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Grumpy Cat On Hump Day: Animals' Effects On Mind, Body, and Spirit--And What We Ought to Do About It

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GRUMPY CAT ON HUMP DAY: ANIMALS' EFFECTS ON MIND, BODY, AND SPIRIT—AND WHAT WE OUGHT TO DO ABOUT IT

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The Effect of Petting Rats on Human Compassion and Rats' Anxiety

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Abstract

Considered fundamental human emotions, compassion and empathy are essential in society. Therefore, it is important to find ways to increase these emotions. Although correlational and anecdotal research suggest that human-animal interaction (HAI) increases empathy and compassion, few, if any, studies experimentally assess the effects of HAI on these emotions. Our study aimed to experimentally determine if petting rats increases humans' compassion and empathy, how treatment duration [(petting a rat every day (longer-term intervention group) or petting a rat once (immediate intervention group)] affects these results, and how long these effects last. We expected that HAI would increase compassion and empathy in both groups, but that only the longer-term intervention group would have long-term changes. We found a significant interaction between day of testing and group for compassionate love of humanity, compassionate love of specific close others, and empathic concern such that these measures increased in the longer-term, but not the immediate, intervention group. We also assessed the effects of consistent and inconsistent HAI on rats' anxiety levels as measured in an elevated plus-maze, expecting HAI to decrease rats' anxiety. Although we did not find a significant effect for amount of HAI (minimal, consistent, or inconsistent), we found a significant interaction between HAI and day of testing such that only consistent HAI rats had low anxiety the first day of testing and increased anxiety the last day of testing. Application of these results to societal systems, including animal research and social work, can improve human and animal life.

The Effect of Petting Rats on Human Compassion and Rats' Anxiety

Human Study

Well-respected philosopher Comte-Sponville considers compassion one of the most critical human emotions (2003), as it allows individuals to fight for the rights of others and to aid the disadvantaged and oppressed (Kolvenbach, 2013). However, despite its importance in society and the potential benefits of increasing compassion, compassion has remained difficult to precisely define. Because it has many different definitions, it is important to clearly define compassion and empathy as the terms will be used in this paper. In this paper, empathy will refer to an emotional state that stems from and matches another's condition. Empathy therefore involves vicarious experiences through emotional matching (Eisenberg & Miller, 1987). On the other hand, compassion (also commonly known as "sympathy") is not identical with another's condition but stems from it. Compassion thus refers to the emotional experience of sorrow or concern for others' welfare, as opposed to merely emotionally matching another's condition (Eisenberg & Miller, 1987). Therefore, when we discuss empathy we mean emotional matching, whereas when we discuss compassion we mean the consequent, genuine concern for others.

Among its important roles in society, compassion can motivate people to alleviate social problems. In fact, the media recognizes the importance of empathy and compassion as it appeals to these emotions in order to inspire social change. Even though people can be motivated by reciprocity (expectations that they are giving money to an organization that can help them in the future, as in medical research; Frisch & Gerrard, 1981), self-esteem (altruistic behaviors improve self-esteem; Burnett, 1981; Dawson, 1988; Hessing & Eiffers, 1985), career advancement (donating money may be an expected performance for company employees; Amos, 1982; Dawson, 1988; Frisch & Gerrard, 1981), and federal and state tax policies (Clotfelter, 1985;

Dawson, 1988), the media continues to rely on compassion to promote social causes—funding animal shelters, feeding the hungry, caring for the elderly. As it appeals to compassion, the media uses advertisements, popular programming, and news coverage to foster concern for specific causes that highlight humanity's struggles—such as humanity's struggles with AIDS, homelessness, violent crime, and child abuse. Through these messages, the media conveys its hope that viewers will be so motivated by their compassion that they will donate to help humanity itself (Kinnick, Krugman, & Cameron, 1996). The fact that the media continues to appeal to compassion above the other motivations (pride, taxes, reciprocity, and career advancement) to promote social causes shows the importance of compassion above these other motivational factors in promoting behaviors that benefit society (Kinnick et al., 1996; Moeller, 1999). However, in this world where society, through the media, increasingly relies on compassion to persuade people to fix humanity's problems, we are beginning to see compassion fatigue—a phenomenon in which people are so overwhelmed by the appeals for compassion that they become desensitized to social problems (Kinnick et al., 1996). Therefore, because compassion plays such a critical role in society, it is important to find ways to increase compassion without overwhelming (and, thereby, desensitizing) individuals.

In addition to its role in motivating people to cure social problems, increasing compassion can benefit society by decreasing rates of certain violent crimes. There is a link between a lack of empathy and violent crimes such as homicide (Aniskiewicz, 1979) and sexual abuse when these criminals were abused as children (Simons, Wurtele, & Heil, 2002). Because a lack of empathy has been linked to violent crimes, increasing empathy—and the emotion that results from it, compassion—in society could help to decrease these crime rates. Further, increasing these criminals' compassion and empathy could serve to improve criminals' quality of

life by allowing them to more fully share in the same emotions many consider vital in societies (Comte-Sponville, 2003); thereby, increasing criminals' compassion can help these individual to function more optimally in society. Ultimately, both criminals and non-criminals can benefit from increasing compassion.

Using animals to increase compassion

Human-animal interaction (HAI) is one way to increase both empathy and compassion, and it has the potential to do so without causing compassion fatigue. Although a literature search of animal-assisted therapy (AAT), empathy, and compassion revealed correlational and anecdotal studies, we found no direct assessments of the link between AAT and human empathy or compassion. However, these correlational and anecdotal studies—such as those measuring compassion and empathy in children with pets (Vidovic, Stet, & Bratko, 1999) and interviews of prison guards stating that prisoner-puppy programs increase their prisoners' compassion (Omerod, 2008)—suggest that positive HAI can increase both emotions. The current study uses the implications of these anecdotal and correlational studies to experimentally investigate the links between HAI and compassion and empathy.

Research on the human-animal bond (HAB) shows that bonding involves increased care and understanding of animals' needs (Russow, 2002). Because caring for an animal's needs involves, in part, caring about pains such as hunger and thirst, and because anticipating an animal's needs involves foreseeing and preventing these pains, this research implies that humans only bond with animals once they have exercised empathy and compassion (e.g. that necessary to anticipate and care for the animals' needs). Part of anticipating these needs then involves being around the animal long enough to recognize its signs—in other words, part of anticipating these needs, and, by extension, part of the HAB, involves consistent HAI. Further, based on the link

between a lack of compassion and animal abuse, researchers have argued that compassion and respect for animals—initiated through the HAB—can initiate compassion and respect for humans (Felthous & Kellert, 1998). Thus, bonding with animals—which can also be accomplished through consistent HAI, such as that involved in consistently petting an animal—involves empathy and compassion that can lead to compassion for humans and animals alike.

In fact, speculation about the connection between these three concepts (empathy, compassion, and the HAB) has persisted since the rise of Animal-Assisted Therapy (AAT). Often considered the father of AAT, Levinson argues that AAT increases humans' capacities for love and empathy. Based on his observations of the interaction between disturbed children and animals, Levinson further claims that the way people treat animals reflects the way they relate to and treat other people (1972). Thereby, Levinson connects animals to human compassion in that, according to his theory, a person that treats an animal compassionately (a sign that the individual compassionately relates to the animal) should also compassionately relate to people. Additionally, Levinson argues that animals contribute to self-understanding (1972). Since self-compassion is marked by the ability to understand oneself (as self-understanding leads to understanding and acceptance of one's own faults), Levinson implies that HAI can increase self-compassion in addition to compassion for others. Furthermore, Levinson explains that, because the animals treat people with love and respect, through interacting with these animals (through HAI) children learn to recognize their common humanity with others while learning to love and respect themselves in the same way the animal does. Thereby, the earliest psychologist to emphasize the need for research of HAI lays the foundation for the idea that animals increase empathy, compassionate love for others, and self-compassion.

Not only does Levinson's work suggest that AAT successfully increases compassion in children in therapy, but further research of AAT and HAI imply that animals' effects on compassion and empathy greatly contribute to HAI's success in a variety of environments. Just as Levinson argues that animals teach children compassion by giving the children something to care for (1972), animals improve the quality of life for patients in palliative care and in nursing homes presumably by giving the patients something to nurture (Geisler, 2004; Thomas, 1996). Serpell further claims that people of all ages (adults and children alike) have traditionally nurtured the compassion that allows them to care for and protect others by nurturing animals (1996). Likewise, schoolchildren learn to relate to others—which in turn helps them to identify and form relationships with other people—by nurturing animals and, thereby, their empathy and compassion (Vidovic, Stetic, & Bratko, 1999). Thus, anecdotal and correlational research suggest that AAT may increase compassion for a variety of people (the disturbed children from Levinson's research, as well as the elderly in Thomas's research, the dying in Geisler's research, and the typical schoolchildren in Vidovic et al.'s research) in various environments (the home, therapeutic offices, nursing homes, schools), which then implies that AAT may work to increase empathy and compassion in the general population.

Not only can HAI increase empathy and compassion in the general population, but HAI and AAT may also improve quality of life in the more specific prison populations for both adult and juvenile criminals, presumably by increasing prisoners' compassion and empathy. Incarcerated youth experience a variety of effects as a consequence of their participation in animal-training programs and education about animals, including increases in empathy, nurturance, and confidence level (Strimple, 2003). Studies of prisoner-puppy programs for adult offenders further indicate that prisoners who train animals form deep emotional bonds with the

these animals (Britton & Button, 2005)—bonds that, as explained above, require people to feel empathy and nurturance in order to care for and anticipate the animals' needs (Russow, 2002). Further qualitative analyses of prisoners who participated in a puppy-training program for service dogs found that prisoners ease the pain of parting with the puppies they have trained by focusing on the good their dogs will be doing (Britton & Button, 2005)—by focusing on the pains in society that their dogs will alleviate. This method of stress relief indicates that these prisoners feel the relief that their participation will bring the community. The indication that prisoners feel the community's relief then implies that these participants were able to feel the community's pain, act to ease it, and thereby feel good about easing it—an indication that they were genuinely concerned about this pain (our definition of compassion). Furthermore, prison guards have expressed their perception that animals increase prisoners' self-worth, specifically by giving the prisoners the opportunity to give to the community (Omerod, 2008). Thus, these prison guards imply that animals increase the prisoners' quality of life by allowing them to practice compassion. Thereby, this research suggests that prisoner-puppy programs allow the participants to experience a deep sense of compassion.

Further qualitative studies revealed that, not only do the dogs help the prisoners by allowing them to participate in a situation that would allow them to feel compassion, but also that the animals themselves increased compassion in this population. In fact, one prisoner reported being changed from a selfish person to an individual motivated to do things for others—specifically as a result of his participation in the program (Britton & Button 2005). Thereby, this prisoner expressed his view that HAI increased his feelings of empathy and compassion. Similarly, other prisoners have expressed that they began caring for people *only* after they started caring for an animal (Omerod, 2008). Thus, while we found no direct studies assessing the effect

of animals on prisoners' compassion, anecdotal research implies that animals improve quality of life for prisoners by increasing their empathy and giving them the opportunity to express their compassion by giving back to the community.

Despite the implications that HAI increase compassion, no previously published study has experimentally measured the effects of animals on empathy and compassion. Therefore, because the role that animals play in compassion and empathy may help people function optimally in our compassionate human society, the current study attempts to experimentally establish a relationship between HAI and human compassion and empathy. By arguing that animals increase compassion by giving people something to care for and nurture (Geisler, 2004; Hanselman, 2001; Levinson, 1972; Levinson, 1965a; Levinson, 1965b; Melson & Melson, 2005; Serpell, 1996; Thomas, 1996), research implies that scientists can simulate the compassion that people learn through HAI by allowing participants to compassionately care for animals. Triebenbacher (1998) then argues that petting an animal is an important part of meaningful HAI, indicating that people may compassionately care for animals by petting them. Further, Levinson (1972) argues that, because they are non-verbal creatures (and therefore any interaction with an animal requires empathy necessary to anticipate the animal's needs), any communication with an animal should increase empathy. Therefore, HAI should increase empathy in humans regardless of the length of the interaction. Thus, HAI in which participants are allowed to communicate with and care for an animal (i.e. by petting it) should stimulate the same compassion people experience as interacting with pets in AAT.

