December 2020

Effects of Values-Based Affirmation About Pets on Physiological and Emotional Arousal

Karen Floan
University of Wisconsin-Milwaukee

EFFECTS OF VALUES-BASED AFFIRMATION ABOUT PETS ON PHYSIOLOGICAL AND EMOTIONAL AROUSAL

by

Karen Floan

A Thesis Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Master of Science

in Psychology

at

The University of Wisconsin-Milwaukee

December 2020

ABSTRACT

EFFECTS OF VALUES-BASED AFFIRMATION ABOUT PETS ON PHYSIOLOGICAL AND EMOTIONAL AROUSAL
by

Karen Floan

The University of Wisconsin-Milwaukee, 2020
Under the Supervision of Professor Raymond Fleming, Ph.D.

The purpose of the current study was to explore whether valuing a pet dog after writing about a negative personal experience could facilitate cardiovascular recovery, reduce anxiety, and boost positive affect even in the absence of the pet. Data was analyzed using one-within and one-between repeated-measures ANOVAs. It was found that there were no significant between-group differences in cardiovascular responses to the affirmation manipulation such that HR decreased at roughly the same rate as the control condition. Self-reported ratings of anxiety significantly decreased for both groups across time, and there was no overall effect on positive mood. Therefore, it was concluded that valuing a pet dog was not more effective at reducing the stress response than writing about the contents of a closet.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Effects of Values-Based Affirmation About Pets on Physiological and Emotional Arousal

Canine companions have long enriched our lives, and for many, have become an integral part of the family. According to the 2017-2018 American Pet Products Association (APPA) National Pet Owners Survey, there has been a consistent increase in pet ownership over the last couple of decades such that 68%, or 84.6 million, of U.S. households own a pet; 48% of which own dogs. In recent years, research suggests that canine companionship provides social, cognitive, and physical benefits for humans. Not only is their presence good for decreasing loneliness (Banks & Banks 2002; 2005), they can also facilitate social interactions with others (Eddy, Hart, & Boltz, 1988; Hart, Hart, & Bergin, 1987; Mader, Hart, & Bergin, 1989; Wood et al., 2015) and reduce physiological arousal when introduced to an acute stressor (Allen, Blascovich, & Mendes, 2002; Allen, Blascovich, Tomaka & Kelsey, 1991; Beetz et al., 2011).

Although compelling evidence supports that the mere presence of a dog is enough for humans to reap significant health benefits, thus far no studies have addressed whether dogs have the same effect when their owner is actively valuing them as an important part of their life. This experiment seeks to answer if writing about an important value, one's canine companion, after writing about a negative personal experience, can help facilitate cardiovascular recovery, reduce anxiety, and uplift mood even in the absence of the pet. The following literature review will cover values-based affirmation and expressive writing as a basis for the current study.

Values Affirmation

Steele's (1988) values affirmation, or self-affirmation theory, proposes that people have a fundamental need to maintain a positive self-view. Affirmations of personal characteristics (e.g., skills or physical attractiveness) or external values (e.g., relationships or religion) can serve as an indirect coping mechanism against threatening information or events that would cause distress.

When a threat is perceived, individuals have a few avenues they can take to psychologically adapt or buffer the stress. People may engage in defensive behavior such as denial, avoidance, and dismissal, or they might involve themselves in rationalizations whereby they can then interpret the situation as less threatening to their self-concept (Sherman & Cohen, 2006). However, these maladaptive behaviors do not completely ameliorate the distress or help the person to learn from the experience. Sherman and Cohen (2006) supported the idea that dealing with threats to the self in this manner may alter the way in which a person deals with their circumstances leading them to no longer need the use of defensive coping behaviors.

Over the years, values affirmation and its benefits on both mind and body have been well documented. For instance, Creswell and colleagues (2005) provided the first evidence that values affirmation can buffer neuroendocrine and psychological responses to stress. By comparing a values-affirmation group and a no-affirmation control group, these researchers were able to discover that affirming one's personal values before stressful tasks could lessen cortisol release. Both the experimental and control groups had similar cardiovascular reactivity to the stressor as well, indicating that regardless of the condition, they engaged with the task in equal measure. However, participants in this study only answered questions pertaining to their values. Perhaps if researchers had asked them to detail why their value was important, they would have found a difference in cardiovascular measures between groups. Another study found similar results in that the values-affirmation group had lower cortisol reactivity to an acute stressor than those in the no-affirmation condition (Gregg, Namekata, Louie, & Chancellor-Freeland, 2014). Sherman, Bunyan, Creswell, and Jaremka (2009) sought to understand if values affirmation also had the same benefits when participants were faced with naturalistic stressors. The researchers randomly assigned college students to either an affirmation or no-affirmation condition and had them

complete values affirmation exercises in the weeks prior to an important academic examination. A urinary assessment showed that those in the no-affirmation condition had significantly increased epinephrine levels from baseline whereas those who affirmed their most important value did not significantly differ from baseline. Tang and Schmeichel (2015) also documented the benefits that values affirmation can have on cardiovascular recovery. Self-threat was induced by giving participants either neutral or insulting feedback on an essay they had written regarding a hot-button issue. By affirming an important value, participants had lower mean arterial pressure by the study's conclusion compared to the control condition. This suggests that affirmation does facilitate cardiovascular recovery. Furthermore, receiving an insulting evaluation significantly raised heart rate except for individuals that affirmed their most important values.

Recently, there have been new developments in understanding just how affirmations effect human physiology. Crowell (2017) wanted to extend self-affirmation theory beyond the scope of it being a protectant of one's self-view to determine if affirmation has an effect on basic emotional responding. After an affirmation manipulation, participants viewed a slideshow of images from the International Affective Picture System (IAPS) while their startle eye-blink responses were recorded via facial electromyography (fEMG). Participants also filled out the Behavioral Inhibition System (BIS) questionnaire. It was found that for those high in BIS, affirming personal values reduced startle eye-blink, a defensive response, to negatives images. An additional study revealed a higher magnitude of Late Positive Potentials (LPP) in electrocortical activity among those that scored high in BIS and had affirmed their values. These results suggest that participants processed the negative images for a longer period of time compared to those in the no-affirmation condition (Crowell, 2017). These findings were

replicated by Finley, Crowell, and Schmeichel (2018) signifying that affirmed individuals higher in BIS showed more engagement and less defensive distancing to the aversive stimuli than those who did not affirm.

In a similar vein, values affirmation has also been known to decrease defensiveness to threatening health information, making those who affirm more open and receptive. Sherman, Nelson, and Steele (2000) examined how female coffee and non-coffee drinkers would react to a fabricated health report positively correlating caffeine intake with the development of breast cancer. Half of the women affirmed a core personal value while the other half did not. Generally, coffee drinkers were more critical of the health message than non-coffee drinkers except if they had affirmed a central value. Those that self-affirmed were more open to the health information and more motivated to reduce their caffeine consumption. Harris and Napper (2005) were able to replicate these findings with women that consumed alcohol. Participants were divided into low and high drinking groups and half were assigned to an affirmation condition while the other half were assigned to a no-affirmation condition. Participants then read a pamphlet pertaining to alcohol consumption and breast cancer. Women at higher risk who affirmed their most important value showed greater acceptance of the information and its implications for their health. Affirmed participants also reported more negative emotions while reading the brochure, which the researchers suggested was an indication that self-affirmation allows for increased threat acceptance. A similar trend was seen with smokers that viewed aversive images after a self-affirmation exercise in that they reported more negative feelings and they felt the images were more threatening and personally relevant (Harris, Mayle, Mabbott, & Napper, 2007).

Many studies have established that affirmation exercises can lower defensiveness and increase receptivity, however, not many experiments attempt to demonstrate why affirming

values has such an effect. Crocker, Niiya, and Mischkowski (2008) challenged Steele's (1988) theory that self-affirmation works to protect self-integrity by maintaining a positive self-image. Instead, they proposed that affirmations work by self-transcendence, by inspiring people to better themselves and reminding them of important values that extend beyond the self. In order to test their hypothesis, they performed an affirmations manipulation and had participants fill out a questionnaire pertaining to their feelings during the affirmation exercise. Results showed that feelings of love and connectedness increased for both men and women regardless of their value. A second study revealed that when these two emotions were controlled for, the affirmation exercise no longer predicted acceptance of threatening information from a leaflet on smoking (Crocker et al., 2008). Moreover, another study found that values affirmation increased feelings of self-compassion and these feelings fostered prosocial behaviors (Lindsay & Creswell, 2014).

