with extracurricular activities. She was “at home.”

...when she is on the back of a horse, Gwen is no longer ‘a person with disabilities.’ Here, her differences melt away, and she appears just as capable as everyone else. Her inability to recall things in correct sequence disappears. The same girl who cannot coordinate her thoughts and speech enough to repeat three colors or numbers in the same order can enter a ring and remember a sequence of eight jumps, recall the number of strides in each line, and fix a crooked approach in only a split second. And—more important—Gwen’s differences don’t matter one bit to any of her friends at the barn. These girls care only about riding horses, something Gwen does as well as any of them and better than some. Her only true friends are at the barn where she takes weekly lessons. There she is accepted just as she is, not separated by any limitations. It has become a haven. (p. 74)

Gwen struggles with various facets of life due to her disorders. However, she excels at horseback riding, providing feelings of competence. Through horseback riding at the barn, she experiences social connectivity and belonging.

Gang Members Demonstrate Empathy and Compassion.

A notable example of increased empathy and compassion is the effect of “horse therapy” on gang members. Two opposing (but biologically related) gang members had vowed to kill each other. They had been attending separate therapy sessions due to this hatred, and both rode

the same horse. Eventually they were scheduled for the same session and ended up working with the horse together. The horse was very muddy that day and they were suggested to work together to groom the horse. Neither spoke nor made eye contact, and they had agreed upon a system to stay separate, which they carried out in a manner that was very sensitive to the horse. They were both athletic and progressed rapidly in therapy sessions. The first day they trotted was an exciting day for both, and they literally rolled on the floor laughing together. Eventually they called a truce and their gangs allowed them to communicate because they are biologically related.

Other gang members who participated in therapy at this ranch reportedly became regularly involved fathers, changed their use of violence, left their gangs or reduced their involvement with them, and were no longer violent to animals because they reported knowing from working with the horses that the animals have feelings too. The connection resulting from the horse therapy also served to protect these men. When out, these connections prevented violence that would typically occur, such as if in a neighborhood of opposing gang members or passed by a car filled with opposing gang members (Hallberg, 2009).

Connections between Positive Emotions and Human-Animal Interactions

Considering recommendations for increasing positive emotions and benefits of companion animals, it seems reasonable that spending time with or experiencing a bond with companion animals could result in increases in positive emotions for their human counterpart. When recommending ways to increase positive emotions, Fredrickson (2009) shared a specific example of positive emotion elicited through human-animal interaction – the joy experienced when playing catch or chase with one’s dog. Such moments with companion animals could also

be good distractions, and Fredrickson (2009) recommended utilizing healthy distractions in decreasing negative emotions.

Exercising.

Exercising has been clearly established as a method of increasing positive emotion, both at low intensity levels for longer durations and at moderate intensity levels for shorter durations (Reed & Ones, 2006). Caring for and interacting with companion animals has been shown to increase exercise levels (Anderson, 2008). Activities inherent to having some companion animals, such as taking the dog for a walk or hacking out with the horse, could easily fulfil exercise levels that have been associated with increases in positive emotion. Conversely, sedentary behavior was associated with lower levels of positive emotions and psychosocial resources (Hogan et al., 2015).

Spending Time Outside.

Likewise, some companion animals require people to spend time outside, such as taking dogs for walks or playing with them, and spending time caring for horses. Similarly, dog owners who report higher attachment to their dogs are more likely to spend time taking their dogs on walks (Douglas, 2005). Spending time outside experiencing nature has led to increased positive emotions in research studies (Keller et al., 2005).

Social Interactions.

Having good social connectivity is an essential aspect of increasing positive emotions since it is so closely linked with positive emotions (McIntyre et al., 1991) and flourishing (Fredrickson, 2009). Companion animals function as social supports, considering many consider them to be part of the family, talk to them as they would another person, and confide in them (Beck & Katcher, 2003). As Friedmann and colleagues described (1980, p. 310), “Pets are a

source of comfort that can be scheduled on demand of the owner, in almost any quantity, without bargaining or supplication.” Similarly, Anderson (2008) believed that animals are unique sources of social support because they facilitate confidential emotional disclosure, since they are unable to disclose information to others. For some people, animals may function as a primary social support (Anderson, 2008). Williams and Williams (1993) recommend getting a companion animal to fulfil social interaction needs when interacting with other humans is limited or difficult.

Companion animals have also shown to increase social interactions with people (Irvine, 2004; Messent, 1983), which is a type of human social support (Beck & Katcher, 2003). Even short social interactions between humans have been shown to increase positive emotion (McIntyre et al., 1991). Along these lines, research findings suggested that extraverts experience higher levels of positive emotion due to increased social interactions, as opposed to higher levels of positive affect causing increased social interactions (Srivastava et al., 2008). Various, even regular, incidental social opportunities may occur from having pets, such as when going to the dog park or to the barn for those people who board their horses. Social support is so integral to companion animals that the longer-term health effects associated with animals have been related to the social support they provide (Serpell, 2010). It is possible that companion animals increase positive emotion through the social support that they provide, which in itself can be multifaceted.

Spending Money on Gifts for Companion Animals.

Spending money on others has been shown to increase positive emotion (Dunn et al., 2008). Statistics on spending money on specific companion animals is somewhat mixed, possibly varying due to the emphasis of distinct data (e.g., relative to attachment versus no consideration to attachment). According to a study by Douglas (2005), cat owners who reported

higher attachment to their cats were especially likely (compared with dog owners) to provide their cats with treats and gifts. However, results from a 2005 survey conducted by the American Pet Products Manufacturing Association indicated that 80% of dog owners buy their dogs gifts, and 63% of cat owners buy their cats gifts, with the average gift costing \$17. Gifts are given for special occasions such as Valentine's Day, Easter, Halloween, Chanukah, Christmas, and also for no particular reason (as cited and described by Anderson, 2008). Data indicates that a large percentage of those with companion animals do buy their animals gifts; therefore, buying companion animals gifts could result in increases in positive emotion.

Random Acts of Kindness.