Not only is it important to determine if AAT can stimulate compassion and empathy in people, but it is also important to determine how long these effects may last. Thus, this study also aims to assess if increased compassion remains in people well after meaningful HAI. Although

some research found that some effects of AAT lasted six months (Berget, Ekeberg, & Braastad, 2008)—which suggests that other effects of AAT, such as compassion, could also be long-lasting—this study lasted 12 wk. However, Odendaal (2000) found that the effective HAI time is between 5 and 24 min. Therefore, it is also important to determine which HAI duration is more effective in stimulating compassion and empathy and how that duration affects how long any effects from the positive HAI last (for example, only the first day after interaction, one week later, or one month later).

Overall, based on research indicating that AAT may effectively stimulate compassion, the current study aims to assess if HAI increases compassion and empathy in humans, how long these effects last, and how these effects and their duration change based on how long the participants interact with the animal. Our first independent variable was the duration of treatment intervention, with levels of 1) 10 min on one day (immediate intervention), or 2) 10 min every day for seven days (longer-term intervention). Our second independent variable was the day of testing, with the levels of 1) baseline (before any HAI, day 1), 2) day 8 (one full week after the initial interaction), and 3) day 22 (three full weeks after the initial interaction). The immediate intervention group had additional immediate measures for compassion and empathy (to assess immediate changes due to HAI, as opposed to longer-lasting changes on days 8 and 22). This measure was not necessary in the longer-term intervention group because we were only interested in how *multiple* occurrences of HAI impacted these participants' compassion and empathy. Based on research reporting that some effects of AAT last up to a month after the end of the intervention (Berget et al., 2008), we expected that the effects of HAI on compassion in the longer-term intervention group would be long-lasting. However, based on the design of Berget's and colleagues' experiment, we expected an interaction such that there would be long-

lasting increases in compassion and empathy for the longer-term intervention, but not the short-term intervention, group.

Rat Study

When asking what effects animals have on people, it is important to keep in mind that HAI affects not just the person involved in the interaction, but the animal as well. Therefore, in addition examining the effects of HAI on human compassion, this study aimed to determine how petting affects rats. This extra step allowed us to determine the potential costs to increasing compassion through HAI, which, in turn, allowed us to better assess if this method of increasing compassion and empathy in humans is worth any potential cost to the animals.

We expected that HAI would positively affect the rats by decreasing their anxiety. While we found no studies assessing the effects of petting rats on the animals, Odendaal (2000) found that petting dogs increased their oxytocin levels. Based on this finding, we expected that petting would have a similar effect in rats. Additionally, because increasing oxytocin levels decreases blood pressure in rats (Petersson, Alster, Lundeberg, & Uvnäs-Moberg, 1996), and because decreased blood pressure is a well-known indication of decreased stress, we expected these increased oxytocin levels to confer decreased anxiety in the animals. Further, because the increases in oxytocin levels decreased blood pressure long-term (Petersson et al., 1996), we also expected the decreased anxiety in this experiment to be long-term for a group of rats that was pet consistently (allowing for long-term oxytocin changes) but not for a group of rats pet inconsistently (allowing for only immediate oxytocin changes). Thus, we expected that HAI would positively impact not just participants, but animals as well.

Although measures of oxytocin indicate decreased stress in animals, another way to measure subjects' stress is through the elevated plus maze. To assess the presumably positive

impact of petting rats on the animals, we tested both how the amount of HAI affects anxiety in rats and how these effects change over time. Our first independent variable was amount of HAI with three levels of: 1) minimally handled (minimal HAI), 2) 10 min on day 1 and not handled afterwards (inconsistent HAI), and 3) 10 min twice a day every day for 1 wk (consistent HAI). Our second independent variable was day of testing, with two levels of 1) 8 days after the start of HAI treatment (day 8) and 2) 22 days after the start of HAI treatment. The inconsistent HAI group had an additional immediate measure to assess how petting the rat 10 min for the first time impacted their immediate anxiety levels. This immediate measure was not necessary in the consistent HAI group because we were only interested in how long-term HAI affected this particular group of rats. We expected decreases in anxiety, as measured in an elevated plus-maze test, in the inconsistent and consistent HAI groups, but not in the minimal HAI group. Further, we expected the decreased anxiety to last 3 wk after the beginning of treatment for the consistent, but not the inconsistent, group. Overall, this study design allowed us to assess how consistent and inconsistent HAI affect rats' anxiety and how these effects change over time.

Method

Human Study

Design. This study had a 3 X 2 mixed factorial design. We assessed changes in compassion due to HAI within-subjects, as this design minimized individual differences between groups and minimized the number of participants needed. The first independent variable was amount of HAI (immediate and longer-term intervention). We assigned participants to the immediate intervention or longer-term intervention groups using an online list randomizer such that each participant had an equal chance of being in either the longer-term or immediate intervention groups. The second independent variable was the day of testing, with three levels of

baseline (day 1), day 8, or day 22. Because we measured immediate changes in the immediate intervention group, and how these changes differed across time, the immediate intervention group had an additional set of measuresments (the immediate measure). This measure was not necessary in the longer-term intervention group because we were only interested in how multiple occurrences of HAI impacted these participants' compassion and empathy. Ultimately, due to the mixed factorial design, each participant completed compassion measurements at a minimum of three time points, and each participant had an equal chance of being assigned to either duration of HAI groups.

Participants. Twelve college students participated in this study. All of the participants, four males and eight females, attended a religious university in the Midwest. Also, upon signing up for the study and arriving to participate, all participants were told that the study would involve petting rats and that they should not participate if they were allergic to, afraid of, or otherwise uncomfortable with animals. Thus, we expect that all of the participants were comfortable with rats. We expected the number of participants to be sufficient for this study based on the sample size and success of an AAT and anger management experiment (part of which aimed to increase sensitivity to others' thoughts, feelings, and needs through HAI; Hanselman, 2001). We randomly assigned six participants to each the immediate intervention and longer-term intervention groups, with three of the four males participating in the immediate intervention group. We expected that twelve students, six in each HAI duration group, was a sufficient sample size for this experiment and that the composition of the sample would accurately reflect effects of HAI on compassion in the general population.

Measures. We used a variety of compassion scales to assess different components of compassion, in addition to an empathy measure. We randomized the order of the surveys using

the balanced Latin square design. We further used an EEG to assess if changes in compassion also conferred changes in EEG waves.

Dispositional Positive Emotions Compassion Subscale (DPES). We used the DPES as a measure of dispositional compassion (Shiota, Keltner, & John, 2006). Using a Likert-type scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"), participants had to decide how much they agreed with five separate statements reflecting dispositional compassion (e.g. "I often notice people who need help," 71).

Compassionate Love of Humanity Scale (CLH). We used the CLH as a measure of participants' compassion towards strangers and humanity as a whole (Sprecher & Fehr, 2005). Using a Likert-type scale from 1 ("not at all true of me") to 7 ("very true of me"), participants had to decide how much they agreed with 21 separate statements reflecting compassion for unknown humans (e.g. "When I see people I do not know feeling sad, I feel a need to reach out to them," 650).

Compassionate Love of Close Others Scale (CLCO). We used the CLCO as a measure of participants' compassion towards people that they knew well (Sprecher & Fehr, 2005). Using a Likert-type scale from 1 ("not at all true of me") to 7 ("very true of me"), participants had to rate how much 21 separate statements regarding compassion towards close others (e.g. "When I see family members or friends feeling sad, I feel a need to reach out to them," 649) applied to them.

Compassionate Love of Specific Close Others Scale (CLSCO). We used the CLSCO as a measure of participants' compassion towards identified individuals (Sprecher & Fehr, 2005). This scale consisted of 21 separate statements, each with a blank (e.g. "When I see ____ feeling sad, I feel a need to reach out to them," 651). For each blank, participants were instructed to

mentally fill in the name of a close friend or a romantic partner. Participants then had to indicate, on a Likert-type scale of 1 ("not at all true of me") to 7 ("very true of me") how much each statement applied to them.

Self-Compassion Scale (SCS). We used the SCS as a measure of participants' self-compassion, or kindness toward oneself and taking a non-judgmental attitude toward one's own failures (Neff, 2003). Consisting of six subscales, this measure assesses self-kindness (items 5, 12, 19, 23, and 26), self-judgment (items 1, 8, 11, 16, and 21; reverse-scored), common humanity (items 3, 7, 10, and 15), isolation (items 4, 13, 18, and 25; reverse-scored), mindfulness (items 9, 14, 17, and 22), and over-identification (items 2, 6, 20, and 24; reverse-scored). Participants were instructed to rate, on a scale of 1 ("almost never") to 5 ("almost always"), how much each statement was true of them. The self-kindness subscale measures the extent to which someone extends understanding and kindness towards oneself instead of judging themselves harshly. The self-judgment subscale measures the opposite of self-kindness, the tendency to judge oneself harshly. The common humanity subscale detects the extent to which individuals recognize their failures and inadequacies as part of the human experience. It directly opposes the isolation subscale, which measures the extent to which people have become isolated by their focus on their failures and inadequacies. The over-identification scale is designed to detect self-pity, which is distinct from self-compassion and characterized by a state in which one's sense of self becomes so immersed in one's own emotional reactions that one can no longer adopt an objective perspective. Over-identification directly opposes the mindfulness subscale, which measures a receptive state of mind in which individuals observe, but do not try to change, their emotions as they arise. Mindfulness necessarily involves refusing to ignore negative feelings, while staying clear of the self-pity characteristic of over-identification. Additionally, because of

the reverse-scoring, high scores for self-judgment, over-identification, and isolation were considered indicative of higher self-compassion. Because these three measures were found to assess separate aspects of self-compassion (Neff, 2003), they were still considered separately. We assessed each subscale individually, in addition to calculating an overall SCS score by averaging all of the subscores.

Interpersonal Reactivity Index (IRI). We used the IRI as an empathy measure for all participants (Davis, 1980). The IRI is designed to individually assess the multiple components of empathy. Consisting of four subscales, the IRI measures fantasy (items 1, 5, 7, 12, 16, 23, and 26), empathic concern (items 2, 4, 9, 14, 18, 20, and 22), perspective-taking (items 3, 8, 11, 13, 14, 15, and 18), and personal distress (items 6, 10, 13, 17, 19, 24, and 27). The fantasy subscale measures how strongly an individual identifies with fictitious characters (i.e. those in movies, books, and plays). The perspective-taking subscale measures the tendency to identify with the perspectives of other people. Both the perspective-taking and fantasy subscales are designed to be measures of the cognitive aspects of empathy. The empathic concern items assess tendency of individuals to experience feelings of warmth and concern for others undergoing negative experiences, whereas the personal distress subscale assesses feelings of discomfort and anxiety when the individual witnesses others in distress. Both the empathic concern and the personal distress subscales are designed to assess the emotional experiences of empathy, as opposed to its strictly cognitive aspects. (Both subscales are considered components of empathy, not compassion, which stems from both the cognitive and emotional aspects of empathy.) For all items, participants used a Likert-type scale of 1 ("does not describe me well") to 4 ("describes me very well") to rate how well each question applied to them. Items 3, 4, 7, 12, 13, 14, 15, and

18 were reverse-scored, such that an answer of "4" was scored as a "1" and an answer of "1" was scored as a "4." We calculated scores for each subscale of the IRI.