While much of the past research regarding values affirmation has focused on acute stressors, there remains little research on how effective this mechanism is for coping with extremely negative life events. Niles, Haltom, Leiberman, Hur, and Stanton (2016) assessed repeated exposure to a stressful situation by having half of participants write about the traumatic event on four separate occasions, while the control group wrote about how they spent their time. Each essay was coded for positive and negative affect, level of detail, narrative structure, self-affirmation, and discovery of meaning. It was found that once baseline anxiety was controlled for, more frequent self-affirmations and detailed descriptions of the trauma predicted lower anxiety symptoms. It was also noted that positive word usage was significantly correlated with self-affirmation statements, and negative emotion words were positively correlated with higher anxiety. Katz, Czech, and Orsillo (2014) also documented that values affirmation writing was associated with more positive affect words which may account for its anxiety-reducing benefits.

Although there is a lack of experiments directly studying affirmations as a useful coping mechanism for trauma, there is research that suggests the negative emotions caused by stressful events can be alleviated through values affirmation. One such study found that participants that affirmed their values were more apt to appraise distressing events as less negative than those who did not affirm (Pauketat, Moons, Chen, Mackie, & Sherman, 2016). Another series of studies showed that participants that were given an opportunity to self-affirm ruminated less about a failed IQ test, and they exhibited more positive emotion on a disguised mood measure (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999). Likewise, values affirmation has been shown to be useful in reducing death-thought accessibility after participants answered questions about their own mortality (Schmeichel & Martens, 2005). However, among those with posttraumatic stress disorder (PTSD), self-affirmation only served as an anxiety buffer for those low in PTSD symptoms (Vail, Morgan, & Kahle, 2018).

In short, the research is suggestive that values affirmation is a powerful tool to use when a threat to the self is perceived. With these findings in mind, it would stand to reason that affirming important values, even of a beloved pet, could potentially lead to less avoidance of memories relating to a distressing personal experience. Writing about one's dog may also increase feelings of love leading to improved mood and lower anxiety following an expressive writing task. Importantly, it should be noted that no studies thus far specifically ask participants to value a canine companion, but that is not to say that participants in the aforementioned studies chose not to detail their pets as an important value. It simply means that these studies did not clearly define the content of participant's affirmations in the final manuscript. Nevertheless, given the amount of people that report pets as a core part of their support system (Allen et al., 2002), it would be a fair assessment to say that dogs are of respective importance to their owners,

and if deeply valued, could facilitate cardiovascular recovery when asked to recall a negative experience.

Expressive Writing

The current study also draws on evidence that expressive writing of stressful events can be therapeutic in the long-term by aiding in recovery and providing a range of health benefits. Pennebaker and Beall (1986) posited that actively inhibiting one's behavior, thoughts, and feelings takes physiological effort, and over time, this stress on the body could increase the likelihood of developing stress-related diseases (Selye, 1976). For instance, stress is known to cause worry, or ruminative thoughts, which increases and prolongs physiological arousal (Brosschot, 2010). This physical arousal, better known as the body's fight-or-flight response, increases sympathetic nervous system activity by raising heart rate, blood pressure, activating sweat glands, and relegating more blood to muscles in preparation to either fight or flee (Cannon, 1915). While the fight-or-flight response may be seen as adaptive when a person is faced with a life or death situation, consistently being under low levels of stress can culminate in greater wear and tear on the body. Thus, it is important to consider evidence suggesting the magnitude of the stress response can be reduced, and articulation of one's thoughts and feelings via writing is one such way of doing so.

Accumulating research in this area points toward several positive physical and mental health outcomes. For example, expressive writing boosted student's grade point average and mood up to two months following the conclusion of the study (Cameron & Nicholls, 1998). Moreover, written expression of emotion regarding trauma-related memories decreased cortisol responses and increased mood in patients diagnosed with PTSD (Smyth, Hockemeyer, & Tulloch, 2008). Although most of the research shows that expressive writing can prove cathartic

in the long-term, the immediate consequences of emotional disclosure can be quite dramatic as seen in one study where participants that wrote about a personal trauma immediately experienced more intense feelings of fear, anger, and higher depressed mood (Greenberg, Wortman, & Stone, 1996). However, the aforementioned study also conducted a 1-month follow-up procedure in which trauma participants reported fewer illness visits but also revealed they exhibited more fatigue and avoidance behaviors. In contrast, Holmes and colleagues (2007) examined the narratives of 25 abused women and discovered that the use of significantly more positive and negative words correlated with higher reports of physical pain over the course of a four-month period. These researchers concluded that the level in which a person engrosses themselves in memories of a traumatic event has an effect on physical health outcomes. If, in some cases, writing about exceptionally stressful experiences can cause deleterious effects, one could reason that writing about positive, important values after an expressive writing exercise might prevent unwanted side-effects by "undoing" negative emotions (Fredrickson & Levenson, 1998).

Previous studies have shown that writing about positive events can have similar effects to writing about negative experiences. In a study by Burton and King (2004), participants were asked to write about intensely positive experiences (IPE) or a control topic for 20 minutes over the course of three days. Analysis of self-reported measures showed an enhancement of mood and significantly less health center visits for the IPE group. Furthermore, King (2001) compared participant's writing about their best personal selves, traumatic life events, or a control topic. Results revealed that writing about oneself in a positive light can have the same benefits as writing about a trauma. In contrast, Klein and Boals (2001) found that writing about negative life events is superior to writing about pleasant experiences because it improves working memory performance and decreases intrusive thoughts. Perhaps the discrepancy in these findings is due to

the differences in writing content of the positive writing exercises, one study having participants concentrate on positive external experiences and the other having participants focus on positive aspects of the self.

Research has consistently shown that expressive writing can have a multitude of health benefits, and yet there is a lack of research that attempts to quantify why it is so effective. As previously mentioned, it has been hypothesized that bottling-up behaviors and emotions requires physiological work. Therefore, it is pertinent to look at research pertaining to disclosure. For example, HIV infection appears to progress at a faster rate among gay men who have not disclosed their sexuality (Cole, Kemeny, Taylor, & Visscher, 1996). Researchers have also documented that prison inmates assigned to a written-disclosure condition about upsetting experiences had subsequently less infirmary visits after the writing intervention compared to those in other groups (Richards, Beal, Seagal, & Pennebaker, 2000). In a study by Pasupathi (2007) participants wrote about a personal event or situation that they had either disclosed or not disclosed to another person. Results showed that those who did not disclose the event tended to use more present-tense verbs, whereas participants who did disclose used more past-tense verbs indicating more resolution.

Collectively, the majority of research on written expression of emotion provides evidence for mental and physical health improvements, albeit there seem to be circumstances in which immersive expressive writing can exacerbate negative health symptoms. From a cognitive-behavioral perspective, it is arguable that such emotional arousal is necessary for long-term therapeutic change (Samoilov & Goldfried, 2000), and animals, like those used in Animal-Assisted Therapy (AAT), could interfere with affective processing due to the calming effect their presence has on human affect and physiology. Despite this enduring belief, one study sought to

challenge this notion by incorporated dogs to simulate AAT during a trauma writing exercise. Hunt and Chizkov (2014) assigned undergraduates to write about a traumatic event or to describe the layout of different rooms during three 20-minute writing sessions with or without a dog present. It was found that participants in the trauma-dog condition reported significantly less depressive symptoms and anxious arousal after each essay than those in the trauma-no-dog condition. Furthermore, an analysis of trauma essays in Lingistic Inquiry and Word Count (LIWC) showed that participants in both trauma conditions wrote comparable essays suggesting the dog was not a distraction. This experiment provides the first evidence that the presence of a dog did not diminish the effectiveness of expressive writing, but may have made the experience of recalling negative events less unpleasant (Hunt & Chizkov, 2014).