Along these lines, random acts of kindness have also shown to increase positive emotion (Lyubomirsky, Tkach, & Sheldon, 2004, as cited in Lyubomirsky, Sheldon, & Schkade, 2005), and being kind is associated with becoming more aware of kindness and subsequent increases in positive emotion (Fredrickson, 2009). It is possible that being kind toward a companion animal in and of itself produces raises in positive emotion, and that it is also impetus for increased awareness of kindness, and the chain leading to increases in positive emotion. In fact, dog owners who reported higher bonds with their dogs were more likely to provide activities for their dogs, such as going on walks or training activities (Douglas, 2005). It would be interesting to know if dog owners perceive these activities as acts of kindness. It also seems reasonable that acts of kindness for horse owners might include caring for their horses through such activities as grooming, applying fly spray and other helpful products (e.g., sun screen for the light skinned horse), and carefully selecting and putting on fly masks/fly sheets during fly season, and blankets during cold weather. These are all services that the horse would not enjoy without human action and that are perceived as benefiting the horse. Again, it would be interesting to know if horse

owners perceive these activities as acts of kindness and their subsequent impact on positive emotion. Finally, if these activities are regarded as acts of kindness, it is also possible that dog and cat owners grooming their dogs and cats could also be regarded as acts of kindness.

Goal Setting.

Setting goals has been associated with increased positive emotion, if the goals are a good fit for the person, if the person finds meaning in goal-related activities, and if goals are pursued and maintained (Lyubomirsky, Sheldon, & Schkade, 2005). Most people purchase horses to fulfill a specific goal, such as to ride recreationally or to show. Riders have been categorized according to how they relate to their horse, and “the achiever” is primarily concerned with achieving excellence in their equestrian discipline (Jones, 1983). Horses can be a very engaging source of goals, which should theoretically lead to positive emotions associated with pursuing and meeting goals. It is also reasonable that those who train and/or show their dogs could enjoy positive emotions from these experiences.

Engaging in “Flow.”

Furthermore, “achievers” communicate with their horses at a level that casual riders or people with companion horses rarely experience (Jones, 1983). Such mutual high levels of communication and confidence are required for success (Mills & McNicholas, 2009; Papows, 2011). Similarly, according to Loch (1997), a requirement of effectively working with horses is to engage in a very focused state. This state required to effectively work with horses; for those who set goals, to meet goals with horses, is consistent with flow. Engaging in “flow” activities – activities in which people are so engaged that they may lose a sense of time – should theoretically increase positive emotion. Such activities are intrinsically motivating and tend to involve curiosity and learning, which are known to increase positive emotion (Fredrickson;

2011). Fredrickson (2011) also compares flow to play, and as Beck and Katcher (1996, p. 31) say, “Pets have a special way of bringing people back to play and laughter no matter what their age. Pets engage in a kind of play that is beyond the world of competition. The games have no winners or losers. Play with an animal has the same constancy as the animal’s response to us.”

Meditation-Like State.

It can also be stated that working with horses evokes feelings or states consistent with meditation (Grandin & Johnson, 2009; Hamilton, 2011; Irwin, 2001). Meditation, specifically loving-kindness meditation, has been found effective in increasing positive emotion (Fredrickson et al., 2008; Johnson et al., 2009; Johnson et al., 2011), including in populations in which negative affect can be challenging to effectively treat (Johnson et al., 2009; Johnson et al., 2011).

Authentic Functioning.

Horses are very attuned to nonverbal cues and energy put off by other beings (Hamilton, 2011; Irwin, 2001). They can sense a human’s physical and emotional state through posture, fractional movements, tone of voice, and smell (Hallberg, 2009). How people carry themselves physically, including their body language and energies, impacts horse behavior. Horses mirror, or reflect back to people, their inner states. As a result, with horses people cannot fake inner states, and this can help people become more aware of their inner states (Hamilton, 2011). Being sincere is a necessity in increasing positive emotion (Fredrickson, 2009; Mauss, Shallcross et al., 2011; Rosenberg et al., 2001), as is required in working with horses.

Resilience and Leadership Qualities Reinforced.

Similarly, resilient people bear qualities that are necessary in being a good leader in the people-horse relationship. Resilient people spend their energy in the present moment rather than worrying about what could happen, overgeneralizing, or overreacting; they are quick at

differentiating between good and bad and adapting emotionally; they have confidence that they have the ability to cope with whatever may happen (Fredrickson, 2009). They recover affectively more quickly (Waugh, Wager et al., 2008) and more completely (Waugh, Fredrickson, & Taylor, 2008) from adverse events. Resilient people experience overall higher positive emotionality (Fredrickson et al., 2003; Tugade & Fredrickson, 2004). Because horses sense inner states and by nature require leadership (Hamilton, 2011), these qualities are essential in being a good leader in the horse-human relationship. It is possible that the human-horse relationship reinforces these qualities which in turn could increase positive emotionality.

Mindfulness Reinforced.

Horses are also a good example of moving beyond the past and living in the moment (Hallberg, 2009). Because horses live in the moment, for people to connect with them, they also need to be fully in the moment. The inner voice pestering about other life worries is a sign that people are not in the moment. It is human nature to be distracted by inner voices, and it takes practice for people to free themselves from their inner voices. Working with horses can help people become more aware of their being (Hamilton, 2011). Similarly, living in the moment is interconnected with mindfulness, which requires noticing feelings or emotions, then moving on without justification or guilt (Shambo, 2013). The effects of mindfulness bear many similarities to the cognitive qualities of contentment. While the two are distinct, mindfulness sets the stage for contentment to occur (Fredrickson, 2000). Becoming more mindful allows people to deal with emotions rather than stifling them. Mindfulness takes practice, and over time it can influence changes in the brain. Mindfulness is also a recommendation for increasing positive emotion (Fredrickson, 2009).

A Deep Sense of Awe Leads to Gratitude.