EEG. We used a resting EEG to analyze alpha and beta waves. Alpha waves are typically associated with relaxation, a known benefit of HAI. Beta waves are associated with outward focus. Since compassion inherently requires individuals to focus their attention outward (i.e. individuals must focus their attention on others to feel compassion for them), we expected HAI to impact both alpha and beta waves.

Procedure. The participants first completed a set of baseline tests consisting of an EEG and a set of surveys designed to measure empathy and compassion (all measures as described above). The participants completed the EEG first, and, immediately after the EEG, participants completed all compassion and empathy surveys. For all baseline tests, we kept the rat out of the participant's sight in order to minimize effects of animals on baseline measures. We followed the same baseline procedure for all participants, regardless of duration of HAI. Once the participants completed the baseline tests, the experimenter retrieved the rat, taking the animal, in its cage, to the testing room. The experimenter then removed the rat from its cage and held it while participants pet the rat for 10 min. [The experimenter held the rat in order to ensure safety of both humans (the experimenter holding the rat provided an extra precaution against participants coming into contact with rat allergens—i.e. urine that gets on the animals' paws and tails) and animals (the experimenter holding the rat prevented mis-handling of the animals).] We based the amount of time the participants spent with the animal on Odendaal's (2000) finding that effective HAI time is between 5 and 24 minutes. All participants completed this procedure, and after the 10 min ended, the participants waited in the testing room while the experimenter returned the rat.

After the initial petting session, the procedure differed for the immediate intervention and longer-term intervention groups. For the immediate intervention group, the participants completed the EEG and all compassion and empathy surveys for immediate measures as soon as they were finished with their 10 min of rat petting. Participants returned in 7 and 21 days from the initial procedure (on days 8 and 22) for follow-up measures.

Conversely, no participant in the longer-term intervention group completed immediate measures, as the purpose of this group was to assess how a full week of HAI impacted compassion and empathy. Instead, participants in the longer-term intervention group returned everyday for the next six days such that each participant pet the rat for 10 min a day, for 7 days in a row. After petting the rat for seven days, all participants in the longer-term intervention group returned on the eighth day for additional compassion and empathy measures. They completed follow-up EEG and survey measures, but they not pet the rat. Additionally, like the immediate intervention group, participants in the longer-term intervention group returned on day 22 for the last set of follow-up compassion and empathy measures. Thus, all participants, regardless of group, completed follow-up compassion and empathy measures on the seventh and 21st day after baseline measures (on days 8 and 22), whereas only participants in the imemdiate intervention group completed additional, imemdiate compassion and empathy measures.

Statistical Analysis. We performed complex ANOVAs for each measure of empathy and compassion, comparing baseline, day 8, and day 22 for both groups. Because we were interested in how the immediate measure compared to immediate intervention participants' compassion and empathy scores at baseline and on days 8 and 22, we ran separate, repeated-measures ANOVAs for the immediate intervention group for all dependent variables. We used only the two-tailed measure for all data, and $\alpha = .05$.

Rat Study

Design. This study used a 3x2 mixed factorial design. We assessed changes in anxiety due to petting within-subjects, as this design minimized the number of subjects needed. We also compared how these effects differed between groups in order to determine how the amount of HAI (consistent, inconsistent, and minimal HAI) changed these results over time. The first independent variable was HAI group. We randomly assigned each rat to its HAI group such that each animal had an equal chance of being assigned to the minimal HAI, inconsistent HAI, or consistent HAI groups. The second independent variable was day of testing, with two levels of 8 and 22 days after assignment to an HAI group. The immediate HAI group had an additional, immediate measure of anxiety after being pet for 10 minutes on the first day of testing. Overall, this study design allowed us to assess how petting rats affects rats' anxiety and how these effects change over time.

Subjects. We used 12 adult, female Sprague-Dawley rats. They each weighed approximately 250 g and had a history of being handled. All of the rats that were pet during the experiment interacted with the participants as well as the experimenter, and each rat in the consistent HAI group interacted with the same individual (the experimenter) every day it was pet. All of the rats had unlimited access to food and water and were singly-housed. They were all also on a 12 hr light cycle, with lights on at 8:00 AM. Ultimately, we expected these rats to be sufficient for this experiment based on their handling history, with a history of handling indicating that HAI would not increase the rats' anxiety.

Anxiety Test. We used a standard elevated plus-maze to measure the rats' anxiety. Each time the rat performed the elevated plus-maze test, it spent 10 min on the maze. We measured the time the rats spent in the open-arms such that higher amounts of time spent in the open arm

indicated less stress. We measured anxiety in the: minimal HAI group 8 and 22 days after we minimized HAI; inconsistent HAI group immediately after petting the rat 10 min, 7 days after we pet the rat (and 7 days after we minimized HAI; day 8), and 21 days after we pet the rat (and 21 days after we minimized HAI; day 22); and consistent HAI group on day 8 (after the rats were pet for 20 min a day for 7 d) and day 22 (at which point the rat had not been pet for 14 days). This procedure then allowed us to determine the effects of petting rats immediately and long-term and how these effects differ depending on how much the rat is pet.

Procedure. We ran the experiment in a way that allowed us to evaluate how petting affects rats, how these effects change based on consistency of HAI, and how these effects change over time. At the start of the experiment, the rats in the minimal HAI group were handled only when their cages were changed. In this way, we minimized HAI such that the rats interacted only with the laboratory workers and only on cage-cleaning days (about twice a week), and on these days only for the few seconds it took to transfer the rat from one cage to the next. We tested each rat in this group 7 and 21 d after minimizing interaction (days 8 and 22). For the inconsistent HAI group, the experimenter pet the rats for 10 min immediately before running an anxiety test (described above). After the test, the experimenter returned the rat to its cage and housing unit. We did not pet the rat for any subsequent anxiety test, which we ran 7 and 21 d after the initial day of testing (on days 8 and 22). For the consistent HAI group, the experimenter, a participant, or a combination of both pet each rat twice a day for 10 min each time (20 min a day total) every day for 1 wk. This amount of petting allowed us to match participants with subjects in a way that allowed each participant to pet the same rat as many times as possible (and, conversely, that allowed each rat to be pet by the same participant as many times as possible). This then maximally ensured formation of a HAB for both humans and animals. The rat was also held by

the experimenter each time it was pet, regardless of whether or not the experimenter actually pet the rat. This procedure allowed us to compare how different HAI durations changed rats' anxiety levels.

Statistical Analysis. We ran a complex ANOVA to assess the immediate and long-term effects of amount of HAI and day on the rats' anxiety levels. Due to the additional, immediate anxiety measure for the inconsistent HAI group, we ran an additional repeated-measures ANOVA to compare the immediate anxiety score with the anxiety scores on days 8 and 22. For all measures, we used a two-tailed significance, with $\alpha = .05$.

Results

Data Analysis.

We used all participants' data for all measures of compassion and empathy. Defining an outlier as a score plus or minus two standard deviations from the mean, we found that we had no outliers. Thus, we used all of the data for statistical analysis. Due to inclement weather, one participant in the longer-term intervention group could not return on the third day of testing, and a separate participant could not return on the third or fourth days. However, because they still interacted consistently with the rat—petting the rat every day for a total of at least five days—their scores were still included in data analysis.

Surveys.

Compassion. We found that the changes in compassion due to HAI were specific to the type of compassion measured. Means and standard deviations for all compassion measures are shown in Table I. Table II shows the means and standard deviations of all SCS subscales, and Table III shows the means and standard deviations of all IRI subscales.

Dispositional Positive Emotions Compassion Subscale (DPES). We did not find any significant differences for the DPES measure. We did not find a main effect for day within subjects ($F(2, 20) = 2.09$, $p = .10$). The main effect for group between subjects was also not significant ($F(2, 20) = 2.09$, $p = .18$). Similarly, the interaction between day and group was not significant ($F(2, 20) = 2.47$, $p = .11$). For the immediate intervention group, there was not a significant difference between the immediate measure and any other measure ($F(3, 15) = 0.49$, $p = .39$). Overall, for DPES, we did not find any significant main effects or interactions.

Compassionate Love of Humanity (CLH). Our results for CLH reveal a significant interaction between day of testing and group, in addition to a significant main effect for day of testing. We found a main effect for day of testing ($F(2, 20) = 10.99$, $p = .001$) such that CLH increased from baseline, after HAI. Post-hoc analysis using a Sidak correction revealed that CLH on day 8 was significantly higher than CLH at baseline ($p = .003$, $d = .31$). Similarly, CLH at day 22 was signicantly higher than CLH at basleline ($p = .01$, $d = .98$). Measures at day 8 and day 22 did not significantly differ from each other ($p = .98$). There was a significant interaction between day and group ($F(2, 20) = 3.90$, $p = .04$, $\eta^2 = 0.07$; Figure 1). Pair-wise comparisons using a Sidak correction revealed that CLH did not significantly differ between any measures in the immediate intervention group (baseline versus day 8: $p = .22$; baseline versus day 22: $p = .78$; day 8 versus day 22: $p = .88$). However, although there was not a significant difference between days 8 and 22 for the longer-term intervention group ($p = .61$), there were significant increases in CLH between baseline and day 8 ($p = .004$, $d = 1.53$) and between baseline and day 22 ($p = .004$, $d = 1.73$). With respect to immediate effects in the imemdiate intervention group, we did not find any significant differences ($F(3, 15) = 1.07$, $p = .39$). Overall, with respect to CLH, we found

that petting a rat consistently increased compassion in the longer-term intervention group on days 8 and day 22.

Compassionate Love of Close Others (CLCO). With respect to CLCO, we did not find any signficant main effects or interactions. There was not a signficant main effect of day within subjects ($F(2, 20) = 0.14$, $p = .87$) or of group between subjects ($F(2, 20) = 0.32$, $p = .58$). The interaction between day and group was only marginally significant ($F(2, 20) = 2.60$, $p = .10$). With respect to the additional repeated-measures ANOVA for the immediate intervention group, we did not find a significant difference ($F(3, 15) = .49$, $p = .70$). Thus, we found that petting a rat did not significantly impact CLCO.

Compassioante Love of Specific Close Other (CLSCO). Although we did not find any main effects for CLSCO, we did find an interaction between day and group. We did not find a main effect for day of testing ($F(2, 20) = 2.19$, $p = .14$) or for group ($F(2, 20) = 0.47$, $p = .51$). However, there was an interaction between day and group ($F(2, 20) = 5.05$, $p = .02$, $\eta^2 = 0.04$; Figure 2). Pairwise comparisons using a Sidak correction did not reveal any significant differences on CLSCO in the immediate intervention group (baseline vs day 8: $p = .42$; baseline vs day 22: $p = .94$; day 8 vs day 22: $p = .74$). In the longer-term intervention group, we saw a trend for CLSCO to increase between baseline and day 8 ($p = .12$, $d = 0.53$). However, CLSCO on day 22 was significantly higher than at baseline ($p = .02$, $d = 0.54$), and days 8 and 22 did not significantly differ from each other ($p = .68$). The additional repeated-measures ANOVA for the immediate interaction group did not reveal any significant differences ($F(3, 15) = 0.85$, $p = .49$). Thus, our results for CLSCO were similar for CLH, with a significant interaction between day of testing and group of HAI such that CLSCO increased significantly between baseline and day 22 in the longer-term intervention, but not the imemdiate intervention, group.

Self-Compassion Scale (SCS). The effects of HAI on SCS depended on the subscale measured. For the overall SCS score, we did not find a main effect of day ($F(2, 20) = 0.02$, $p = .98$), a main effect of group ($F(2, 20) = 1.32$, $p = 28$), or an interaction ($F(2, 20) = 2.10$, $p = .15$). The additional repeated-measures ANOVA for the immediate intervention group also did not show any significant effects ($F(3, 15) = 1.06$, $p = .39$). Means and standard deviations of the SCS subscales are presented in Table II.