Current Study

Although numerous studies detail the effects of values affirmation and expressive writing, no studies have focused on valuing pets. Moreover, little research addresses how values affirmation works as a coping mechanism for dealing with intensely negative experiences, and only one study addresses if dogs help or hinder immersion in emotional writing. Therefore, the current study explored the possibility that valuing one's canine companion after writing about an exceptionally negative experience would help facilitate cardiovascular recovery, reduce anxiety, and boost mood even in the absence of the pet.

It was hypothesized that affirming the value of a pet dog would facilitate cardiovascular recovery such that, by the end of the study, participants in the trauma-values condition would have lower heart rate than those assigned to the trauma-control condition. It was also predicted that those that affirm the value of their dog will report lower anxious arousal and higher positive affect relative to those that write about a control topic. Furthermore, it was hypothesized that the

strength of the participant's pet attachment will positively correlate with the effectiveness of the values writing task in lowering physiological arousal.

Methods

Participants

The online Sona system and PowerPoint slides were used to recruit college students at the University of Wisconsin-Milwaukee (UWM). There were no restrictions in regards to gender, ethnicity, age, or major throughout recruitment; although, smokers and those that had heart or lung ailments were not eligible to participate due to cardiovascular responses being measured. Hence, the main inclusionary criteria stated that individuals must be non-smokers, must not have a history of cardiovascular or respiratory issues, and must own and live with at least one dog. A total of 51 undergraduates participated in the current study, but six participants' data was excluded from final analysis due to much of the data being unreadable. Specifically, four participants were excluded from the values condition and two were excluded from the control condition. A final sample of 45 individuals ages 18-34 (M = 21.71, SD = 3.76) completed two writing tasks and various questionnaires while having their heart rate recorded. After excluding those with unreadable data, the trauma-values condition had a total of 21 participants and the trauma-control condition had 24 participants. See Table 1 for further demographic information.

Table 1
Participant Demographics

Variable		
Gender		
Female	n = 34	75.6%
Male	n = 11	24.4%
Ethnicity		
White/Caucasian	n = 32	71.1%
Black/African American	n = 6	13.3%

Asian/Pacific Islander	$n = 5$	11.1%
Hispanic/Latino	$n = 1$	2.2%
Other	$n = 1$	2.2%

Note. $N = 45$.

Apparatus

Cardiovascular Measures. A BioPac MP35 Acquisition Unit (Biopac Systems, Inc., Santa Barbara, CA), was used to gather heart rate (HR) and heart rate variability (HRV) information throughout the experiment to gauge whether participants adequately engaged in the writing tasks to cause physiological arousal and induce physiological recovery from an acute stressor. Using a lead III configuration for participants with right-handedness, a disposable ECG electrode was placed on the left wrist and one electrode on both inner ankles. For left-handed participants, a lead II configuration was used whereby one disposable ECG electrode was placed on the upper right arm with one electrode on both inner ankles. The difference in electrode placement for right or left-handed individuals was simply so that the BioPac cables would not impede on participant's ability to write and fill out questionnaires.

LIWC. Linguistic Inquiry and Word Count software (Pennebaker, Booth, Boyd, & Francis, 2015) was used in an exploratory analysis for the writing tasks. Writing tasks were first typed and then prepared for LIWC by correcting spelling mistakes and abbreviations. The academic version of LIWC was then purchased for use for one month from the official LIWC website. The word categories of most interest were that of positive and negative emotion.

Self-Report Measures

Prospective participants learned of the study's inclusionary criteria via the Sona System. Basic demographic information was collected through the Sona System at the time each individual scheduled a participation appointment. When participants arrived at the laboratory, the

researcher confirmed eligibility by asking if individuals were non-smokers, had any history of cardiovascular or respiratory ailments, and if they owned and lived with at least one dog.

Brief Resilience Scale. The Brief Resilience Scale (BRS; Smith et al., 2008; Appendix A) is a questionnaire developed to assess an individual's ability to recover from stress. At the beginning of the study, participants were asked to rate six items on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." A sample statement reads as follows, "I tend to take a long time to get over set-backs in my life." The purpose of using the BRS was to make sure there was no significant differences in stress resiliency between conditions. The Cronbach's α for the BRS was .89 in the present study.

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; Appendix E) was used twice throughout the study, once at first recovery and again at second recovery. The PANAS consists of 10 positive (e.g., "inspired," "excited") items and 10 negative (e.g., "afraid," "hostile") items that were scored by computing the sum of each category. In the present study, the PANAS was found to have a Cronbach's α range of .77 to .82.

Perceived Arousal Scale. The Perceived Arousal Scale (PAS; Anderson, Deuser, & DeNeve, 1995; Appendix F) was also given two times throughout the study during both recovery phases. This questionnaire measured current perceived arousal and consisted of 24 adjectives that were rated on a 5-point Likert scale from "extremely" to "very slightly or not at all." Arousal scores were calculated by reverse scoring low-arousal items and summing the new low-arousal scores and high-arousal scores. The PAS has been found to be both reliable and valid as either a 5-point or 7-point scale (Anderson et al., 1995), and within the current study, received a Cronbach's α score of .90 to .92.

State-Trait Anxiety Inventory. The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970; Appendix G) was given at each recovery period to assess current anxious arousal and in addition to the PANAS and PAS. Participants rated 20 items on a 4-point scale ranging from "very much so" to "not at all." Sample items include "I am presently worrying over possible misfortunes" and "I am tense." The STAI has been found to be a highly reliable and valid measure of state-anxiety (Metzger, 1976; Spielberger, Reheiser, Ritterband, Sydeman, & Unger, 1995). The Cronbach's α for the STAI ranged from .92 to .93 in the present study.

Lexington Attachment to Pets Scale. The Lexington Attachment to Pets Scale (LAPS; Johnson, Garrity, & Stallones, 1992; Appendix H) is a 23-item questionnaire that measures general pet attachment, pet substitution for people, and animal rights; however, general pet attachment was the main focus for this study. Participants were asked to rate statements on a 0-3-point scale from "strongly agree" to "strongly disagree." Examples of statements include, "My pet means more to me than any of my friends" and "I feel that my pet is a part of my family." The LAPS has been found to have excellent reliability, high internal consistency, and content validity (Johnson et al., 1992). This questionnaire was administered last during the second recovery. The LAPS was found to have Cronbach's α score of .86.

Writing Tasks

All participants were asked to write for 10 minutes about a significant personal trauma from their past with no restriction as to subject, timeframe, or age at which the trauma occurred. Participants were randomly assigned the second writing task which was either to write about the contents of their closet or write about their canine companion. The trauma writing (Appendix B) specifically asked participants to detail their inner most thoughts and feelings in regards to the

experience. Trauma topics included, but were not limited to, suicide, sexual assault, being the victim of a natural disaster, etc. Additionally, there were two items at the end of the trauma writing tasks which asked participants to score how much their trauma still affected them and if they had disclosed this specific event to another person. Those that were assigned to the values affirmation condition (Appendix C) were asked to write for 10 minutes about their pet dog by detailing their deepest thoughts and feelings about their canine companion, and in addition, writing about a time in their relationship where their dog was of particular importance to them. The control condition writing task (Appendix D) asked participants to write for 10 minutes about the contents of their closet.

Procedure

Upon arrival to the Stress and Coping laboratory at UW-Milwaukee, a researcher went over inclusionary criteria once more with each prospective participant to make sure they were eligible for the study. Once eligibility was confirmed, participants were seated and given an informed consent document to read and sign. Participants were free to ask questions about the consent document or the study before participation. If participants had no further questions, the researcher asked that cellphones be silenced to avoid disruptions during the study. Participants were then identified as either right or left-handed and fitted with ECG electrodes that connected to a BioPac MP35 unit. Figure 1 represents a visual guide of the experimental procedure including the time duration for each phase.

During initial baseline, the BRS was administered and participants were asked to sit quietly until the researcher returned. After baseline was collected, all participants were given 10 minutes to write about a significant personal trauma. Additionally, participants rated on a 5-point Likert scale how much their trauma still affected them and if they had disclosed this event to

another person. A brief recovery period followed in which participants filled out the PANAS, PAS, STAI questionnaires. For the second writing task, participants were asked to write about either their pet dog or the contents of their closet. Next, participants underwent another brief recovery period where they again filled out the PANAS, PAS, and STAI with the addition of the LAPS questionnaire. A final baseline of heart rate was then collected and participants were informed that the study was over and that they could relax until the researcher returned. Lastly, participants were asked how many dogs they owned, debriefed, and given a list of mental health resources should they need them.