Expressing gratitude can also increase positive emotions (Emmons & McCullough, 2003). Loch (1997), who is a classical horsewoman, teacher, and lecturer, encouraged the importance of always appreciating horses' generosity. Creating a partnership with animals who are not only large and powerful, but also generous and sensitive prey animals, trusting against their nature, instills a "deep sense of awe" (p. 17, Loch, 1997), which is a form of positivity (Fredrickson, 2009; Fredrickson, 2013a) and forms the basis of the gratitude felt by many equestrians. Loch illustrated this most aptly:

For where on earth can such a partnership be found as that of a human being with their horse? How can any creature allow us such minute and demanding control over its entire being? How is it the horse, above all the animals, offers us so much? . . . the submission of the horse to the human being is beyond compare. It is truly awesome. Not only does he allow us to become master of his slender limbs, but of his entire muscular system, his massive power, even his mind. The better trained the horse, the more he puts his own fine sense of balance in our hands which ultimately means relinquishing all self-preservation. What trust! What sacrifice! It is hard to believe that such a sensitive creature, with so much awareness of danger and suspicion of the unknown, can endow us with so much generosity that he will willingly make the final gesture. Yet this has been proved and repeated a million times over down the centuries – the horse, in all his nobility, will even die for us. (p. 17)

These ties between human-animal interaction and the human-animal bond with specific recommendations for increasing positive emotions imply that human-animal interactions, possibly through the human-animal bond, could be a means for increasing positive emotions,

which is the basis for the upward spiral and enduring benefits associated with the Broaden-and-Build-Theory (Fredrickson, 1998; Fredrickson, 2001; Fredrickson & Branigan, 2005). Similarly, Coren (2009; para. 5) summarizes, “The benefits [of pet dogs] are not just short term but last well beyond the time that the pet is in the room, and the positive effects build up over time.”

Chapter 3 - Method

Research Design

The independent variables were total amount of time spent with favorite companion animal during the previous two weeks, animal to whom the participant feels closest (dog, cat or horse), and human-animal bond. The dependent variable was positivity ratio. Total amount of time spent interacting with humans in a connected manner and total amount of time spent outside during the previous two weeks during the previous two weeks were covariates. Note that “animal to whom they feel closest” is being utilized to prevent potential social desirability bias associated with using terms such as “favorite,” which could influence participants to answer items in a more positive manner (Johnson, Garrity, & Stallones, 1992). A quasi-experimental ex post facto design (Campbell & Stanley, 1963) was utilized. This design allowed for the variables to be measured as naturally occurring, which is necessary in exploring the variables of interest.

Sampling Procedures

The snowball sampling technique was utilized to recruit participants within the local community. In snowball sampling, the researcher identifies people with key information to their study and requests recommendations for other people to include, thus expanding the study sample as the study progresses (Mertens, 2005). It was utilized as the sampling method in this study due to the specific population (i.e., people with companion animals) inherent to the research questions.

Participants were acquired through their responding to posted information about the study. Information was intentionally distributed in general community locations to attract people without companion animals as a control group, and also in more specific locales or through specific groups (e.g., local saddle clubs, horse boarding facilities, pet daycare/boarding

businesses, veterinary offices) to attract people with companion animals. Information was placed in an advertisement in the local newspaper, The Manhattan Mercury. Information was also posted around the community in hard-copy format on placards, in locations such as coffee shops, veterinary offices, the public library, and pet/farm stores. It was also posted electronically on relevant social media sites (e.g., Facebook pages) and via listserv e-mails (e.g., to Kansas State University Veterinary Hospital staff and students and to clients at local barns). Study information was also posted under various sections of the local Craigslist site, an internet resource for obtaining or selling needed items or services within specific communities. Finally, the study was advertised at local assisted-living facilities, where participants have shown an interest in volunteering during previous opportunities.

Procedures

Paper and electronic advertisements included a link that participants could click on to participate, as well as information to contact the researcher if the participant had difficulty accessing the link, wanted a paper survey, or had questions. In some situations, paper packets were made available for participants to complete and return (e.g., at the local assisted-living facilities). At the end of the survey, participants were provided the researcher's contact information to obtain study results, if they were interested.

See Appendix A for the Institutional Review Board approval letter. Consent forms were not required as part of this study. The beginning of the survey instead included a terms of participation statement:

TERMS OF PARTICIPATION: In completing the following questions, you are participating in research. Your participation is voluntary. You may withdraw your participation at any time without explanation. Your consent is inherent to and indicated

by your completing the questions and submitting your responses. Participation will require approximately 10 minutes.

All participants were asked to take the modified Differential Emotions Scale (mDES) and to answer demographic questions. Participants with companion animals were asked to complete the Lexington Attachment to Pets Scale (LAPS). The order of administration of these components was the mDES, LAPS (if applicable), and demographic questions; see Appendices B and C to view the mDES and LAPS. These measures were combined in the stated order and presented to participants as one single survey.

Most participants completed the survey electronically (all but eight). For participants who took the survey via paper format, the questions were typed into a word document, and participants who do not have companion animals were instructed to skip from the end of “First Part” to the beginning of “Last Part.” Sections were labeled as such to promote consistency between paper and electronic surveys, and to avoid potential confusion for those who did not complete “Middle Part,” which would have been labeled “Part 2” had sections been numbered. This was primarily a concern for those who completed the survey electronically, since they did not see “Middle Part” (see next paragraph), so going from “Part 1” to “Part 3” would have implied something was amiss.

Qualtrics, an online survey tool provided by Kansas State University for students to utilize in research, was a wonderful resource during the course of this study. All questions were typed into the program, and additional settings improved survey flow and increased ease of survey completion and data processing. Routing options allowed participants without companion animals to automatically go from section one to section three without even knowing section two existed. Scoring options allowed the mDES and LAPS to be automatically scored

and results uploaded during the course of survey completion. This nearly eradicated potential for human error during scoring and recording data. When data collection ended, all results were uploaded from Qualtrics to Excel. Data were evaluated for invalid responses and processed as necessary to upload into SPSS, which was utilized for statistical analysis.

Measures

Modified Differential Emotions Scale.