Interestingly, we did find a significant interaction between day and group for the self-kindness subscale ($F(2, 20) = 3.95$, $p = .04$, $\eta^2 = .03$; Figure 3). Pair-wise comparisons using a Sidak correction revealed that self-kindness did not significantly differ between any measures in the immediate intervention group (baseline vs day 8: $p = .40$; baseline vs day 22: $p = .51$; day 8 vs day 22: $p = .12$). Additionally, pairwise comparisons using the Sidak correction did not reveal any significant differences in self-kindness for the longer-term intervention group (baseline vs day 8: $p = .17$; baseline vs day 22: $p = .11$; day 8 vs day 22: $p = .93$). For self-kindness, we did not find a main effect of day ($F(2, 20) = 1.02$, $p = .38$) or of group ($F(2, 20) = 1.27$, $p = .29$). We also did not see any effects in the additional repeated-measures ANOVA for the immediate intervention group ($F(3, 15) = 0.82$, $p = .50$). Overall, with respect to self-kindness, we found a significant interaction such that self-kindness increased between baseline and day 22 for the longer-term intervention, but not for the immediate intervention, group.

With respect to the other subscales, we did not find a main effect or an interaction for the self-judgment subscale (day: $F(2, 20) = 1.37$, $p = .28$; group: $F(2, 20) = 0.90$, $p = .37$; interaction: $F(2, 20) = 0.24$, $p = .79$). We also did not find any effects in the additional repeated-measures ANOVA for the immediate intervention group for this subscale ($F(3, 15) = 1.60$, $p = .30$). Similarly, we did not find a significant main effect for day ($F(2, 20) = 1.40$, $p = .27$) or for

group ($F(2, 20) = 0.33$, $p = .58$) for the over-identification subscale. The interaction between day and group for the over-identification subscale was also not significant ($F(2, 20) = 1.40$, $p = .27$), and there was only a marginally significant difference in the immediate intervention group ($F(3, 15) = 2.99$, $p = .07$). For the mindfulness subscale, we did not find a signficant main effect for group ($F(2, 20) = 2.36$, $p = .16$) or for day ($F(2, 20) = 0.43$, $p = .66$), and we did not find a signficant interaction ($F(2, 20) = 2.00$, $p = .17$). We also did not find a significant difference in immediate intervention mindfulness subscores ($F(3, 15) = 0.32$, $p = .81$). For the isolation subscale, we did not find an interaction ($F(2, 20) = 0.58$, $p = .57$) or a main effect for day ($F(2, 20) = 0.63$, $p = 0.54$) or for group ($F(2, 20) = 0.02$, $p = .90$). Similarly, we did not see any significance when the immediate measures were taken into account for the immediate intervention group ($F(3, 15) = 0.29$, $p = .38$). We found similar results for the common humanity subscale, which did not have a significant: main effect for day ($F(2, 20) = 0.38$, p = .69), main effect for group ($F(2, 20) = 2.45$, $p = .15$), interaction ($F(2, 20) = 1.89$, $p = .18$), or effect in the immediate intervention group when the immediate measure was taken into account ($F(3, 15) = 0.82$, $p = .50$). Overall, with respect to the SCS, we found a significant difference only for the self-kindness subscale.

Empathy. Like compassion, the effects of HAI on empathy depended on the subscale. For empathic concern, the main effect of group was not significant ($F(1, 10) = 0.98$, $p = .35$). However, we found a significant main effect of day ($F(2, 20) = 4.15$, $p = .03$). Post-hoc analysis with a Sidak correction revealed that empathic concern in the immediate interaction group on day 8 was marginally significanlty higher than at baseline ($p = .08$) and that empathic concern on day 22 was significanty lower than on day 8. Empathic concern on day 8 was significantly higher than empathic concern on day 22 ($p = .02$, $d = 0.54$). We also found a significant interaction for

empathic concern ($F(2, 20) = 9.50$, $p = .001$, $\eta^2 = 0.14$; Figure 4). Pairwise comparisons using a Sidak correction did not reveal any significant difference between baseline and day 8 in the immediate intervention group ($p = .87$). However, empathic concern on day 8 in the immediate intervention group was marginally significantly higher than on day 22 ($p = .11$, $d = 1.20$), and empathic concern at baseline was significantly higher than on day 22 ($p = .001$, $d = 1.02$). For the longer-term intervention group, empathic concern was higher on day 8 than at baseline ($p = .04$, $d = 0.69$). Empathic concern in the longer-term intervention group was also marginally significantly higher on day 22 compared to baseline ($p = .09$, $d = 0.75$). Empathic concern on days 8 and 22 did not significantly differ from each other in the longer-term intervention group ($p = .99$). When the immediate measure was taken into account for the immediate intervention group, we found a significant difference within the immediate intervention group ($F(3, 15) = 6.10$, $p = .006$, $\eta^2 = 0.17$); however, the immediate measure did not signiciantly differ from any of the other measures (immediate vs baseline: $p = 1.00$; immediate versus day 8: $p = 1.00$; immediate versus day 22: $p = .67$). Overall, with respect to the IRI empathic concern subscale, we found a signiciant interaction such that empathic conern increased between baseline and days 8 and 22 in the longer-term, but not the immediate, intervention group.

With respect to the other IRI subscales, we found a significant difference in the personal distress, but neither in the perspective-taking nor in the fantasy subscales. With respect to personal distress, although there was not a signifciant main effect of group ($F(2, 20) = 0.05$, $p = .83$), and although the interaction was not significant ($F(2, 20) = 1.68$, $p = .21$), we did find a main effect of day ($F(2, 20) = 3.67$, $p = .04$, $\eta^2 = 0.06$). However, post-hoc analysis using a Sidak correction revealed no statistically significant differences between days (baseline vs day 8: $p = .14$; baseline vs day 22: $p = .26$; day 8 vs day 22: $p = .97$). Taking the immediate measure into

account for the immediate intervention group revealed only a marginally significant difference ($F(3, 15) = 2.57, p = .09$). Additionally, we did not find a significant main effect of day ($F(2, 20) = 0.79, p = .47$) or of group ($F(2, 20) = 1.21, p = .30$), or a significant interaction ($F(2, 20) = 1.00, p = .39$), for perspective taking. For perspective taking, there was also not a significant effect when the immediate measure was taken into account ($F(3, 15) = .60, p = .63$). Similarly, there was not a significant main effect of day ($F(2, 20) = 0.33, p = .72$) or of group ($F(2, 20) = 0.70, p = .42$), and there was not a significant interaction ($F(2, 20) = 1.60, p = .23$), for the fantasy subscale. Taking the immediate measure into account for the fantasy subscale did not reveal any statistically significant differences ($F(3, 15) = .45, p = .53$). Thus, overall, with respect to the IRI, we found significant increases only in empathic concern between baseline and follow-up measures, with a significant interaction such that empathic concern decreased from baseline and day 8 in the immediate, but not the longer-term, intervention group and increased between baseline and days 8 and 22 for the longer-term, but not the immediate, intervention group.

EEGs. We did not find any significant differences in alpha or beta waves for either group. For alpha waves, there was not a significant main effect of day ($F(2, 20) = 2.01, p = .16$) or of group ($F(2, 20) = 2.68, p = .13$). Taking the immediate measure into account also did not reveal any significant differences ($F(3, 15) = 1.76, p = .20$). Additionally, there was not a significant interaction between day and group ($F(2, 20) = 0.89, p = .43$). With respect to the beta waves, we found the main effect for group ($F(2, 20) = 0.41, p = .54$) and the interaction ($F(2, 20) = 0.30, p = .75$) were not significant. The main effect for day was only marginally significant ($F(2, 20) = 2.76, p = .09$). When we took the immediate measures into account, we did not find

any significant differences in the immediate intervention group ($F(3, 15) = 1.61$, $p = .23$). Thus, we did not find any significant main effects or interactions for any of the EEG measures.

Elevated Plus Maze.

While we did not find a main effect for amount of HAI, we found that day significantly affected rats' anxiety levels. (For means and standard deviations for elevated plus maze tests, see Table V.) We did not find a main effect for amount of HAI ($F(2, 9) = 0.47$, $p = .64$). However, we did find a main effect for day of testing ($F(2, 9) = 10.55$, $p = .047$) such that time spent in the unprotected arms increased between day 8 and day 22. For the inconsistent HAI group, a repeated-measures ANOVA post-hoc analysis using a Sidak correction revealed that the anxiety level from the immediate measure did not significantly differ from either day 8 or day 22 (immediate vs day 8: $p = .98$; immediate vs day 22: $p = .30$). There was also not a significant difference between days 8 and 22 in the inconsistent HAI group ($p = .26$). Interestingly, we found a significant interaction such that anxiety increased on day 22 in the consistent HAI group but decreased on day 22 in the inconsistent and minimal HAI groups ($F(2, 1) = 6.86$, $p = .015$; Figure 5). Pairwise comparisons using a Sidak correction revealed that anxiety significantly decreased between day 8 and day 22 for the minimal HAI group ($p = .005$) and for the inconsistent HAI group ($p = .02$), but not for the consistent HAI group ($p = .29$).

Discussion

Effects of HAI on Compassion and Empathy and the Duration of the Effects

Findings. Our hypotheses that human-animal interaction (HAI) would increase compassion for both intervention groups and that these results would last 22 d for only the longer-term intervention group were both rejected. With respect to our first hypothesis regarding the effects of petting rats on human empathy, we found that only one subscale, empathic

concern, increased from baseline. This effect depended on the interaction between day of testing and group such that HAI increased empathic concern in the longer-term, but not the immediate, intervention group. This effect was not evident on day 22, indicating that the effects of HAI on empathy are not long-lasting. Although HAI did not increase all measures of compassion, we found that petting rats significantly increased compassionate love of humanity (CLH), compassionate love of specific close other (CLSCO), and the self-kindness subscale of the self-compassion scale (SCS) only in the longer-term intervention group. However, the small effect size and pairwise comparisons of the self-kindness subscale interaction indicates that the effect of longer-term HAI on self-kindness is not strong. Additionally, although pairwise comparisons of the CLSCO revealed only a marginally significant difference between baseline and day 8, because the effect size was medium and because the difference between baseline and day 22 was significant, we expect that subsequent studies with a larger sample size would yield results in which CLSCO increases on day 8 as well as on day 22. All of the significant interactions with significant pairwise comparisons for the interactions on compassion measures were evident on 22, indicating that the effects of consistent HAI on compassion are long-lasting.

Firstly, our finding that there is an interaction between day and group for empathic concern, such that this measure increased significantly only in the longer-term intervention group, shows that a human-animal bond (HAB) is necessary for eliciting empathic concern. Although we cannot explain the decrease in empathic concern in the immediate intervention group between day 8 and day 22, we believe that the lack of significant increases in empathic concern between baseline and day 8 are because participants in this group did not have the opportunity to form a HAB. Participants in the immediate intervention group pet an unknown rat for only 10 min on one occasion. Since the animal's recognition of the human is essential in

forming a meaningful HAB (Russow, 2002), this design in which the participants and rats met only once prevented the animals from recognizing the participants, thereby preventing formation of a HAB. Thus, our results indicate that, because participants in the immediate intervention group did not have the opportunity to bond with the rats, they did not experience increases in this emotional component of empathy.

Conversely, participants who pet the same rat on multiple occasions, and who, thereby did have the opportunity to bond with the rat, showed increases in empathic concern. This result indicates that HAB formation is necessary to increase empathic concern in humans. Thereby, these results confirm Hanselman's suggestion that animals increase empathy by allowing people to form attachments (2001), as our study suggests that forming attachments through the HAB (which our study design—maximizing contact between the same rat and human for a full week—allowed) is important in increasing empathy towards others. Conversely, our finding is inconsistent with Levinson's (1972) suggestion that any communication with a nonverbal creature increases empathy, as we found that only 10 min of petting a rat—a nonverbal creature—did not significantly increase empathic concern. Paired with Levinson's and Russow's arguments, our study shows that the simple act of petting a rat *on multiple occasions* may allow for a meaningful HAI experience in which participants feel like they communicate and bond with the animal through petting. Thereby, our study confirms Triebenbacher's (1998) finding that petting is an important component of HAI.