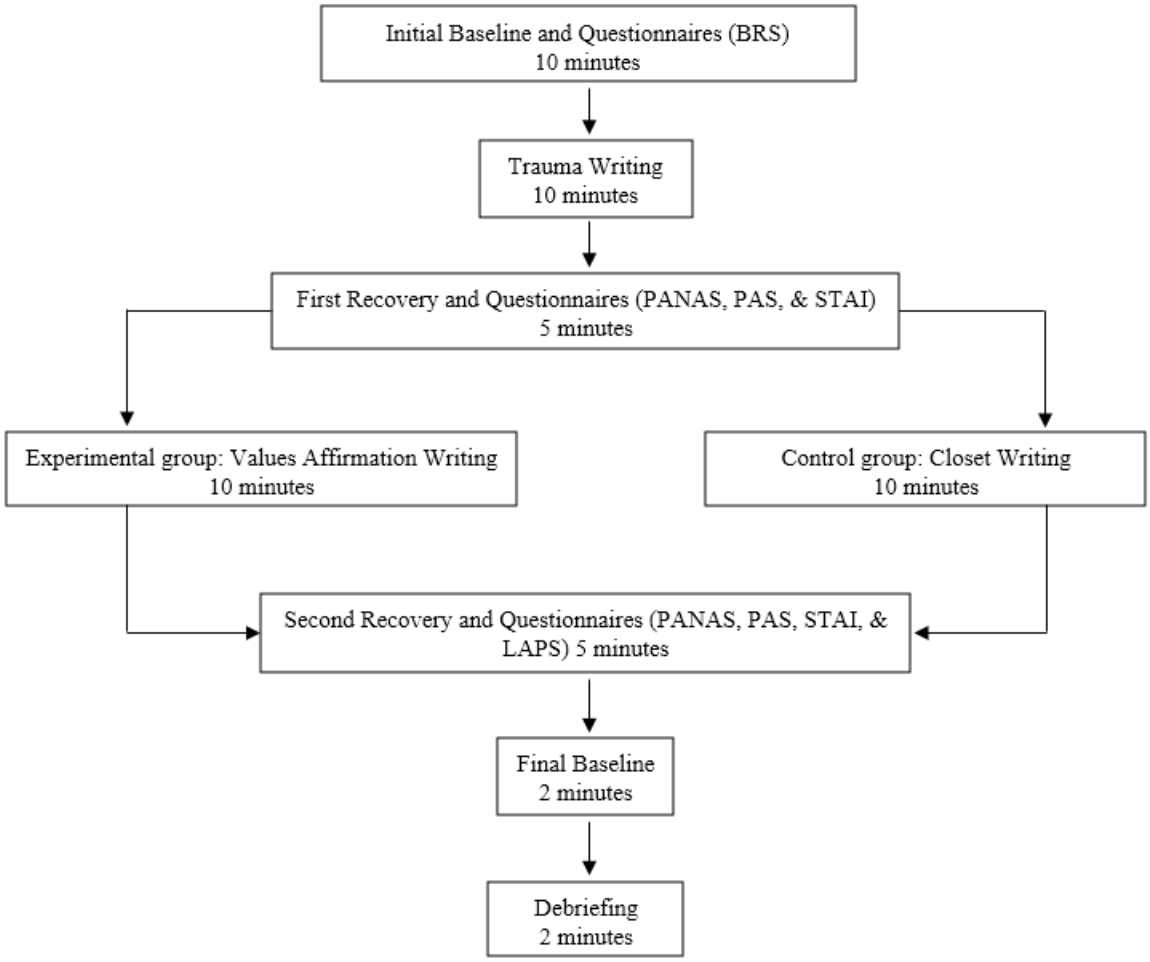

Figure 1. Visual representation of experimental procedure timeline. The order of phases is read from top to bottom, and the arrows indicate the next phase in the experiment. Each cell briefly describes what participants were asked to do and the length of that particular phase.

Results

Hypothesis Testing

The current study's data was analyzed using IBM SPSS software, and a significance level of $p < .05$ was applied. To assess the first hypothesis that valuing a pet dog would facilitate faster cardiovascular recovery than writing about a neutral topic, one-between (group), one-within (phase) repeated-measures ANOVAs were conducted, and since the assumption of sphericity was violated, the Greenhouse-Geisser correction was made. Results showed that participant's mean HR did not significantly differ by condition, $F(1, 40) = .56$, $p = .46$, but it did significantly differ by phase, $F(3.08, 123.28) = 13.64$, $p < .001$. There was also no significant interaction between phase and condition, $F(3.08, 123.28) = .24$, $p = .88$. Hence, the first hypothesis was unsupported since the values writing task did not have an effect on reducing average HR more rapidly than the control writing task. Similarly, once the Greenhouse-Geisser correction was made, mean HRV was found to significantly differ by phase, $F(2.89, 115.60) = 7.10$, $p < .001$, but there was no significant difference between conditions, $F(1, 40) = 1.26$, $p = .27$. The interaction between phase and condition was also not significant, $F(2.89, 115.60) = 1.24$, $p = .30$. Table 2 shows the descriptive statistics for HR and HRV by phase.

Table 2
Descriptive Statistics for Cardiovascular Responses

Variable	*M*	*SD*	*SE*
Average HR			
Initial Baseline			
Control	86.27	12.07	2.46
Values-Affirmation	83.34	10.67	2.51
Trauma Writing			
Control	89.02	12.84	2.62
Values-Affirmation	87.13	9.76	2.30
Recovery 1			
Control	86.89	12.06	2.46
Values-Affirmation	84.04	9.50	2.24
Values/Control			

Control	87.17	12.17	2.48
Values-Affirmation	85.17	8.14	1.92
Recovery 2			
Control	85.99	12.37	2.52
Values-Affirmation	83.32	9.43	2.22
Final Baseline			
Control	84.13	12.05	2.46
Values-Affirmation	81.24	11.07	2.61
Average HRV			
Initial Baseline			
Control	9.07	11.56	2.36
Values-Affirmation	16.31	18.70	4.41
Trauma Writing			
Control	8.45	9.62	1.96
Values-Affirmation	11.08	10.05	2.37
Recovery 1			
Control	10.88	11.51	2.35
Values-Affirmation	14.79	16.59	3.91
Values/Control			
Control	9.53	10.47	2.14
Values-Affirmation	12.08	10.61	2.50
Recovery 2			
Control	12.12	12.46	2.54
Values-Affirmation	15.37	14.03	3.31
Final Baseline			
Control	13.42	13.41	2.74
Values-Affirmation	19.73	20.35	4.80

Note. M = mean; SD = standard deviation; SE = standard error; HR = heart rate; HRV = heart rate variability.

An analysis of within-subjects contrasts of phase revealed a significant increase in average HR from initial baseline leading into the trauma writing task, $F(1, 40) = 21.58$, $p < .001$, thereby indicating that participants adequately engaged with the trauma task enough to trigger the body's stress response. Additionally, another within-subjects contrasts of phase showed a significant decrease in HRV from initial baseline to the trauma writing task, $F(1, 40) = 4.56$, $p = .04$ as well as a significant decrease from recovery one to the second writing task, $F(1, 40) = 4.17$, $p < .05$. Since one of the consequences of activating the body's fight-or-flight response is

lower HRV, these findings seem to suggest that participants found both writing tasks stressful to a degree. Further within-subjects contrasts for both HR and HRV are shown in Tables 3.

Table 3
Within-Subjects Contrasts of Phase for Cardiovascular Responses

Variable	*F*	*Significance*
Average HR		
Phase		
Level 1 vs. Level 2**	21.567	.000
Level 2 vs. Level 3**	30.538	.000
Level 3 vs Level 4	2.285	.139
Level 4 vs Level 5**	14.403	.000
Level 5 vs Level 6*	7.168	.011
Phase * Condition		
Level 1 vs Level 2	.542	.466
Level 2 vs Level 3	1.045	.313
Level 3 vs Level 4	.836	.366
Level 4 vs Level 5	.705	.406
Level 5 vs Level 6	.023	.881
Average HRV		
Phase		
Level 1 vs. Level 2*	4.558	.039
Level 2 vs. Level 3*	9.698	.003
Level 3 vs Level 4*	4.172	.048
Level 4 vs Level 5*	11.283	.002
Level 5 vs Level 6*	3.253	.079
Phase * Condition		
Level 1 vs Level 2	2.832	.100
Level 2 vs Level 3	.416	.522
Level 3 vs Level 4	.461	.501
Level 4 vs Level 5	.159	.692
Level 5 vs Level 6	.951	.335

Note. HR = heart rate; HRV = heart rate variability
* $p < .05$. ** $p < .001$.