B. L. Fredrickson (personal communication, October 2, 2014) granted permission to use the modified Differential Emotions Scale (mDES) in the present study. In her positivity research, Fredrickson (2013a) has utilized self-report of subjective experiences in response to emotion induction in a laboratory setting, repeated daily surveys, or over the past two weeks. Measures for the present study included the mDES adjusted to measure emotions over the past two weeks in response to participants' naturalistic experiences based on lifestyle choices (i.e., having a companion animal) that may not be duplicated in a laboratory setting.

The modified Differential Emotions Scale (mDES), as it is called in the scientific literature (Fredrickson, 2013a), is also referred to as the Positivity Self-Test at the University of North Carolina at Chapel Hill's Positive Emotions and Psychophysiology Laboratory (PEP Lab) website (www.positivityratio.com). It measures the ten most frequently experienced positive emotions, including joy, gratitude, serenity, interest, hope, pride, amusement, inspiration, awe, and love. It also measures specific negative emotions, yielding a ratio of positive to negative emotions, also called a positivity ratio. It does this through three emotion adjectives to most effectively measure each emotion (Fredrickson, 2013a). Participants respond by indicating the greatest amount of the emotion (and to a lesser extent how much they experienced the emotion) adjectives they have experienced within a given time period (24 hours or 2 weeks) on a 5-point

scale (0=not at all, 4=extremely; Fredrickson, 2013a). This is based on findings that people more accurately recall peak experiences than emotional experiences across multiple situations (Fredrickson & Kahneman 1993), thus minimizing recall biases. Internal consistency is high (.82 to .94 across various studies; cited in Fredrickson, 2013a).

People who demonstrate positivity ratios of less than 1 to 1 tend to be suffering or depressed. People experiencing positivity ratios of approximately 3 to 1 may be flourishing (Fredrickson, 2013b); less than 20% of the population has been found in the flourishing range (Keyes, 2007). While a definite set point distinguishing flourishers and an upper critical limit is questionable (Brown, Sokal, & Friedman, 2013; Fredrickson, 2013b), higher positivity ratios are clearly associated with higher levels of positive emotions (Fredrickson, 2013b). The positivity ratio provides a quantitative measure of positive to negative emotion that accounts for positivity offset and negativity bias. Some amount of negativity is necessary to remain grounded (Fredrickson 2009). Positivity offset reflects that most moments are at least somewhat positive (Cacioppo, Gardner, & Bernston, 1999; Diener & Diener, 1996). Negativity bias refers to negative events holding more weight than good events (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

Lexington Attachment to Pets Scale.

T.P. Johnson (personal correspondence, January 18, 2015) granted permission to use the Lexington Attachment to Pets Scale (LAPS) in the present study. The LAPS was utilized to measure strength of bond between human and companion animal. The LAPS is a 23-item survey that measures strength of attachment with companion animal through questions asking how much owners agree or disagree with specific factors related to strength of attachment. It emphasizes affection for companion animal, based on the assumption that as with human

relationships, this is the aspect most associated with well-being. In response to weaknesses in previous scales and to provide scope of assessment, the authors also include items that measure weak attachment (Johnson, Garrity, & Stallones, 1992). Results range from scores of 0 to 69, with higher scores indicating higher attachment (Douglas, 2005). The LAPS has strong psychometric properties, which the authors document with data on internal consistency, factor analysis, item response theory modeling, and correlations between variables known to relate to pet attachment and the LAPS. Based on this data, the LAPS developers concluded it more effectively measures strong attachment than weak attachment. They also indicated that it is appropriate for use with dog and cat owners. Although they present insufficient data to conclusively recommend use of the scale with other species of pets, in the normative sample a small percentage of participants listed their favorite pet as “other” (4%) or were unable to decide which pet is their favorite (5%). This implies the LAPS could be appropriate for use with other companion animals; there is simply a lack of data documenting the effectiveness of the scale with other animals, in order to recommend its use with other animals. Also, though horses were not specifically included in this analysis, the items in the survey have face validity for use with horses. Data on the LAPS was collected through a random, representative sample of 412 participants through phone interview, taking on average 16 minutes to complete (Johnson et al., 1992). It has since been used in numerous studies (Anderson, 2007) and appears to be the most widely used companion animal attachment measure.

Chapter 4 - Results

Demographics

Three-hundred thirty-six people residing in the Manhattan, Kansas area participated in the study. Manhattan is a small Midwestern city in the United States with a population of approximately 55,000 people (United States Census Bureau, 2010). Notable characteristics include several higher education institutions, including a large university, a Christian college, a technical college, two cosmetology schools, and an army base nearby.

Demographic data is generally reported based on participants who responded to the respective demographic questions (unless otherwise specified), to the nearest whole number. The mean modified Differential Emotions Scale (mDES) score for all participants was 1.35; this is considered typical (see below information about the mDES). Eighty-one percent of participants reported having companion animals; this is at the upper end, though comparable with national statistics. Of participants who responded, the companion animal to whom they feel closest is specifically a dog, cat, or horse, 71% responded they feel closest to a dog; 21% responded they feel closest to a cat, and 7% responded that they feel closest to a horse. Some participants responded that they have a companion animal but failed to specify the type of animal to whom they feel closest. Additionally, a small number of participants responded that they feel closer to a different type of animal or a combination of animals than the categories included in this study, such as cats and dogs, dogs and cats, ball python, goat, guinea pig, rat and lizard. Most participants were female (70%), though a substantial number (19%) were male, and the remainder preferred not to specify or did not respond to this question. While most people were approximately 35 years of age, participants ranged in age from 18 years to 85 years. Most participants reported their highest level of education attained was a bachelor's degree (36%), and

levels of education ranged from 8th grade to doctorate. Participants reported a variety of occupations. Many reported working in the local school system, in the veterinary field, or that they are in vet school. Participants also reported learning about the study from a variety of sources, such as e-mail, Craigslist, social media, newspaper, poster in veterinary office, word of mouth, and poster in coffee shop.