Despite the increase in empathic concern, we found no changes in the IRI subscales regarding fantasy or perspective taking. Our overall results with respect to empathy agree with the finding that children and adults who own pets do not significantly differ from non-pet-owners with regards to the IRI's fantasy or perspective-taking subscales (Daly & Morton, 2009).

However, our findings suggesting that a HAB (formed through consistent HAI, such as that provided by pet ownership) increases empathic concern disagree with Daly and Morton's finding that pet-owners and non-pet owners do not significantly differ in levels of empathic concern. Additionally, although Daly & Morton found that dog owners had decreased personal distress when compared to cat owners and non-owners (2009), we found no decrease in personal distress in our study. The lack of differences in personal distress could then explain the lack of changes in EEG beta waves, as beta waves indicate relaxation that could be linked to decreased personal distress. Both differences (with respect to empathic concern and personal distress) between the current study and that of Daly and Morton (2009) could potentially be explained by differences between the experimental and correlational (respectively) natures of the study designs. It is possible that the process of *forming* a new HAB increases empathy (whereas Daly & Morton's work would have measured empathy well after bond formation). Future replicative studies should investigate the potential of *new* HAB formation to increase empathy and compassion (to determine, for example, if continually establishing additional bonds can continually increase empathy, to determine how long after ownership/bond formation increases in empathy may last, and to determine whether these increases last longer than three weeks).

Additionally, in this study, we asked participants to pet the rat but did not give them instructions on whether they should talk to the animal, talk to the experimenter, or remain silent. Most of the participants talked to the experimenter—sometimes about the rat and sometimes about school-work, courses, etc. Most participants also occasionally spoke to the rat, verbally telling the animal "Hello," and making observations while petting such as, "That's the spot." Therefore, one possibility is that talking to the rat (verbal communication with the nonverbal animal) was also important in increasing empathic concern in this group. Thus, future studies

should separate petting and talking actions in order to determine which, if either, is more important in increasing empathic concern and/or compassion. Another replicative study that could simplify data analysis would be adding an immediate measure to the longer-term intervention group (in order to verify that talking and/or petting the animal on one occasion differs from talking and/or petting the animal for a full week, within-subjects). However, because Triebenbacher (1998) suggests that petting is important in HAI, and because consistent, but not inconsistent, HAI would allow for a HAB, we do not expect that separating talking from petting or that adding another measure to the longer-term intervention group would change the results.

Further, it is possible that talking to, or even bonding with, the experimenter could have influenced results. However, although there was no intentional relationship between the experimenter and the participants, all but two of the participants had prior interactions with (and were thus acquaintances of) the experimenter, and only one participant reported that she felt she got to know the experimenter. Of the two participants who had no prior interaction with the experimenter, only one of them was in the longer-term intervention group. We therefore expect that bonding with the experimenter did not influence results. Even taking into account the one participant that reported feeling that she "got to know" the experimenter, we would expect that bonding with the experimenter (i.e. turning an acquaintance into a friend through bonding) would increase compassionate love of close others (CLCO), as this measure accounts for compassion for friends. However, we would not expect an increase in compassionate love of *specific* close other (CLSCO), as the latter measure accounts for bonds between romantic partners or *strong* friendships (e.g. "best friends," sisters, etc.). Because our results show the opposite pattern (CLSCO, but not CLCO, increases after long-term HAI), we do not expect that bonding (i.e. forming a friendship) with the experimenter influenced results. However, future

replicative studies may want to manipulate talking to the experimenter as an independent variable, to add a group that only interacts with an experimenter who is an acquaintance, or have multiple experimenters such that the participants in the longer-term intervention group interact only once with each experimenter (but still pet the same rat on most days). Because, we do not expect significant bonding with the experimenter, or that any such bonding would yield increases in CLSCO but not CLCO, we expect any of these future replicative studies to yield the same results as the current study.

Similar to the results indicating that the formation of a HAB increases empathy, we also found that increases in compassion require a HAB. There was a significant interaction between day and group for CLH and CLSCO such that the longer-term intervention group experienced sharp increases in both of these compassion measures. Our findings that petting rats increases CLH and CLSCO in the longer-term intervention group on post-baseline testing suggest that bonding is important for these increases in compassion. In the longer-term intervention group, participants had a chance to bond with the rats because they saw, and cared for, them multiple times. Therefore, by the end of the intervention, the participants knew the animal(s) they pet, and vice versa. Thus, unlike the immediate intervention group, participants in the longer-term intervention group had the opportunity to form a HAB.

Since our results suggest that the HAB is important in increasing human compassion, our results support Hanselman's (2001) claim that animals successfully improved an anger management program specifically by allowing participants to form attachments (or bonds) with animals. While Hanselman did not directly relate the success of the program to animals' effects on compassion, a major goal of the AAT anger management program was to increase participants' sensitivity to others' feelings, thoughts, and emotions. According to Hanselman, the

animals in the program facilitated awareness of participants' attachments and attachment behavior while giving them an opportunity to nurture others. Thereby, Hanselman argues that the animals in that study allowed participants to replace negative attachments they had formed earlier in life (as all participants in Hanselman's study came from a background of some kind of abuse—abuse leading to a lack of the secure attachments necessary to form self-empathy and empathy towards others). The results of the current study, especially the finding that CLSCO increased only in the group that had the opportunity to bond with the animal, support this theory in that the results of the current experiment show that bonding—necessary for forming the intimate attachments necessary for self-compassion and compassion towards others, as Hanselman suggested—is a necessary component of increasing humans' compassion towards humanity and specific close others. Thus, our findings that petting rats increases compassion in the longer-term intervention, but not the immediate intervention, group suggests that a deeper emotional experience of bonding and forming attachments with animals corresponds with a deeper emotion of compassion (which stems from empathy but involves feeling others' suffering instead of merely understanding it; Eisenberg & Miller, 1987).

Although we found that petting a rat significantly increased empathic concern, CLH, and CLSCO in the longer-term intervention group, we found that petting a rat did not affect CLCO for either group. Since we found no increase in any compassion measure for the immediate-intervention group, the difference between the immediate and longer-term intervention groups can be explained by the lack of HAB formation in the immediate intervention group. Our results further indicate that there may be a similarity between bonds people share with animals and bonds people share with significant close others, but not close others in general. Thus, it is possible that interacting with one specific animal over time elicits compassion for a specific

individual with whom one has a strong bond. Applying Hanselman's attachment theory of HAI (2001) to these findings, since the CLSCO asks participants to think of a person with whom they are close—or, in other words, a person with whom they have formed a strong emotional attachment—it is possible that bonding with an animal reminds participants of their comparable, strong bonds with their significant close other. Thus, HAI could increase CLSCO but not CLCO because the HAB resembles the bond between significant close others (as Hanselman compares attachment to animals with replacing attachment to unloving parents) but not the bond between others the participants love but do not share that specific, special bond with. Therefore, we expect that HAI increased CLSCO, but not CLCO, in the longer-term intervention group because of the similarities between HAB (involving an attachment to a specific animal) and attachments between specific humans.

Similarly, HAI did not affect DPES in either intervention group. Although it measures an important aspect of compassion, the DPES compassion subscale measures a dispositional tendency to feel compassion. Thus, because the DPES measures compassion as a component of disposition, because the DPES is associated with the big five personality traits (Shiota, 2006), and because personality changes are typically small during adulthood (Caspi & Roberts, 2001), our results show that HAI, while it may affect other aspects of compassion, does not change personality. However, because this study lasted only 1 wk, because dispositional positive emotions correlate with some of the big five personality traits (Shiota, 2006), and because personality may change *gradually* during different life stages and is likely to change based on interactions with the environment (for example, animals in the environment; Caspi & Roberts, 2001), future longitudinal studies should assess whether long-term interaction with animals, over

the course of years, affects DPES. Thus, it is possible that we saw no effects on the DPES compassion subscale due to the short duration of this study.

Likewise, we found that petting rats did not significantly affect the self-judgment, common humanity, isolation, mindfulness, or over-identification subscales of the SCS, indicating that HAI has only limited effects on self-compassion. Although our finding that petting a rat increases self-kindness agrees with Levinson's theories, his description of children experiencing common humanity, motivating them to love and respect themselves, and judge themselves less harshly by learning to accept the things about them that are undesirable (1972) directly contrast with this study. The discrepancy between our results and Levinson's experiments could be explained by Levinson's use of case studies to form his theories. Additionally, given the changes in personality (including neuroticism) as children age (McCrae et al., 2002), it is also possible that animals may affect people differently depending on their age. For example, as Levinson and others suggest, children could see the animals as extensions of themselves; conversely, because adults have more developed self-conceptions, they could see animals more as outside entities. These differences in people's experiences of animals according to age could account for the discrepancy between Levinson's work suggesting that HAI increases children's self-compassion and the current study that found no such effect. Thus, the lack of increase in self-compassion in this study could be explained by differences in study design and participants' age and corresponding personality differences.

Mechanisms. Although they did not study the direct relationships between HAI and compassion and between HAI and empathy, several researchers have attempted to explain how animals may work as aids in the development of these emotions. These explanations directly apply to our findings that HAB increases certain aspects of compassion and empathy. Levinson

(1972) suggests that owning an animal requires delaying gratification, exercising patience, and deferring to others' needs (as pet caretakers must feed the pet at certain times, take a dog outside, etc.). This deference to others' needs—which requires empathy in understanding these needs and compassion in responding to them (in order to prevent suffering—from starvation, dehydration, etc.)—is part of becoming a self-directing, autonomous human being. Thereby, Levinson implies that children can learn empathy and compassion by caring and acting compassionately towards a pet. More current research supports these early theories, as this new research maintains that children learn to nurture others (a sign that children are learning empathy and compassion) by caring for pets because, in caring for an animal, children must nurture the animal while respectfully exercising power over it (Melson & Melson, 2005). Thereby, through HAI, children learn to meld dominance and compassion as they begin to understand how compassion fits into everyday situations. Similarly, in this study participants experienced dominance as they pet a rat that had no choice as to whether or not it was pet, in addition to nurturance as they cared for the animal through their petting, and sometimes talking, to the animal. Thereby, like the children in Levinson's research, the participants in the current study experienced dominance and nurturance and, therefore, the same compassion-causing mechanisms may also explain the results of this study.

In addition to animals' role in nurturing empathy and compassion because of animals' need for care, some theorize that HAI increases empathy and compassion because animals serve as extensions of the self. Levinson argues that children conceive of pets as being parts of themselves (1965a). Under this theory, because pets are extensions of the person, people can learn to love and care for themselves as they love and care for their pets. Indeed, Levinson states that children learn to accept socially-undesirable parts of themselves by accepting those traits in

an animal (1965b). More current researchers further argue that animals allow children and adolescents to develop both self-empathy and empathy towards others by giving individuals the opportunity to form secure attachments with others (Hanselman, 2001). The improved success of an anger management program after incorporation of AAT reflects animals' importance in providing people with an opportunity to nurture others and the self (Hanselman, 2001). Thus, pets can simultaneously teach people self-compassion and compassion and empathy for others by serving as extensions of the self with which people can bond. Therefore, self-nurturance through petting the rats could explain both increased self-kindness and compassion towards others in the current study.