A repeated-measures ANOVA was also used for analysis of the second hypothesis predicting that participants who valued their pet dog would report lower anxious arousal and higher positive affect during second recovery. Results showed that anxiety was significantly reduced for both conditions from first to second recovery, $F(1, 41) = 18.29$, $p < .001$, but there was no significant difference between the values and control condition, $F(1, 41) = .69$, $p = .41$. However, for positive affect, there was no overall effect for either condition, $F(1, 39) = 381.16$, $p = .99$ or time, $F(1, 39) = .06$, $p = .81$. Thus, the second hypothesis was not supported since anxiety was reduced for both groups regardless if they valued their canine companion or wrote about the contents of their closet, and positive affect did not significantly increase after valuing a pet dog.

Lastly, a Pearson's Correlation was used to test the hypothesis that the strength of pet attachment would positively correlate with the effectiveness of the values affirmation writing task by decreasing physiological arousal. When the control group was excluded from the analysis, results showed that there was no significant relationship between general pet attachment and average heart rate, $r(18) = .37$, $p = .11$, or average heart rate variability, $r(18) = -.40$, $p = .08$ at the time of second recovery. Although the final hypothesis was not supported, there was a positive correlation between general pet attachment and positive affect at second recovery when all participants were included in the analysis, $r(41) = .34$, $p < .05$.

Additional Analyses

Self-report Measures. Firstly, an independent-samples *t*-test was performed to make sure that both conditions did not differ significantly on the BRS. Findings showed no significant difference between the trauma-values ($M = 3.38$, $SD = .90$) and the trauma-control conditions ($M = 3.12$, $SD = .73$), $t(43) = 1.09$, $p = .17$. Next, repeated-measures ANOVAs were conducted to

determine the difference in self-report measures between both group and time. Results revealed that negative affect had significantly decreased for both conditions from recovery one to recovery two, $F(1, 43) = 25.88$, $p < .001$, but there was no significant difference in negative affect by condition, $F(1, 43) = .07$, $p = .79$. Conversely, perceived arousal significantly increased for both groups across time, $F(1, 35) = 6.03$, $p = .02$; however, there was no main effect by condition, $F(1, 35) = .01$, $p = .93$. These findings suggest that writing about the contents of one's closet was equally as effective at reducing negative affect as writing about a pet dog while also increasing perceived arousal.

Additional Pearson's Correlations were conducted to examine the relationship between the questionnaires. Brief Resilience scores were negatively correlated with negative affect at first recovery, $r(43) = -.53$, $p < .001$, but this relationship was not significant at second recovery, $r(43) = -.23$, $p = .12$. However, resilience scores and anxiety held a significant negative relationship between both recovery one, $r(42) = -.64$, $p < .001$ and recovery two, $r(42) = -.44$, $p < .01$. These findings show that participants with lower resilience tended to report more negative emotions immediately after writing about a trauma, and also feel more anxiety throughout the study, even after writing about their pet dog or a neutral topic. Table 4 shows the correlation coefficients for the self-report measures.

Table 4
Pearson's Correlations for Self-Report Measures

Measure	1	2	3	4	5	6	7	8	9	10
1. BRS	-									
2. PA R-1	.29	-								
3. NA R-1	-.53**	-.27	-							
4. PA R-2	.25	.66**	-.07	-						
5. NA R-2	-.23	.02	.41**	-.09	-					
6. PAS R-1	.16	.61**	-.34*	.34*	-.40**	-				
7. PAS R-2	.09	.15	-.00	.49**	-.52**	.47**	-			
8. STAI R-1	-.64**	-.44**	.78**	-.35*	.48**	-.56**	-.28	-		

9. STAI R-2	-.44**	-.23	.34*	-.47**	.63**	-.53**	-.59**	.69**	-	
10. LAPS	.16	.14	.04	.34*	.15	.00	.10	-.16	-.22	-

Note. BRS = Brief Resilience Scale; PA = Positive Affect on the PANAS; NA = Negative Affect on the PANAS; PAS = Perceived Arousal Scale; STAI = State Trait Anxiety Inventory; LAPS = Lexington Attachment to Pets Scale; R-1 = Recovery one; R-2 = Recovery two.
* $p < .05$. ** $p < .01$.

Cardiovascular responses also correlated with affect throughout the experiment such that participants with higher average heart rate during the trauma writing task tended to report more negative affect at recovery one, $r(43) = .34$, $p = .02$. Alternatively, participants that reported more positive affect during first recovery also had lower heart rate, $r(39) = -.34$, $p = .03$ and higher heart rate variability, $r(39) = .32$, $p = .04$ during the second writing task. Lastly, the number of dogs participant's owned, disclosure, or trauma impact ratings did not significantly correlate with any cardiovascular or self-report measures.

LIWC. Due to the current study's hypotheses being unsupported, an exploratory analysis of the writing tasks was performed using Linguistic Inquiry and Wordcount (LIWC) software. Repeated measures ANOVAs were performed to detect changes in affective from the first to second writing task. An analysis of positive emotion words showed significant main effects of condition, $F(1, 43) = 43.94$, $p < .001$, and time, $F(1, 43) = 24.51$, $p < .001$. There was also a significant interaction effect, $F(1, 43) = 38.74$, $p < .001$. Results for negative emotion words were similar in that there was a main effect of condition, $F(1, 43) = 7.44$, $p < .01$, and time, $F(1, 43) = 52.48$, $p < .001$. However, the interaction was not significant, $F(1, 43) = 3.72$, $p = .06$. Thus, positive emotion words significantly increased for the trauma-values condition, but negative word usage significantly decreased for both groups. In addition to negative emotion words, expressions of sadness also showed a main effect of time, $F(1, 43) = 8.79$, $p < .01$, but the main effect of condition was not significant, $F(1, 43) = 3.85$, $p = .06$. There was also a significant interaction between time and condition, $F(1, 43) = 5.20$, $p = .03$. Pairwise

comparisons of the simple effects of time showed that expressions of sadness were much lower for the control condition than the values condition during the second writing task, $p < .01$.

Discussion

The purpose of the present study was to examine the effects of valuing a canine companion on physiological and emotional arousal. It was hypothesized that affirming the value of a pet dog would aid in cardiovascular recovery after writing about a negative personal experience. Since it was found that HR and HRV significantly differed by phase, but not condition, it can be concluded that valuing a pet dog was not more sufficient at lowering heart rate than writing about the contents of one's closet. It was also hypothesized that those who wrote about a pet dog would report less anxiety and increased positive affect by second recovery. Results indicated that both writing tasks were equally effective at significantly decreasing anxiety, but there was no significant change in positive affect from first to second recovery. However, upon conclusion of the study, many participants told the researcher that, following the trauma task, writing about their pet put them in a better mood. Results from LIWC seem to corroborate these verbal reports such that positive emotion words were used significantly more when affirming the value of a pet dog than when writing about the contents of a closet. Furthermore, it was hypothesized that the strength of pet attachment on the LAPS would negatively correlate with mean HR by the end of the study, but results did not support this prediction. Instead, positive affect was significantly correlated with pet attachment suggesting that the more positive emotions dog owner's felt by the end of the study, the stronger they would rate their attachment to their dog.

The present study's findings are inconsistent with past research done by Tang and Schmeichel (2015) who found that values affirmation was successful in inducing cardiovascular

recovery after insulting feedback was given on an essay. However, it should be noted that much of the research done on affirmation has had participants affirm their top-rated value. Perhaps the reason for the current study's non-significant results, at least in part, lies in that pets are not a top value for most individuals. Additionally, writing about items in one's closet may not have been as neutral a topic as first anticipated. For example, a few participants shared their closet with their significant other, and as a consequence, also described their partner's belongings. Others chose to detail clothing that they borrowed from family or had been given as a gift. Describing items that hold significance to a loved one, or that a person is sentimentally attached too, could have led participants to think about, or value, those relationships. If this is the case, it might explain why negative affect and anxiety were significantly reduced for both conditions. Furthermore, the LAPS questionnaires, given at second recovery, may have caused both groups to inadvertently value their bond with their dog; thus, causing HR to decline at roughly the same rate.