Research Question 1 Results

The first research question assessed the relationships between variables in people who have companion animals. The only assumption required for bivariate correlation is the data must be interval; this assumption was met. To run the standard Pearson's correlation, the sample data must also be normally distributed. Because not all variables were normally distributed, Spearman's rho was utilized to calculate bivariate correlations for the variables of interest specified in research question one (Field, 2009). There was a significant relationship between time outside and positivity, $r_s = .166, p < .01$, and between time spent in connected social interactions with other humans and positivity, $r_s = .029, p < .05$. These are small effect sizes (Leech, Barrett, & Morgan, 2005). Note that time outside and time spent in connected social interactions with other humans was also correlated, $r_s = .316, p < .001$, indicating medium strength of relationship or effect size (Leech et al., 2005). Additionally, time spent outside and time spent with the companion animal to whom one feels closest is also related, $r_s = .361, p < .001$ (again, medium effect size; Leech et al., 2005). Human-animal bond (when human-animal bond refers to the relationship that results when humans and animals interact), time spent with companion animal (with companion animals referring to animals chosen for companionship), and time spent in connected social interactions were not found to significantly predict positivity in the present study.

Research Question 2 Results

This research question assesses various aspects of the human-animal relationship as related to positivity, while taking into consideration potential confounds. All assumptions were met for hierarchical multiple regression. All predictor variables were quantitative, and the outcome variable was quantitative, continuous and without constraints or unbounded. The predictors had variation; there was non-zero variance. There was no perfect multicollinearity; all variables were correlated at less than $R = .8$. Predictors were not correlated with outside variables; anticipated confounding variables were appropriately included in the analysis. Homoscedasticity was met. Errors were independent, as indicated by Durbin-Watson values approximating two, and they were not smaller than one or greater than three. Normally distributed errors, independent outcome variable values, and linearity were all assumed (Field, 2009).

Hierarchical multiple regression results indicated that human-animal bond and time spent with companion animal did not significantly predict positivity when time spent in connected social interactions was controlled and when time spent outside was controlled. Only 2.3% ($R^2 = .023$) of the variability was included in this model, which is a small effect size (Leech et al., 2005). See Table 1.

Research Question 3 Results

This research question assessed experiences of people with companion animals, separately depending on the type of animal to whom they feel closest. All assumptions for hierarchical multiple regression were met (Field, 2009), as discussed under Research Question 2. Hierarchical multiple regression analysis was computed individually for participants who report the animal to whom they feel closest is a dog, for participants who report the animal to whom

they feel closest is a cat, and for participants who report the animal to whom they feel closest is a horse. There was essentially no effect for type of animal; $R^2 = .005$, $.006$, and $.009$, respectively. Human-animal bond and time spent with companion animal did not predict positivity differentially for people with dogs, cats, and horses. See Table 2, Table 3, and Table 4.

Research Question 4 Results

This research question evaluated positivity in people who have and who do not have companion animals while considering potential confounds. All assumptions for hierarchical multiple regression were met (Field, 2009), as discussed under Research Question 2.

Hierarchical multiple regression analysis was computed individually for participants who report they have companion animals and for participants who report they do not have companion animals.

Hierarchical multiple regression results reflect that in the current study sample, not having a companion animal predicted positivity greater than having a companion animal, considering that the model only accounted for 1.8% of the variance when having a companion animal was considered ($R^2 = .018$; this is less than a small effect size; Leech et al., 2005), but it accounted for 15.7% of the variance when participants who report not having a companion animal were considered ($R^2 = .157$; this is a medium effect size; Leech et al., 2005). This means that the model including amount of time spent in connected social interactions with other humans, amount of time spent outside, and not having a companion animal predicted 15.7% of the variability in positivity levels for participants in the present study. However, as mentioned under Research Question 1, time spent outside was highly correlated with time spent in connected social interactions with humans. Therefore, time spent in connected social

interactions with humans is the only significant predictor for positivity when comparing people who have and do not have companion animals. See Table 5 and Table 6.

Chapter 5 - Discussion

Discussion of Study Results in Context of the Literature

In the present study, combinations of variables that are unavailable or minimal in the literature were explored, including many variables that specific researchers have indicated need to be further investigated. Specific variables studied in the present study include companion animals and positivity levels, the impact of the amount of human-animal interaction (i.e., recommended to be studied by Jaspersen, 2013 and Joye, 2011), the relative importance of specific factors related to the human-animal bond, and horses' impact on humans (i.e., Hallberg, 2009; Hausberger, Roche, Henry, & Visser, 2008; Robinson, 1999), including information related to the therapeutic value of horse ownership (i.e., Robinson, 1999) and the benefits of animals in healthy populations (i.e., Beck & Katcher, 2003). These variables were studied in the real world context, which Pressman and Cohen (2005) indicated as necessary since laboratory and field study results were found to be uncorrelated.

The only significant predictor of positivity in the present study was time spent in connected social interactions with other humans, and this was only found for people without companion animals. It is possible this was not a significant predictor for people with companion animals due to spending time with their companion animal rather than spending time with other humans, or from obtaining social support from their companion animal rather than from other humans. Some findings indicate that some companion animals facilitate more and longer social interactions (Irvine, 2004; Messent, 1983), which has been considered a type of social support (Beck & Katcher, 2003). However, these do not consider quality of interaction, and the current study inquired about “connected social interactions with other humans.”

Also of consideration are studies that indicate animals might provide more substantial support than human social support (Allen et al., 1991; Anderson, 2008; Krause-Parello, 2012). Because many people consider their companion animals to be part of the family, talk to them as they would another person, and confide in them, they do in fact function as social supports (Beck & Katcher, 2003). Emotional disclosure has been associated with various beneficial outcomes and is an essential component of social support (Anderson, 2008). Unlike other humans, companion animals provide support in a nonevaluative manner (Allen et al., 1991), on demand and in any quantity (Friedmann et al., 1980), and they are unable to disclose information (Anderson, 2008). Not surprisingly, companion animals have been shown to reduce loneliness (Black, 2012).