Duration of HAI. With respect to the duration of the compassion and empathy effects that come from petting rats, we found that all of the significant compassion effects (CLH, CLSCO, and self-kindness in the longer-term intervention group) lasted 3 wk after the last HAI session but that the significant empathy effect (empathic concern) did not. The compassion findings are consistent with Berget et al.'s (2008) finding that some effects of AAT are long-term, and our results should be taken into account when designing future experiments looking at the effects of HAI on empathy and compassion. We also found that interacting with an animal on multiple occasions for an amount of time lasting between Odendaal's 4 and 24 min timeframe successfully increased compassion, compared to people who had only one HAI experience lasting between 4 and 24 min. Thus, future studies may want to re-evaluate the effects of HAI on other emotions—including stress—to determine if HAB is as important in eliciting these effects or long-term changes in these emotions as it is in increasing compassion. Based on the results of this study, we expect that more consistent HAI will reveal that HAB (caused by *consistent* HAI) and inconsistent HAI (e.g. a one-time HAI) affect different emotions differently, and HAB may

be more effective in eliciting changes in more complex emotions, such as compassion (the results of the current study) and self-efficacy (the results of Berget et al.'s study).

Anxiety in Rats

The results are inconclusive with respect to our hypothesis that petting rats would decrease the animals' anxiety. We found that HAI did not significantly affect that rats' anxiety in the inconsistent HAI group. Our results are thus consistent with the finding that handling previously handled rats does not have anxiogenic effects (Andrews & File, 1993). Also consistent with the study by Andrews and File, our results show that petting rats consistently does not increase their anxiety (as, if consistent petting had anxiogenic effects, we would expect the anxiety on day 8 to be significantly higher on day 22—which the results conclusively show does not occur). Our results also suggest that consistent petting could decrease rats' anxiety, as anxiolytic effects of consistent petting would explain why the rats had lower anxiety on the first (day 8), as opposed to the second (day 22), day of testing. The effect of anxiety being lower on the first day of testing compared to the second day is reversed with minimal and inconsistent HAI groups.

The lower anxiety on day 8 compared to day 22 in the consistent HAI group could be explained by the effects of anxiety on contextual learning. Consistent with previous research, we found that rats spent more time in the open arms with repeated exposures to the elevated plus-maze (File, 1993) due to the rats learning the maze (File, Andrews, Zharkovsky, & Zangrossi, 1992). This learning could alternatively explain our finding that day has a significant effect on anxiety, with rats in the minimal and inconsistent HAI groups spending more time in the open arms on the second and third tests compared to the first tests due to learning. Interestingly, rats in the consistent HAI group did not experience this learning effect of day. Rats in the consistent

HAI group also showed less anxiety on the first test (day 8), after being pet for 20 min a day for 7 days—the opposite of the effects one would expect based on learning. Based on the finding that learning causes rats to spend more time in the open arms on later tests in the elevated plus-maze (File, 1992), paired with the finding that stress can be made context-dependent (Korte & De Boer, 2003), we expect that the rats in this group were affected by the context-dependent learning, based on the context of HAI's anxiolytic effects. Although we expect that the experimenter holding the rats did not affect participants' experience of HAI, our results indicate this procedure could have affected the rats' experience of HAI. Because the experimenter held the rat during each petting session, we expect that the animals learned to associate the experimenter with the anxiolytic, repeated petting sessions. Thus, since the same experimenter that held, and sometimes petted, the rats (for 10 min twice a day for 7 days) also tested the rats on the elevated plus-maze, we expect that the rats were in the context of anxiolytic HAI during their first test. However, we expect that, after 14 days of not being handled, this context became extinct. Therefore, with the context removed, the rats performed worse compared to the rats that experienced the same context (i.e. that associated with the plus maze alone and not with HAI) for each elevated plus-maze test. Therefore, future studies should test the role of context-dependent learning, especially context of anxiety associated with HAI, on the elevated plus-maze test in order to determine the role that context-dependent learning plays on rats' anxiety and learning. Future studies should also more definitively determine if consistent petting decreases rats' anxiety. We expect that these future studies will find that consistent petting decreases the animals' anxiety, and this finding would have implications for treatment of laboratory animals in that, should a study conclusively determine that consistent petting decreases rats' anxiety, petting could be a reasonable measure taken to minimize stress in the laboratory setting—a concern of

ethical value (with regards to animal rights in animal research) and practical value (with regards to inadvertently confounding stress with other studies).

Applications

The findings that long-term HAI increases CLH, CLSCO, and empathic concern can be applied to some areas of society most in need of help. The first major implication of this study is that HAI significantly increases CLH and CLSCO through bonding. The importance of bonding in increasing these aspects of compassion then suggests, as Hanselman (2001) argues, that animals serve as surrogates for the deep emotional attachments—the deep emotional attachments children need in order to develop into empathetic people who can manage emotions such as anger without habitually, negatively impacting others. One societal structure that can directly benefit from our findings, paired with Hanselman's explanations of them, is the foster care system.

Despite several attempts to improve the foster care system, placement instability continues to be one of its downfalls. This placement instability then increases delinquency, presumably by preventing the children from forming the social bonds necessary for proper development (Ryan & Testa, 2005). Further, consequent of the absence of these necessary social ties, children do not form the empathy that would motivate them to refrain from delinquent behavior in order to protect their social relationships (Ryan & Testa, 2005). However, animals—though they cannot be a complete substitute for loving parents—can help children to cope and deal with life crises and provide them with unconditional love and stability in times of disrupting change (Levinson, 1972; Hanselman, 2001). Our study implies not only that animals can increase the empathy and compassion needed to motivate children to refrain from delinquent behavior, but that animals can also provide a form of stable social support—social support in the form of a

bond that reflects the bond between "specific close others" that these children in foster care, who suffer from placement instability, do not have. Therefore, when placement instability is unavoidable due to maltreatment, and when social services becomes involved to save children from people with whom those children could not have bonded (only rarely will there be formation of healthy attachment between a child and an abusive guardian), allowing children to move with a pet can allow formation of a HAB—which, as discussed above, could resemble the bond with a specific close other. This HAB can then foster compassion and provide the love and stability that these children need. Therefore, integrating animals into the foster care system has the potential to decrease juvenile delinquency and improve the quality of life for children in the system, and future longitudinal studies should evaluate the potential of animals to do both.

In addition to its potential to decrease juvenile delinquency and improve quality of life for children in foster care, our study implies that the HAB may also be successful in crime prevention. According to Feshbach (1989), abusive parents, along with their children, show a lack in empathy. Hanselman (2001) adds to this finding as she suggests that a reason for the cycle of abuse and lack of empathy is the inability of children to form attachments with their abusive parents. Her suggestion then implies that the cycle of abuse can be broken by teaching the children empathy. In these situations, children can learn empathy from animals; thereby, introducing animals and HAB to abused children can prevent them from becoming abusers themselves. In this way, animals have the potential to prevent abused children from becoming criminals, and, thereby, HAB has the potential to decrease crime rates. Similarly, sexual offenders who were abused as children demonstrate a lack of empathy towards their victims—a lack of empathy that they have learned from their abusers (Simons, Wurtele, & Heil, 2002). Thus, by integrating animals into therapy for those who were sexually abused as children, we

may be able to teach them the empathy and compassion they have learned not to feel for their victims. In these situations, the animal would serve as someone on whom the child can depend, someone the child can trust, and someone who models healthy love—and, thereby, a model of compassionate love of humanity. Therefore, the findings of the current study imply that consistent HAI leading to a HAB can increase CLSCO and CLH, thereby helping abused children heal and preventing them from becoming criminals themselves once they are older.

Conclusion

Ultimately, we tested the effects of petting rats on different aspects of human compassion and empathy. We also tested the effect of petting rats on the rats' anxiety. Surveys revealed that only the longer-term intervention group (in which participants pet a rat every day, 10 min a day, for 1 wk) showed increased CLH, CLSCO, self-kindness, and empathic concern. These results lasted for 3 wks after the last interaction, indicating that the effects of animals on compassion and empathy are long-lasting, and possibly permanent. The findings also show that bonding with an animal is important in HAI's effects on compassion. Thus, we found that people who have the opportunity to *bond* with an animal experience a sensation deeper than people who merely interact with the animal. Our findings can be applied to programs such as foster care to improve the lives of children, as well as to programs designed to decrease juvenile delinquency and cycles of physical and sexual child abuse. Therefore, future studies should apply our findings that animals increase CLH and CLSCO to practical situations (such as foster care and prisoner rehabilitation) in order to benefit society. Further, our rat study shows that HAI could positively impact the rats only when it is consistent; therefore, to minimize unnecessary distress to the

animals, studies of HAI should use only animals that are habituated to handling. Ultimately, this study shows that consistent HAI positively impacts both humans and animals, and these findings should be applied and studied: to modify experimental designs in order to maximize benefits and minimize harms to animals; to potentially improve the well-being of children in the foster-care system; and to potentially decrease criminal behavior associated with high rates of displacement and low empathy and compassion for victims.

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Table I. Means and standard deviations for compassion measures by test, test day, and group. For all measures, $n = 6$. SCS and IRI refer to the overall, averaged scores.

	Test Group	Test Day	CLCO	CLSCO	DPES	CLH	SCS	IRI
M	Immediate	Baseline	6.46	6.31	5.87	5.13	2.62	4.01
	Intervention	Immediate	6.45	5.92	6.00	5.32	2.65	4.00
		Day 8	6.23	6.11	5.90	5.49	2.40	4.19
		Day 22	6.24	6.24	5.87	5.35	2.33	3.57
	Longer-term	Baseline	6.34	6.22	5.93	4.87	2.72	3.42
	Intervention	Day 8	6.51	6.53	6.40	5.68	2.95	3.55
		Day 22	6.63	6.68	6.60	5.93	2.97	3.57
SD	Immediate	Baseline	0.70	0.80	0.68	0.61	0.76	0.52
	Intervention	Immediate	0.68	1.26	0.73	0.64	0.82	0.75
		Day 8	0.57	0.75	0.75	0.67	0.91	0.52
		Day 22	0.77	0.86	0.65	0.78	0.91	0.46
	Longer-term	Baseline	0.55	0.62	0.62	0.62	0.67	0.65
	Intervention	Day 8	0.54	0.53	0.46	0.42	0.35	0.44
		Day 22	0.26	0.30	0.38	0.60	0.47	0.47

Table II. Means and standard deviations for SCS subscales by group and test day. For all measures, $n = 6$.

	Test Group	Test Day	Common Humanity	Isolation	Mindfulness	Over-Identification	Self-Judgment	Self-Kindness
M	Immediate	Baseline	2.88	2.58	3.13	2.46	2.13	2.37
	Intervention	Immediate	2.40	2.67	3.04	2.75	2.30	2.40
		Day 8	2.63	2.50	2.83	2.25	2.00	2.20
		Day 22	2.21	2.46	3.00	2.13	1.93	2.23
	Longer-term	Baseline	3.04	2.67	3.21	2.38	2.53	2.53
		Day 8	3.54	2.38	3.81	2.96	2.67	2.93
	Intervention	Day 22	2.83	2.71	3.75	2.46	2.40	3.00
SD	Immediate	Baseline	1.00	1.30	0.98	0.98	0.71	0.86
	Intervention	Immediate	1.05	1.28	0.81	0.81	0.99	0.96
		Day 8	2.63	2.50	1.37	0.86	0.76	1.07
		Day 22	2.21	2.16	1.26	1.13	0.67	1.11
	Longer-term	Baseline	0.99	0.49	0.81	1.24	0.68	0.72
		Day 8	0.71	0.56	0.50	0.84	0.98	0.80
	Intervention	Day 22	0.91	0.58	0.42	0.86	0.54	0.66

Table III. Means and standard deviations of IRI subscale measures by test group and test day. For all measures, $n = 6$.