Another plausible explanation is that since disclosing stressful experiences have been shown to cause immediate and intense negative emotions (Greenberg, Wortman, & Stone, 1996), these negative feelings may have carried over into the second writing task which, in turn, may have influenced what participants chose to write about. For instance, many participants in the values condition wrote about feeling severe anxiety or fear over their dog's eventual death, while others mentioned grieving for a previous pet that had since passed away. As found in the LIWC analysis, expressions of sadness were significantly higher for those that wrote about their dog than those who wrote about the contents of their closet. It is also arguable that if the affirmation manipulation had come first instead of the trauma essay, participants would not have felt compelled to write about the mortality of their pets, and therefore, the values affirmation may

have been more effective at buffering cardiovascular arousal. Understandably, from the cognitive-behavioral perspective, writing about a dog first could serve as a distraction from the emotional arousal needed for therapeutic change. Nevertheless, research shows that when affirmations come before a stressor, participants are more likely to be open to the aversive stimuli (Nelson & Steele, 2000; Harris & Napper, 2005) and less defensive (Crowell, 2017). Hunt and Chizkov (2014) also found that participants wrote comparable essays with or without a dog present, but only for those in the trauma-dog condition were depressive symptoms significantly lower. This finding suggests that having a dog present was not a distraction, but in fact, could have aided in emotional arousal in order for the expressive writing essays to be effective. With these findings in mind, writing about a valued canine companion before recalling a negative life experience may not hinder but help the emotional arousal process.

A further way in which participants may have been unintentionally influenced is by the mention of dog ownership as a key variable of interest in the study's title on SONA as well as being a major eligibility requirement. This could have primed participants to think of their canine companion before their scheduled appointment thereby affecting what they chose to mention in the trauma task. For example, a few participants wrote about the death of a pet as the focus for the first writing task while others mentioned how important their pet was to their support system. Therefore, values affirmation may have started sooner in the experiment than intended regardless of condition.

Although, the hypotheses were unsupported, this study was the first research attempt at understanding if dog owners still gain stress relieving benefits when their pet is not physically present; however, this experiment is not without its limitations. Firstly, the lack of literature pertaining to the subject of valuing pets made it difficult to predict the outcome of this study. The

predictions that were made were largely based on research that was done in the presence of dogs. Secondly, values affirmations research tends to have participants write about their top-rated value. No studies were found that had participants write about a value that was chosen by the researcher. Another way the study was further limited was the advent of the Covid-19 pandemic. As a consequence, data collection abruptly came to a halt when the University of Wisconsin-Milwaukee was shut down. If data collection had been allowed to resume, the results of the study may have reached a different conclusion with a larger sample size.

Future research should continue to examine whether dog owners still gain health benefits even in the absence of their pet as well as how effective values affirmation is for coping with negative life events. Perhaps if this study were to be replicated, researchers should counterbalance the order of the writing tasks to determine if values affirmation of pets is best done before or after expressive writing. In addition, subsequent studies may wish to take into account whether participants have PTSD and if they have a therapy animal that helps them cope since this could affect how they would engage with an expressive writing task about distressing experiences. Lastly, to gauge the effectiveness of values affirmation as a coping strategy, it would be beneficial for future studies to include a cognitive appraisal measure that is given at multiple timepoints such as at the beginning and conclusion of a study. In this way, researchers may be able to come to a firmer conclusion regarding the benefits of values affirmation and its role in coping with negative events.

References

Allen, K., Blascovich, J., & Mendes, W. B. (2002). Cardiovascular reactivity in the presence of pets, friends, and spouses: The truth about cats and dogs. *Psychosomatic Medicine, 64*(5), 727-739. doi:10.1097/01.PSY.0000024236.11538.41

Allen, K. M., Blascovich, J., Tomaka, J., & Kelsey, R. M. (1991). Presence of human friends and pet dogs as moderators of autonomic responses to stress in women. *Journal of Personality and Social Psychology, 61*(4), 582-589. http://dx.doi.org/10.1037/0022-3514.61.4.582

Anderson, C. A., Deuser, W. E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: Tests of a general model of affective aggression. *Personality and Social Psychology Bulletin, 21*(5), 434-448. http://dx.doi.org/10.1177/0146167295215002

Banks, M. R., & Banks, W. A. (2002). The effects of animal-assisted therapy on loneliness in an elderly population in long-term care facilities. *The Journals of Gerontology: Series A: Biological Sciences and Medical Sciences, 57*(7), M428-M432. http://dx.doi.org/10.1093/gerona/57.7.M428

Banks, M. R., & Banks, W. A. (2005). The effects of group and individual animal-assisted therapy on loneliness in residents of long-term care facilities. *Anthrozoös, 18*(4), 396-408. http://doi.org/10.2752/089279305785593983

Beetz, A., Kotrschal, K., Turner, D. C., Hediger, K., Uvnäs-Moberg, K., & Julius, H. (2011). The effect of a real dog, toy dog and friendly person on insecurely attached children during a stressful task: An exploratory study. *Anthrozoös, 24*(4), 349-368. http://dx.doi.org/10.2752/175303711X13159027359746

Brosschot, J. F. (2010). Markers of chronic stress: Prolonged physiological activation and (un)conscious perseverative cognition. *Neuroscience and Biobehavioral Reviews, 35*(1), 46-50. http://dx.doi.org/10.1016/j.neubiorev.2010.01.004

Burton, C. M., & King, L. A. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality, 38*(2), 150-163. http://dx.doi.org/10.1016/S0092-6566(03)00058-8

Cameron, L. D., & Nicholls, G. (1998). Expression of stressful experiences through writing: Effects of a self-regulation manipulation for pessimists and optimists. *Health Psychology, 17*(1), 84-92. http://dx.doi.org/10.1037/0278-6133.17.1.84

Cannon, W. B. (1915). *Bodily changes in pain, hunger, fear and rage* (2nd ed. ed.) Harper & Row, Oxford.

Cole, S. W., Kemeny, M. E., Taylor, S. E., Visscher, B. R., & Fahey, J. L. (1996). Accelerated course of human immunodeficiency virus infection in gay men who conceal their homosexual identity. *Psychosomatic Medicine, 58*(3), 219-231. http://dx.doi.org/10.1097/00006842-199605000-00005

Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science*, *16*(11), 846-851. doi:10.1111/j.1467-9280.2005.01624.x

Crocker, J., Niiya, Y., & Mischkowski, D. (2008). Why does writing about important values reduce defensiveness? Self-affirmation and the role of positive other-directed feelings. *Psychological Science*, *19*(7), 740-747. doi:10.1111/j.1467-9280.2008.02150.x

Crowell, A. L. (2017). *The effects of self-affirmation on basic emotional responses* (Order No.