Also, while companion animals have been associated with improved psychological well-being, when looking at the specific variables studied, they tend to measure reduced pathological outcomes (i.e., Anderson, 2008; Black, 2012; Hama et al., 1996; Krause-Parello, 2012; Pendry et al., 2014) as opposed to levels of normal emotions or superior functioning. In one study, companion animals improved people's perceptions of situations, including the people in the situations. This could conceivably occur through associated increased positive emotions (Friedmann & Son, 2009); however, this was not specifically included in the study. Overall, it appears that Beck and Katcher (2003) had good reason to indicate a need to study the benefits of companion animals in healthy populations, especially considering companion animals appear to function in a very typical social support role.

While there were very limited significant findings in this study, there are various factors that may have minimized results. These need to be considered in conceptualizing the findings.

Not only do these study limitations imply that companion animals may positively impact their humans in ways not captured in this study, they also provide direction for future studies.

Limitations of the Study

The study utilized a quasi-experimental ex post facto study design (Campbell & Stanley, 1963). An ex post facto design attempts to induce the experimental process through assignment of groups based on participant attributes that existed prior to the beginning of the study and that are not possible to replicate in a pure experimental design, hence the term “quasi-experimental” (Campbell & Stanley, 1963). Within the current study, these attributes were if people have companion animals, and furthermore, specific types of companion animals. While this study design was necessary in studying the population of interest (i.e., people with companion animals), there are also weaknesses associated with this design. As Stanley and Campbell (1963, p. 71) stated, “Even with the pre-*X*-predictor and *O* covariance analysis, a significant treatment effect is interpretable only when *all* of the jointly contributing matching variables have been included.” Therefore, while potential confounds that were identified to be of concern for people with companion animals were included, it is possible other confounds exist that were overlooked.

Multiple studies have shown support for self-report of affect as a valid measure (Cohen, Doyle, Turner, Alper, & Skoner, 2003; Diener, Sandvik, Pavot, & Gallagher, 1991; Sandvik, Diener, & Seidlitz, 1993; Lucas, Diener, & Suh, 1996, all as cited in Pressman & Cohen, 2005); however, self-report results might also be susceptible to bias resulting from the respondent’s mood (Lyubomirsky, King, & Diener, 2005). While instruments were chosen to minimize bias as much as possible (see also modified Differential Emotions Scale description), this study relied on self-report results.

Additionally, participants were asked to recall and report information regarding their experiences during the past two weeks. While measures were taken to minimize related problems, limitations remain. The designers of the modified Differential Emotions Scale utilized specific research-based design characteristics to minimize biases associated with recalling information (Fredrickson, 2013a). Given the nature of the Lexington Attachment to Pets Scale, recall bias should not be a concern. However, participants were also asked to calculate variables, including amount of time spent with companion animals over the past two weeks, amount of time spent in connected social interactions over the past two weeks, and amount of time spent outside over the past two weeks. Some participants reported that these variables were difficult to calculate. Not only did this relatively extended time period present risk for recall bias, it also increased risk of mathematical error.

Furthermore, time with animal proved difficult to measure in the present study. People interpreted this and reported it in various ways. For example, some reported sleeping with their animals and being with them “24/7.” It is possible others who reported less time also sleep with their animals but did not include it in their calculations. It is uncertain the impact of time with animals when awake versus when sleeping. A more effective conceptualization might have been to ask participants to report waking time with animals. Even then, there is the question of potential differences between actively interacting with animals and passively spending time with them. Amount of time with companion animal necessary to derive benefit as recommended in the literature (Jasperson, 2013; Joye, 2011) should be further explored, and the time variable should be more clearly defined in order to obtain more reliable results.

Time outside was included in the study because it can increase positive emotion, and it was identified as a potential confound since many people with companion animals spend time

outside with their animals. Typical spring weather during the time of the study tends to be associated with increases in positive emotion when people spend more time outside. However, people who spend only small amounts of time outside may experience decreased mood. Keller and colleagues (2005) reasoned this could be the result of wanting to spend more time outside and being unable to do so (Keller et al., 2005). This study happened to occur during a period of rainy, cloudy weather. As a result, it is possible that inability to spend time outside due to the weather, especially in people with companion animals who may be prone to spending time outside, resulted in decreased positive affect/increased negative affect. This may be emphasized in people who are unable to spend time with their companion animals due to the weather, since they might be disappointed by both not being able to spend time outside and being restricted in time with their companion animal. Therefore, it is important to consider that positivity results for people with companion animals might be underestimated in the current study due to the weather preventing participants from spending desired time outside and with their companion animal during the time period when the study occurred. This limitation is likely of most concern for people with horses, and possibly people with dogs. In fact, participants specifically noted that they were unable to spend as much time with their horse as they usually would due to the weather. On a similar note, time outside and time with companion animal was significantly correlated, implying the two activities co-occur.

This study did not take into consideration the proximity of time with animal relative to completing the positivity measure. Since positive emotions tend to be short in duration (Fredrickson et al., 2008; McIntyre et al., 1991), this could be an important factor to consider. While this would be a more causal approach to studying the impact of companion animals on positive emotion, the current study assessed overall (e.g., at any given time) levels of positive

emotion in people with companion animals. It is possible that companion animals are in fact a source of positive emotion, but this study did not reveal this because people without companion animals simply utilize other sources of positive emotion, and therefore the two groups enjoy similar overall levels of positive emotion.

Finally, the study was restricted to people who live in the Manhattan, Kansas area. It is possible that people in the study are inherently different from, and therefore not representative, of people who live outside of the Manhattan, Kansas area. This would affect generalizability of findings.

Recommendations for Future Studies

It is well documented in the scientific literature that positive emotions function well beyond the pleasure associated with them; this establishes the need to continue studying positive emotions (Fredrickson et al., 2000). Discussed weaknesses have implications for further studies. Specifically, future studies with broader populations could yield more representative results. A repeated measures design would be stronger (Campbell & Stanley, 1963), though also less practical and more difficult to secure sufficient participation. In addition to a stronger study design, repeated measures would address difficulty in recalling and calculating the time variables in this study. Time elapsed since spending time with companion animal could also readily be included in a repeated measures study.