	Test Group	Test Day	Empathic Concern	Fantasy	Personal Distress	Perspective Taking
M	Immediate	Baseline	4.07	3.62	2.52	3.91
	Intervention	Immediate	4.00	3.55	2.31	4.05
		Day 8	4.19	3.57	2.22	4.00
		Day 22	3.57	3.48	2.45	3.83
	Longer-term	Baseline	3.90	3.86	2.65	3.29
	Intervention	Day 8	4.39	3.86	2.24	3.52
		Day 22	4.43	4.17	2.07	3.60
SD	Immediate	Baseline	0.52	0.68	0.47	0.65
	Intervention	Immediate	0.75	1.00	0.48	0.83
		Day 8	0.52	1.09	0.67	0.74
		Day 22	0.46	1.18	0.49	0.90
	Longer-term	Baseline	0.82	0.73	0.71	0.79
	Intervention	Day 8	0.57	0.82	0.78	0.56
		Day 22	0.56	0.63	0.87	0.83

Table IV. Means and standard deviations of EEG measures (alpha and beta waves) by test group and test day. For all measures, $n = 6$.

	Test Group	Test Day	Alpha Waves	Beta Waves
M	Immediate Intervention	Baseline	1.80	1.90
		Immediate	10.27	6.85
		Day 8	3.35	3.75
		Day 22	2.27	1.87
	Longer-term Intervention	Baseline	4.26	3.11
		Day 8	5.27	4.12
		Day 22	1.97	1.66
SD	Immediate Intervention	Baseline	1.80	1.15
		Immediate	14.30	8.16
		Day 8	2.58	3.61
		Day 22	1.49	0.84
	Longer-term Intervention	Baseline	3.54	2.62
		Day 8	4.06	2.83
		Day 22	1.08	0.58

Table V. Means and standard deviations for time spent in the open arms (s) on the elevated plus maze test, by test day and group. For all data, $n = 4$.

	Minimal HAI		Inconsistent HAI		Consistent HAI	
	Day 8	Day 22	Day 8	Day 22	Day 8	Day 22
M	11.50	64.75	6.25	8.50	33.00	17.00
SD	16.00	31.86	7.32	5.97	20.61	16.12

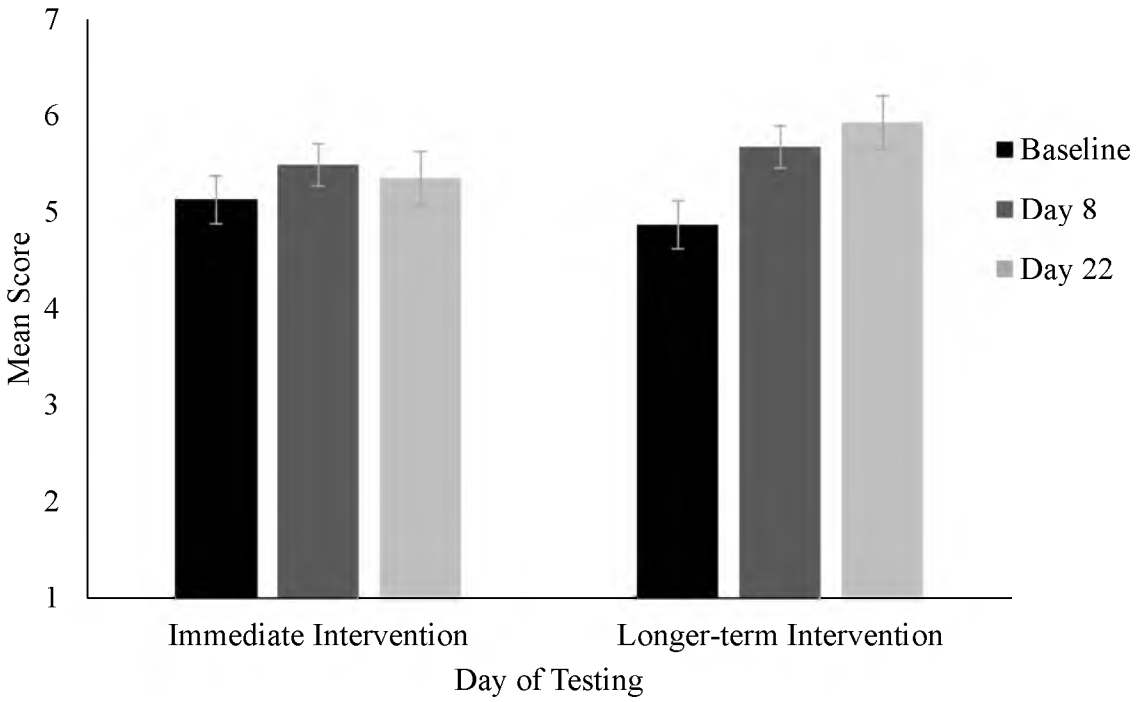

Figure 1. Means for CLH in the longer-term and immediate intervention groups. The interaction between day of testing and group is significant. Error bars represent standard error.

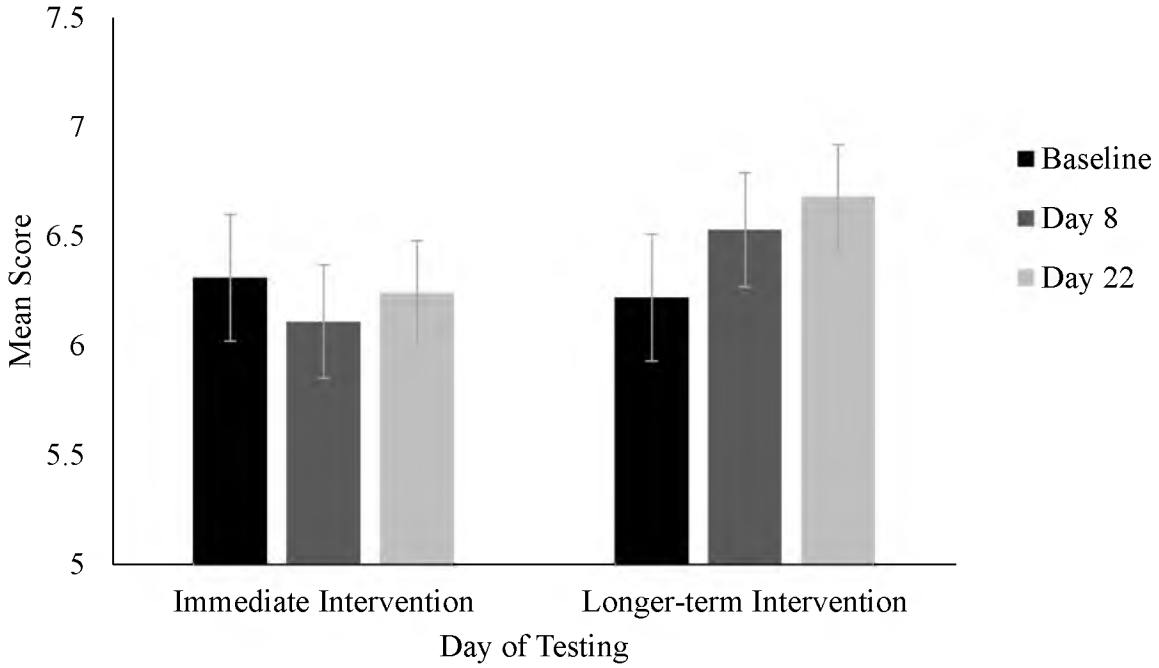

Figure 2. Means for CLSCO in the longer-term and immediate intervention groups. The interaction between day of testing and group is significant. Error bars represent standard error.

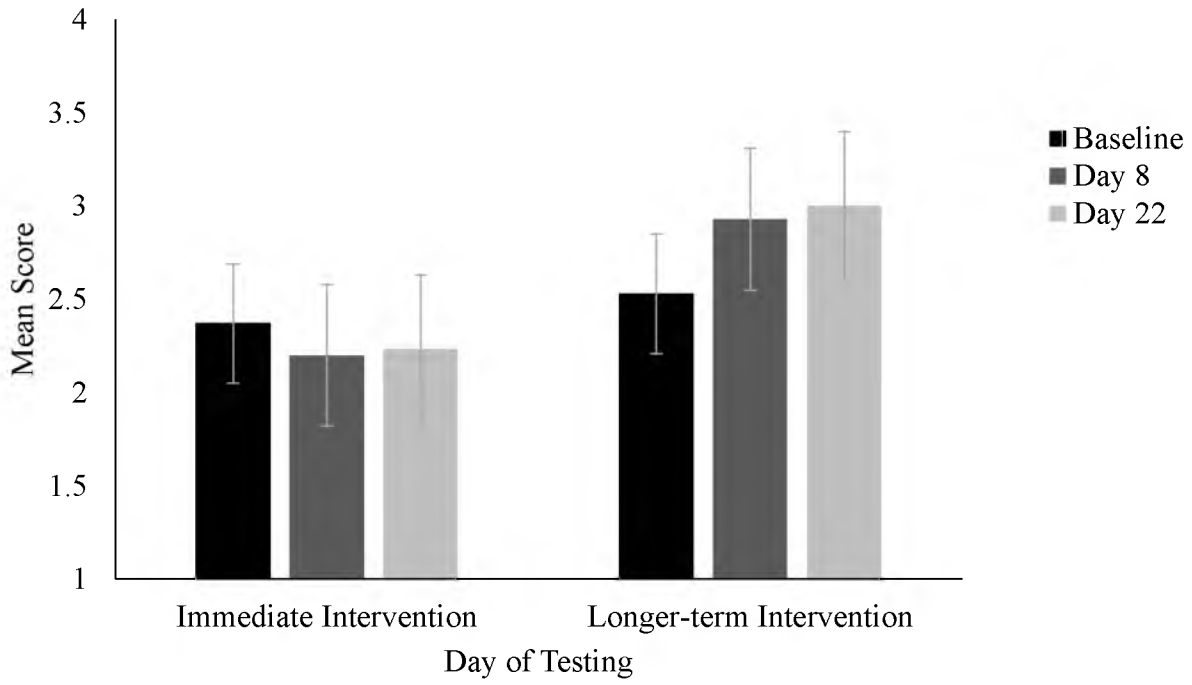

Figure 3. Means for the SCS self-kindness subscale in the longer-term and immediate intervention groups. The interaction between day of testing and group is significant. Error bars represent standard error.

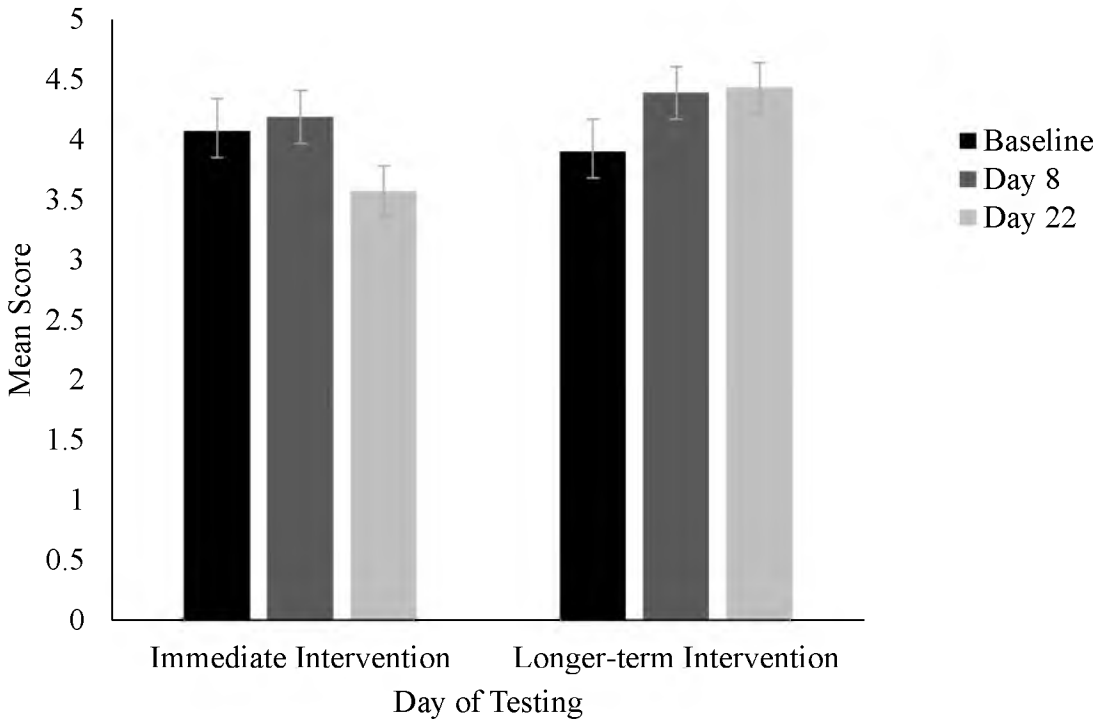

Figure 4. Means for the IRI empathic concern subscale in the longer-term and immediate intervention groups. The interaction between day of testing and group is significant. Error bars represent standard error.