AAI10143791). Available from PsycINFO. (1914296212; 2017-01060-038). Retrieved from https://ezproxy.lib.uwm.edu/login?url=https://search-proquest com.ezproxy.lib.uwm.edu/docview/1914296212?accountid=15078

Eddy, J., Hart, L. A., & Boltz, R. P. (1988). The effects of service dogs on social acknowledgments of people in wheelchairs. *The Journal of Psychology, 122*(1), 39-45. doi:10.1080/00223980.1988.10542941

Finley, A. J., Crowell, A. L., & Schmeichel, B. J. (2018). Self-affirmation enhances processing of negative stimuli among threat-prone individuals. *Social Cognitive and Affective Neuroscience, 13*(6), 569-577. http://dx.doi.org/10.1093/scan/nsy036

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion, 12*(2), 191-220. http://dx.doi.org/10.1080/026999398379718

Greenberg, M. A., Wortman, C. B., & Stone, A. A. (1996). Emotional expression and physical health: Revising traumatic memories or fostering self-regulation? *Journal of Personality and Social Psychology, 71*(3), 588-602. http://dx.doi.org/10.1037/0022-3514.71.3.588

Gregg, J. A., Namekata, M. S., Louie, W. A., & Chancellor-Freeland, C. (2014). Impact of values clarification on cortisol reactivity to an acute stressor. *Journal of Contextual Behavioral Science, 3*(4), 299-304. http://dx.doi.org/10.1016/j.jcbs.2014.08.002

Hart, L. A., Hart, B. L., & Bergin, B. L. (1987). Socializing effects of service dogs for people with disabilities. *Anthrozoös, 1*(1), 41-44. doi:10.2752/089279388787058696

Harris, P. R., Mayle, K., Mabbott, L., & Napper, L. (2007). Self-affirmation reduces smokers' defensiveness to graphic on-pack cigarette warning labels. *Health Psychology, 26*(4), 437-446. http://dx.doi.org/10.1037/0278-6133.26.4.437

Harris, P. R., & Napper, L. (2005). Self-affirmation and the biased processing of threatening health-risk information. *Personality and Social Psychology Bulletin, 31*(9), 1250-1263. doi:10.1177/0146167205274694

Holmes, D., Alpers, G. W., Ismailji, T., Classen, C., Wales, T., Cheasty, V., . . . Koopman, C. (2007). Cognitive and emotional processing in narratives of women abused by intimate partners. *Violence Against Women, 13*(11), 1192-1205. http://dx.doi.org/10.1177/1077801207307801

Hunt, M. G., & Chizkov, R. R. (2014). Are therapy dogs like xanax? does animal-assisted therapy impact processes relevant to cognitive behavioral psychotherapy? *Anthrozoös, 27*(3), 457-469. https://doi.org/10.2752/17530371X14023922797959

Johnson, T. P., Garrity, T. F., & Stallones, L. (1992). Psychometric evaluation of the lexington attachment to pets scale (LAPS). *Anthrozoös, 5*(3), 160-175. http://dx.doi.org/10.2752/089279392787011395

Katz, A. M., Czech, S. J., & Orsillo, S. M. (2014). Putting values into words: An examination of the text characteristics of values articulation. *Journal of Contextual Behavioral Science, 3*(1), 16-20. http://dx.doi.org/10.1016/j.jcbs.2013.11.004

King, L. A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin, 27*(7), 798-807. http://dx.doi.org/10.1177/0146167201277003

Klein, K., & Boals, A. (2001). The relationship of life event stress and working memory capacity. *Applied Cognitive Psychology, 15*(5), 565-579. http://dx.doi.org.ezproxy.lib.uwm.edu/10.1002/acp.727

Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology*, *77*(1), 111-125. doi:10.1037/0022-3514.77.1.111

Lindsay, E. K., & Creswell, J. D. (2014). Helping the self help others: Self-affirmation increases self-compassion and pro-social behaviors. *Frontiers in Psychiatry*, *5*(421), 1-9. doi:10.3389/fpsyg.2014.0042

Mader, B., Hart, L. A., & Bergin, B. (1989). Social acknowledgments for children with disabilities: Effects of service dogs. *Child Development, 60*(6), 1529-1534. http://dx/doi/org/10.2307/1130941

Metzger, R. L. (1976). A reliability and validity study of the state-trait anxiety inventory. *Journal of Clinical Psychology, 32*(2), 276-278. http://dx.doi.org/10.1002/1097-4679(197604)32:2<276::AID-JCLP2270320215>3.0.CO;2-G

Niles, A. N., Haltom, K. E. B., Lieberman, M. D., Hur, C., & Stanton, A. L. (2016). Writing content predicts benefit from written expressive disclosure: Evidence for repeated exposure and self-affirmation. *Cognition and Emotion, 30*(2), 258-274. http://dx.doi.org/10.1080/02699931.2014.995598

Pasupathi, M. (2007). Telling and the remembered self: Linguistic differences in memories for previously disclosed and previously undisclosed events. *Memory, 15*(3), 258-270. http://dx.doi.org/10.1080/09658210701256456

Pauketat, J. V. T., Moons, W. G., Chen, J. M., Mackie, D. M., & Sherman, D. K. (2016). Self-

affirmation and affective forecasting: Affirmation reduces the anticipated impact of negative events. *Motivation and Emotion, 40*(5), 750-759. http://dx.doi.org/10.1007/s11031-016-9562-x

Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*(3), 274-281. http://dx.doi.org/10.1037/0021-843X.95.3.274

Pennebaker, J. W., Booth, R. J., Boyd, R. L., & Francis, M. E. (2015). Linguistic Inquiry and Word Count: LIWC2015. Austin, TX: Pennebaker Conglomerates (www.LIWC.net).

Pet Industry Market Size & Ownership Statistics (n.d.). Retrieved January 28, 2019, from http://www.americanpetproducts.org/press_industrytrends.asp

Richards, J. M., Beal, W. E., Seagal, J. D., & Pennebaker, J. W. (2000). Effects of disclosure of traumatic events on illness behavior among psychiatric prison inmates. *Journal of Abnormal Psychology, 109*(1), 156-160. http://dx.doi.org/10.1037/0021-843X.109.1.156

Samoilov, A., & Goldfried, M. R. (2000). Role of emotion in cognitive-behavior therapy. *Clinical Psychology: Science and Practice, 7*(4), 373-385. http://dx.doi.org/10.1093/clipsy/7.4.373

Schmeichel, B. J., & Martens, A. (2005). Self-affirmation and mortality salience: Affirming values reduces worldview defense and death-thought accessibility.*Personality and Social Psychology Bulletin, 31*(5), 658-667. http://dx.doi.org/10.1177/0146167204271567

Selye, H. (1976). *Stress in health and disease.* Boston, MA: Butterworths.

Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: The effects of self-affirmation on sympathetic nervous system

responses to naturalistic stressors. *Health Psychology, 28*(5), 554-562. http://dx.doi.org/10.1037/a0014663

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna, M. P. Zanna (Eds.), *Advances in experimental social psychology, Vol 38* (pp. 183-242). San Diego, CA, US: Elsevier Academic Press. doi:10.1016/S0065-2601(06)38004-5

Sherman, D. K., Nelson, L. D., & Steele, C. M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin*, *26*(9), 1046-1058. doi:10.1177/01461672002611003

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*(3), 194-200. http://dx.doi.org/10.1080/10705500802222972

Smyth, J. M., Hockemeyer, J. R., & Tulloch, H. (2008). Expressive writing and post-traumatic stress disorder: Effects on trauma symptoms, mood states, and cortisol reactivity. *British Journal of Health Psychology, 13*(1), 85-93. http://dx.doi.org/10.1348/135910707X250866

Spielberger, C. D., Gorsuch, R.L., & Lushene. R.E. (1970). Manuel for the State-Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C.D., Reheiser, E.C., Ritterband, L.M., Sydeman, S.J. & Unger, K. K. (1995). Assessment of emotional states and personality traits: Measuring psychological vital signs. In *Clinical Personality Assessment: Practical Approaches,* 42-58, ed. J.N. Butcher. New York: Oxford University Press.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz, L. Berkowitz (Eds.), *Advances in experimental social psychology, Vol. 21: Social psychological studies of the self: Perspectives and programs* (pp. 261-302). San Diego, CA, US: Academic Press.