Similarly, studying how companion animals function over time, and using various methods of data collection would provide more insight into how companion animals might increase positive emotions. While there is evidence for the validity of self-report of positive emotions (Cohen, Doyle, Turner, Alper, & Skoner, 2003; Diener, Sandvik, Pavot, & Gallagher, 1991; Sandvik, Diener, & Seidlitz, 1993; Lucas, Diener, & Suh, 1996, all as cited in Pressman &

Cohen, 2005), utilizing other assessment methods, such as peer reports, experience sampling, and physiological measures, could corroborate and expand upon self-report results (Fredrickson & Tugade, 2004).

Along these lines, this study did not investigate the processes by which companion animals might increase positive emotions, other than accounting for anticipated confounding variables. The section linking findings about benefits of human-animal interactions and positivity is fraught with ideas for future studies. It specifically has ideas for investigating possible chains of events involving human-animal interactions that might lead to increases in positive emotion. For example, because performing acts of kindness is associated with increases in positive emotion (Lyubomirsky, Tkach, & Sheldon, 2004, as cited in Lyubomirsky, Sheldon, & Schkade, 2005), it would be fruitful to investigate if people perceive the care that they provide their animals to be acts of kindness, and if these care acts are associated with subsequent increases in positive emotion. Also, when considering discussion of study results in light of previous studies, another area to investigate is animals as social supports. Specifically, it is recommended that future studies account for how animals as social supports relate to interactions and social support from other humans and positive emotions.

Some studies have found only very specific positive emotions to be associated with benefits (e.g., hope in Johnson et al., 2010). This study focused on an aggregate of the ten most frequently experienced positive emotions. It is possible that companion animals are associated with increases in very specific positive emotions that were not captured by the mDES, but that in actuality yield incremental increases in positive emotions that contribute to the broaden and build process. For example, Loch (1997) discussed the awe and resulting gratitude that many equestrians experience from working with their horses. Awe and gratitude are two of the ten

most frequently experienced positive emotions (Fredrickson, 2009; Fredrickson, 2013a). Specifically assessing awe and/or gratitude as positive emotions experienced by equestrians would give more insight into how positive emotions occur in specific populations with companion animals. This more targeted manner of studying positive emotions might also be sensitive enough to reflect if equestrians do in fact experience specific positive emotions associated with their companion animal, which could subsequently contribute to the broaden and build process. Additionally, companion animals have been linked to stress reduction (Barker & Wolen, 2008; conference presentation by Nagasawa, as cited by Daley Olmert, 2009; Odendaal & Meintjes, 2003). Anecdotal accounts (e.g., personal communications, November 4, 2015, anonymous for privacy reasons) illustrate that people with companion animals routinely seek comfort from their companion animal when de-stressing, calming and relaxing, such as when coming home after work. Conceptualizing calmness and relaxation as serenity, one of the ten most frequently experienced positive emotions (Fredrickson, 2009; Fredrickson, 2013a), would be another method of specifically assessing positive emotions associated with companion animals. Again, this would facilitate more sensitive assessment regarding if and how companion animals function to increase positive emotions as part of the broaden and build process.

Furthermore, investigating the impact of companion animals in specific samples would allow more controlled investigation of the specified variables, and it would provide more depth into how companion animals might increase positive emotions in humans. For example, studying companion animals in schools has practical implications. It would be fruitful to assess if companion animals facilitate calming down and serenity in students more quickly than other methods. Considering the undo effect (Fredrickson & Levenson, 1998; Fredrickson et al., 2000), if animals prompt positive emotions, then these positive emotions could facilitate students in

rebounding more quickly when upset. Also, studying students who have companion animals compared to those who do not have companion animals, and considering how companion animals specifically impact students with disabilities has important implications.

When considering limitations, creating a variable that considers time outside with accounting for weather variables that have also been associated with affect would strengthen inclusion of this variable. Also, as noted under limitations, being more specific when asking participants to recall how much time they spent with their companion animal would yield a more reliable measure. This is necessary to effectively measure how much time is necessary to derive benefit from companion animals, if this is in fact a variable that impacts benefits of companion animals on humans. While this study did not find time spent with animal to be a significant predictor in positivity, this might be more a reflection of variability in the manner participants conceptualized and reported time with animal. Furthermore, asking specific questions could help differentiate between participants with a pet in the house and those who truly love their pet and view them as a companion. Such questions could inquire about friends knowing pets' names, frequency of posting pictures of pets on social media, knowledge of which hotels allow animals and related policies and associated costs, and how often when traveling do participants seek out accommodations for their companion animal.

Finally, companion animals have been shown to positively impact their human companions on health measures; however, most of these effects are immediate and short lived (the longer-term health effects are related to the social support animals provide; Serpell, 2010). Positive emotions are also brief in nature (Fredrickson et al., 2008; McIntyre et al., 1991). On a related note, Uvnas Moberg (2003) describes what she has termed the calm and connection system, of which oxytocin is the basis. Oxytocin is associated with health benefits and positive

emotions resulting from bonding and touch. The effects of oxytocin are similarly short in duration. Uvnas Moberg (2003, p. 14) stated, “We need calm and connection not only to avoid illness, but also to enjoy life, to feel curious, optimistic, creative.” Uvnas Moberg’s description of the calm and connection system has marked similarities to certain aspects of Fredrickson’s (2013a) broaden-and-build theory. Considering these temporal consistencies and overlapping qualities, it is possible that the immediate and short-lived health effects coincide with positive emotions stemming from the same specific mechanism at work during human-animal interactions. In fact, (as stated above under Human-Animal Bond and Biophilia) Uvnas Moberg (2003) believes that oxytocin is responsible for ongoing interactions between humans and animals, because mammals are “rewarded” through the positive effects of oxytocin. It is reasonable that the touch and bonding inherent in the human-companion animal relationship results in increases in oxytocin, and that oxytocin is the mechanism through which companion animals effect some of the identified benefits in humans. It was not feasible in the current study to measure oxytocin levels in participants; however, it would be very interesting in future studies to investigate human-animal bond, time with animal, positive emotions, oxytocin levels, and health measures (especially stress-related measures).