Tang, D., & Schmeichel, B. J. (2015). Self-affirmation facilitates cardiovascular recovery following interpersonal evaluation. *Biological Psychology*, *104*108-115. doi:10.1016/j.biopsycho.2014.11.011

Terry, P. C., Lane, A. M., & Fogarty, G. J. (2003). Construct validity of the profile of mood states-adolescents for use with adults. *Psychology of Sport and Exercise, 4*(2), 125-139. http://dx.doi.org/10.1016/S1469-0292(01)00035-8

Terry, P. C., Lane, A. M., Lane, H. J., & Keohane, L. (1999). Development and validation of a mood measure for adolescents. *Journal of Sports Sciences, 17*(11), 861-872. http://dx.doi.org/10.1080/026404199365425

Vail, Kenneth E., I.,II, Morgan, A., & Kahle, L. (2018). Self-affirmation attenuates death-thought accessibility after mortality salience, but not among a high post-traumatic stress sample. *Psychological Trauma: Theory, Research, Practice, and Policy, 10*(1), 112-120. http://dx.doi.org/10.1037/tra0000304

Wood, L., Martin, K., Christian, H., Nathan, A., Lauritsen, C., Houghton, S., McCune, S. (2015). The pet factor—Companion animals as a conduit for getting to know people, friendship formation and social support. *PLoS ONE, 10*(4), 17. https://doi.org/10.1371/journal.pone.0122085

Appendix A

Brief Resilience Scale (BRS)

Please indicate the extent to which you agree with each of the following statements by using the following scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. Please respond to each item by marking one number per row.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I tend to bounce back quickly after hard times	1	2	3	4	5
2	I have a hard time making it through stressful events	1	2	3	4	5
3	It does not take me long to recover from a stressful event	1	2	3	4	5
4	It is hard for me to snap back when something bad happens	1	2	3	4	5
5	I usually come through difficult times with little trouble	1	2	3	4	5
6	I tend to take a long time to get over set-backs in my life	1	2	3	4	5

Scoring:

1. Reverse score items 2, 4, and 6.
2. A resilience score is the mean of all the items.

Source: Smith et al. (2008)

Appendix B

Trauma Writing Exercise

For the next 10 minutes, please write about your deepest thoughts and feelings regarding an extremely negative or traumatic event you have experienced. Topics may include, but are not limited to: suicide, sexual assault, natural disaster such as tornado, flood, or earthquake, domestic violence, serious car accident, etc. Please note that everything you write here will be kept confidential, and will not be published. If you need more space to write, you may use the back of this paper.

1. Please indicate to what extent this event still impacts your life on a scale of 1-5: _____
2. Lastly, please answer if you have disclosed this event to another person, at any time, in the past: I have disclosed this event to another person / I have not disclosed this event to another person.

Appendix C

Values Affirmation Writing Exercise

For the next 10 minutes, please write about your deepest thoughts and feelings regarding your canine companion. If you have more than one dog, please write about the dog you share the closest bond with. In addition, describe a time in your relationship with your dog that they were of particular importance to you.

Appendix D

What is in your closet? Writing Exercise

For the next 10 minutes, please write about the contents of your closet. Don't worry about finding the perfect words or phrases. The purpose of this exercise is to focus your thoughts on listing and describing each item in your closet. If you need more space to write, you may use the back of this paper.

Appendix E

Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way **right now**, that is, at the **present moment**. Use the following scale to record your answers.

		Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	Interested	1	2	3	4	5
2	Irritable	1	2	3	4	5
3	Distressed	1	2	3	4	5
4	Alert	1	2	3	4	5
5	Excited	1	2	3	4	5
6	Ashamed	1	2	3	4	5
7	Upset	1	2	3	4	5
8	Inspired	1	2	3	4	5
9	Strong	1	2	3	4	5
10	Nervous	1	2	3	4	5
11	Guilty	1	2	3	4	5
12	Determined	1	2	3	4	5
13	Scared	1	2	3	4	5
14	Attentive	1	2	3	4	5
15	Hostile	1	2	3	4	5
16	Jittery	1	2	3	4	5
17	Enthusiastic	1	2	3	4	5
18	Active	1	2	3	4	5
19	Proud	1	2	3	4	5
20	Afraid	1	2	3	4	5

Scoring:

1. Positive Affect: Sum Interested, Excited, Strong, Enthusiastic, Proud, Alert, Inspired, Determined, Attentive, and Active.
2. Negative Affect: Sum Distressed, Upset, Guilty, Scared, Hostile, Irritable, Ashamed, Nervous, Jittery, and Afraid

Source: Watson et al. (1988)

Appendix F

Perceived Arousal Scale (PAS)

Different people react very differently to the same situations. **Indicate to what extent you feel this way right now, that is, at the present moment.** Use the following 5-point rating scale. Write the number corresponding to your rating on the blank line next to each word.

		Very slightly or Not at all	A little	Moderately	Quite a bit	Extremely
1	Active	1	2	3	4	5
2	Drowsy	1	2	3	4	5
3	Exhausted	1	2	3	4	5
4	Lively	1	2	3	4	5
5	Sleepy	1	2	3	4	5
6	Vigorous	1	2	3	4	5
7	Alert	1	2	3	4	5
8	Dull	1	2	3	4	5
9	Fatigued	1	2	3	4	5
10	Powerful	1	2	3	4	5
11	Slow	1	2	3	4	5
12	Weak	1	2	3	4	5
13	Aroused	1	2	3	4	5
14	Energetic	1	2	3	4	5
15	Forceful	1	2	3	4	5
16	Quiet	1	2	3	4	5
17	Sluggish	1	2	3	4	5
18	Weary	1	2	3	4	5
19	Depressed	1	2	3	4	5
20	Excited	1	2	3	4	5
21	Inactive	1	2	3	4	5
22	Sharp	1	2	3	4	5
23	Tired	1	2	3	4	5
24	Worn-out	1	2	3	4	5

Scoring:

1. Reverse score items 2, 3, 5, 8, 9, 11, 12, 16, 17, 18, 19, 21, 23, and 24.

Source: Anderson et al. (1995)

Appendix G

State-Trait Anxiety Inventory (STAI) Form Y-1

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number in the blank at the end of the statement that indicates **how you feel right now, that is, at this moment.** There is no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

		Not at all	Somewhat	Moderately so	Very much so
1	I feel calm	1	2	3	4
2	I feel secure	1	2	3	4
3	I am tense	1	2	3	4
4	I feel strained	1	2	3	4
5	I feel at ease	1	2	3	4
6	I feel upset	1	2	3	4
7	I am presently worrying over possible misfortunes	1	2	3	4
8	I feel satisfied	1	2	3	4
9	I feel frightened	1	2	3	4
10	I feel comfortable	1	2	3	4
11	I feel self-confident	1	2	3	4
12	I feel nervous	1	2	3	4
13	I am jittery	1	2	3	4
14	I feel indecisive	1	2	3	4
15	I am relaxed	1	2	3	4
16	I feel content	1	2	3	4
17	I am worried	1	2	3	4
18	I feel confused	1	2	3	4
19	I feel steady	1	2	3	4
20	I feel pleasant	1	2	3	4

Scoring:

1. Scores may range from 20-80. No or low anxiety (20-37), moderate anxiety (38-44), and high anxiety (45-80).

Source: Spielberger et al. (1970)

Appendix H

Lexington Attachment to Pets Scale (LAPS)

Please take a few minutes to fill in this questionnaire based on the animal you have lived with the longest. Answer using the follow criteria: Strongly disagree = 0; Somewhat disagree = 1; Somewhat agree = 2; Strongly agree = 3.

		Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
1	My pet means more to me than any of my friends	0	1	2	3
2	Quite often I confide in my pet	0	1	2	3
3	I believe that pets should have the same rights and privileges as family members	0	1	2	3
4	I believe my pet is my best friend	0	1	2	3
5	Quite often, my feelings towards people are affected by how they react to my pet	0	1	2	3
6	I love my pet because he/she is more loyal to me than most of the people in my life	0	1	2	3
7	I enjoy showing other people pictures of my pet	0	1	2	3
8	I think my pet is just a pet	0	1	2	3
9	I love my pet because it never judges me	0	1	2	3
10	My pet knows when I'm feeling bad	0	1	2	3
11	I often talk to other people about my pet	0	1	2	3
12	My pet understands me	0	1	2	3
13	I believe that loving my pet helps me stay healthy	0	1	2	3
14	Pets deserve as much respect as humans do	0	1	2	3
15	My pet and I have a very close relationship	0	1	2	3
16	I would do almost anything to take care of my pet	0	1	2	3
17	I play with my pet quite often	0	1	2	3
18	I consider my pet to be a great companion	0	1	2	3
19	My pet makes me feel happy	0	1	2	3
20	I feel that my pet is a part of my family	0	1	2	3
21	I am not very attached to my pet	0	1	2	3
22	Owning a pet adds to my happiness	0	1	2	3
23	I consider my pet to be a friend	0	1	2	3

Scoring:

1. Reverse score items 8 and 21 before addition.
2. General attachment: 10, 11, 12, 13, 15, 17, 18, 19, 21, 22, and 23.
3. People substitution: 1, 2, 4, 5, 6, 7, and 9.
4. Animal rights: 3, 8, 14, 16, and 20.

Source: Johnson et al. (1992)