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Table 1. *Hierarchical Regression Model Predicting Positivity, when Time Spent in Connected Social Interactions with Other Humans and Time Spent Outside is Controlled*

(*N*=244)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.134	.018	.018
	Time Humans	.000	.001	.033			
	Time Outside	.003	.002	.121			
2					.150	.023	.005
	Time Humans	.000	.001	.019			
	Time Outside	.003	.002	.117			
	Human-Animal Bond	-.006	.006	-.065			
	Time Animal	.000	.001	.047			

Note: **p* < .05; no asterisk indicates no significant findings.

Table 2. *Hierarchical Regression Model Predicting Positivity for Participants with Dogs*

(N=172)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.069	.005	.005
	Human-Animal Bond	.006	.007	-.070			
	Time with Animal	2.662E-5	.001	.002			

Note: * $p < .05$; no asterisk indicates no significant findings.

Table 3. *Hierarchical Regression Model Predicting Positivity for Participants with Cats*

(N=51)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.078	*.006	.006
	Human-Animal Bond	.001	.011	.011			
	Time with Animal	.001	.001	.074			

Note: * $p < .05$; no asterisk indicates no significant findings.

Table 4. Hierarchical Regression Model Predicting Positivity for Participants with Horses

(N=18)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.096	*.009	.009
	Human-Animal Bond	.006	.018	.092			
	Time with Animal	.001	.006	.044			

Note: * $p < .05$; no asterisk indicates no significant findings.

Table 5. *Hierarchical Regression Model Predicting Positivity for Participants with Companion Animals, When Time Spent in Connected Social Interactions with Other Humans and Time Spent Outside is Controlled*

(N=248)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.134	*.018	.018
	Time Outside	.003	.002	.120			
	Time Humans	.000	.001	.036			

Note: * $p < .05$; no asterisk indicates no significant findings.

Table 6. *Hierarchical Regression Model Predicting Positivity for Participants without Companion Animals, When Time Spent in Connected Social Interactions with Other Humans and Time Spent Outside is Controlled*

(N=57)

Model	Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>R</i> ²	<i>R</i> ² Change
1					.307	.157	.157*
	Time Outside	.000	.004	-.003			
	Time Humans	.004	.001	.398			

Note: * $p < .05$; no asterisk indicates no significant findings.

Appendix A - Institutional Review Board Letter



University Research Compliance Office

TO: Fred Bradley
SECSA
369 Bluemont

Proposal Number: 7687

FROM: Rick Scheidt, Chair 
Committee on Research Involving Human Subjects

DATE: 04/10/2015

RE: Proposal Entitled, "A study of the contribution of specific variables (type of animal, human-animal bond, time spent with animal) related to companion animals on measures of positivity."

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written - and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Appendix B - modified Differential Emotions Scale (mDES)



APPENDIX

modified Differential Emotions Scale

Instructions: Please think back to how you have felt during the past 24 h. Using the 0–4 scale below, indicate the *greatest amount* that you have experienced each of the following feelings.

Not at all 0	A little bit 1	Moderately 2	Quite a bit 3	Extremely 4
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1. What is the most **amused, fun-loving, or silly** you felt?
2. What is the most **angry, irritated, or annoyed** you felt?
3. What is the most **ashamed, humiliated, or disgraced** you felt?
4. What is the most **awe, wonder, or amazement** you felt?
5. What is the most **contemptuous, scornful, or disdainful** you felt?
6. What is the most **disgust, distaste, or revulsion** you felt?
7. What is the most **embarrassed, self-conscious, or blushing** you felt?
8. What is the most **grateful, appreciative, or thankful** you felt?
9. What is the most **guilty, repentant, or blameworthy** you felt?
10. What is the most **hate, distrust, or suspicion** you felt?
11. What is the most **hopeful, optimistic, or encouraged** you felt?
12. What is the most **inspired, uplifted, or elevated** you felt?
13. What is the most **interested, alert, or curious** you felt?
14. What is the most **joyful, glad, or happy** you felt?
15. What is the most **love, closeness, or trust** you felt?
16. What is the most **proud, confident, or self-assured** you felt?
17. What is the most **sad, downhearted, or unhappy** you felt?
18. What is the most **scared, fearful, or afraid** you felt?
19. What is the most **serene, content, or peaceful** you felt?
20. What is the most **stressed, nervous, or overwhelmed** you felt?

Note: This image of the mDES was obtained from Fredrickson, 2013a.

Appendix C - Lexington Attachment to Pets Scale (LAPS)

Lexington Attachment to Pets Scale

Please tell us whether you agree or disagree with some very brief statements about your favorite pet. For each statement, check whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. You may refuse to answer.

	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly	Don't Know or Refuse
a. My pet means more to me than any of my friends.					
b. Quite often I confide in my pet.					
c. I believe that pets should have the same rights and privileges as family members.					
d. I believe my pet is my best friend.					
e. Quite often, my feelings toward people are affected by the way they react to my pet.					
f. I love my pet because he/she is more loyal to me than most of the people in my life.					
g. I enjoy showing other people pictures of my pet.					
h. I think my pet is just a pet.					
i. I love my pet because it never judges me.					
j. My pet knows when I'm feeling bad.					
k. I often talk to other people about my pet.					
l. My pet understands me.					

Agree Strongly
Agree Somewhat
Disagree Somewhat
Disagree Strongly
Don't Know or Refuse

Appendix C – Lexington Attachment to Pets Scale (LAPS), Continued

	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly	Don't Know or Refuse
m. I believe that loving my pet helps me stay healthy.					
n. Pets deserve as much respect as humans do.					
o. My pet and I have a very close relationship.					
p. I would do almost anything to take care of my pet.					
q. I play with my pet quite often.					
r. I consider my pet to be a great companion.					
s. My pet makes me feel happy.					
t. I feel that my pet is a part of my family.					
u. I am not very attached to my pet.					
v. Owning a pet adds to my happiness.					
w. I consider my pet to be a friend.					

Note: This image of the LAPS was obtained from Anderson, 2007.