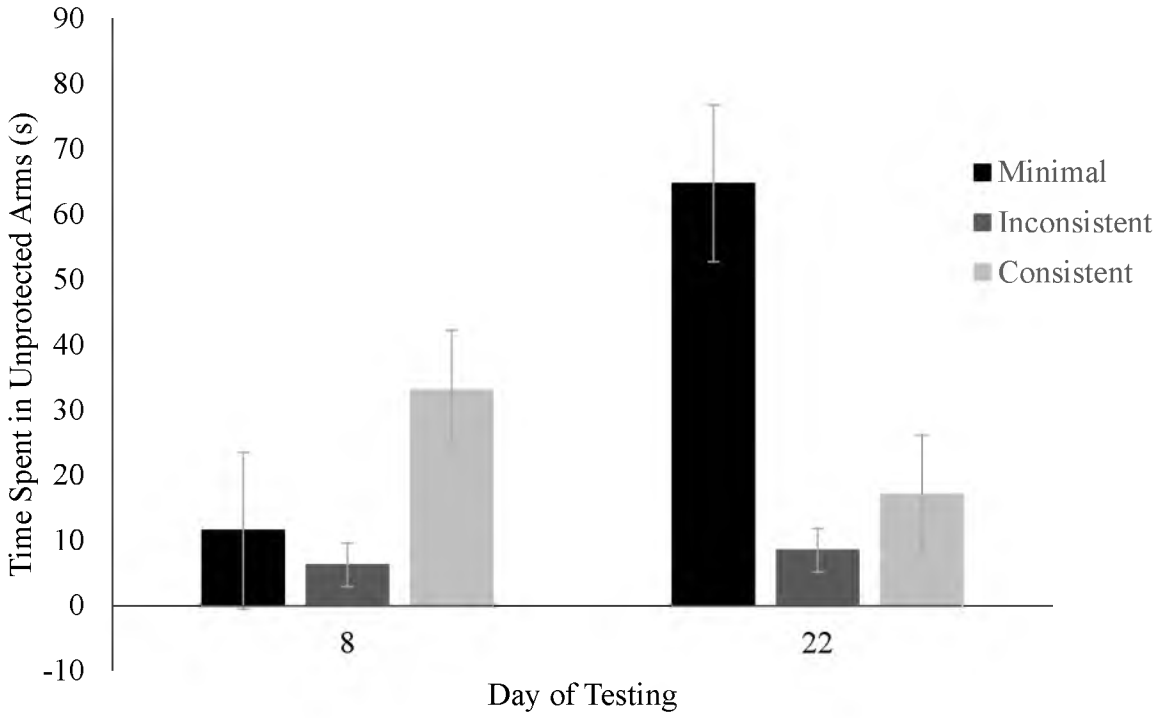

Figure 5. Interaction between day and HAI group. For the consistent HAI group, time in the open arms decreased significantly between day 8 and day 22 (time decreased after HAI ceased).

GRUMPY CAT ON HUMP DAY: ANIMALS' EFFECTS ON MIND, BODY, AND SPIRIT—AND WHAT WE OUGHT TO DO ABOUT IT

Thesis Expansion

How ought we to live?: the Jesuit question. How ought we to live?: the question that Regis University asks all students to pursue through their classes, through their service, through their lives. How ought we to live?: the question we must live and breathe to become men and women in service of others. How ought we to live?: the call to serve. "How ought we to live?" is the question that we, under the instruction of a Jesuit university, ask ourselves day after day, week after week, month after month, year after year. It is the call that echoes in our minds in every class, in every major life decision. It is the battle drum that beats out the rhythm of our lives, as we figure out how to live as we ought to live—and then live it.

"How ought we to live?" is the battle drum of our lives only because Regis University, as a Jesuit institution, requires us to ask it of ourselves so often—only because Regis aims to give us the tools to answer this call. Among the many tools that Regis provides us with in our quest to answer this call is *cura personalis*: care for the whole person—mind, body, and spirit.

We all know what the body is, and psychology has given us some insight into what makes the mind. But what about spirit? Spirit can generally be understood as *anima*, the soul. Although the definition of the soul, and even its existence, is disputed, the modern western world has come to understand "the soul" to generally refer to the unique individual. In *The Early Greek Concept of the Soul*, Jan Bremmer analyzes its historical roots and its modern conception. In his analysis, Bremmer argues that our current understanding of "soul" is innately tied to our understanding of psyche. Bremmer explains:

> This study…applies the model of 'primitive' soul belief with its distinction between a free soul representing the individuality of a person and the body soul endowing a person with life and consciousness. Following this model *psyche* will be identified…as

> corresponding with the free soul and terms connected with man's inner life such as *thymos*, *noos*, and *menos*, as corresponding with the body souls. (11)

In this passage, Bremmer clarifies the implications of the two different Greek concepts that our modern understanding of "soul" combines (free soul and body soul). Thereby, Bremmer argues that the modern idea of a soul encompasses the values of individuality, spiritedness and passion (*thymos*), common sense (*noos*), and state of mind (*menos*). The modern idea of a soul thus combines individuality with *thymos*, *noos*, and *menos* to create one, unified picture of the human state of mind.

And it is this one, unified picture of the human state of mind that makes us who we are. We could not be ourselves without individuality—after all, "being oneself" implies that we express our inner uniqueness, our individuality. We could not be ourselves without spiritedness—after all, it is our passion that drives us to fight for what we believe in, that drives us to seek *magis*, that allows us to persevere. We could not be who we are without common sense—after all, it is common sense that allows us to interact with others and, in turn, to learn and grow from them (how many people regularly rely on someone who lacks common sense?). Above all else, we could not be who we are without our states of mind—after all, it is our states of mind that allow us to perceive the world the way we do, to decide what we are passionate about and when to persevere, to decide who we are. Therefore, the modern idea of a soul is the combination of all of the factors—individuality, spiritedness, common sense, and state of mind—that make us who we are, that determine how we act in different situations, that determine how we live.

The way in which we live inextricably applies to that resounding question of our lives, the question of how we ought to live. As students in a Jesuit institution, we are taught that the

idea of how we ought to live intertwines with caring for the whole person, *cura personalis*. Like the idea of the *anima*, which intertwines the many threads of individuality, spiritedness, state of mind, and common sense, c*ura personalis* teaches us that we ought to integrate mind, body, and spirit in learning (Bogel, 2012). Thereby, *cura personalis* holds that the ultimate goal of education should be to nurture and unify the soul—to unify and thereby nurture the soul by integrating all of its components (the mind that is the state of mind, the common sense that is learning, the spiritedness that is spirit itself), to nurture the human by nurturing the soul.

As students, we know that we should nurture mind, body, and spirit. However, the ultimate question for many of us becomes *how* to find *cura personalis* in our daily lives. Unfortunately, as students, the three facets of *cura personalis* often seem to conflict with one another. We can nurture our minds through our academics, but how can we continue to nurture our bodies when we stress so much about classes and grades and theses that we have no time for exercise and forget to eat and fail to sleep? We can nurture our bodies through food and exercise, but how effective will that really be, given the deleterious effects of stress on the human body? How can we truly nurture our minds—academically *and* personally, in a way that allows us to learn while evading the all-consuming stress that is often part of an academic life? And even if we figure out how to balance mind and body, how do we work on the spirit—something so intangible and so immeasurable?

Many of us spend our entire undergraduate careers—and will spend the rest of our lives—trying to answer these questions, trying to reconcile care for the mind and care for the body and care for the spirit, trying to implement *cura personalis* to live how we ought to live. And in our quest to nurture *anima,* animals can be our faithful companions. A combination of published studies and my own thesis research study show that animals—and, more specifically,

human-animal interaction (HAI)—nurture all three of these aspects of the human being: mind, body, and spirit.

Why Animals?

Grumpy Cat is a small cat sporting an intoxicating frown, starring in several memes with sarcastic quotes. On Twitter, Grumpy Cat has 125,110 followers and counting (Grumpy Cat). Why? Because Grumpy Cat, like many other animals, is intoxicating—she makes people laugh, she makes people relax enough to laugh, she makes people forget about their stressful lives for long enough to relax. And Grumpy Cat is not the only one: a much beloved member of the Peanuts gang, the canine Snoopy has 249,000 followers (Peanuts Snoopy)—2,000 more than his human counterpart, Charlie Brown (Peanuts Charlie Brown); a video of a baby panda sneezing went viral, and has now been viewed 190,246,963 times (Jimvwmoss); not including the many montages this sheep has starred in, or the many music videos it has been made a part of, the original video alone of a sheep screaming like a human has 9,318,432 hits (AjQ2891); and the GEICO "Hump Day" camel commercial has 20,641,398 hits—not including the many songs and remixes, or the memes, that have been made in his image (GEICO Insurance). Like Grumpy Cat, these animals—and the larger species they represent—have an amazing ability to make people feel "warm and fuzzy"—to feel relaxed and happy. They have an amazing ability to make people feel loved unconditionally. Josh Billings captures this unconditional love of animals—how animals love how we ought to love, and, thereby, live how we ought to live—as he remarks, "A dog is the only thing on earth that loves you more than he loves himself" (2013).

Animals and the Mind. A dog is the only thing on earth that loves you more than he loves himself. Equally important, a dog can love you more than *you* love yourself—and dogs can be your companions as they teach you how you ought to love yourself again. Depression is a

major issue amongst American college students. In fact, 30% of college students report feeling so depressed that it interfered with normal functioning (American College Health Association, 2012). Coinciding with this finding, suicide is the third leading cause of death for teens and young adults between the ages of 15 and 24 (National Center for Health Statistics, 2012)—ages that predominately include the college years. Not only does this depression negatively impact the mental health side of "the mind," but it also negatively affects the academic mind, as 11.9% of depressed college students report that their depression interferes with their academics (American College Health Association, 2012). These statistics showing the deleterious effects of depression in college students—effects that are not uncommon—suggest that colleges should have access to treatment strategies that can further student success by alleviating the depression that interferes with their academics and tortures their psyches.

Animal-Assisted Therapy (AAT) is one very effective way to alleviate this depression (Barker, Pandurangi, & Best, 2003; Berget & Braastad, 2011). And not only can AAT alleviate depression, but, because the participants in these studies were already in therapy, research shows that animals further well-being and care for the mind *beyond* what other treatments can do alone. Applying these findings to the question "How ought we to live," the fact that college students often suffer from depression—detrimental to multiple aspects of "the mind"—and the fact that this depression can be alleviated through HAI beyond what therapy can do alone (in other words, beyond a majority of the current opportunities Regis offers to deal with depression) suggest that we ought to expand opportunities to interact with animals to help our students nurture their minds.

Further, not only can AAT help alleviate depression to nurture the mind, but it can also improve academic and psychological functioning by working to relieve stress and anxiety.

Almost half of college students, 49.9%, reported feeling overwhelming anxiety in the past 12 months (American College Health Association, 2012), and 19.9% of college students reported that their anxiety interfered with their academic performance (American College Health Association, 2012). That is almost 1 in 2 college students suffering from severe anxiety, in addition to 1 in 5 suffering academically because of their anxiety. And when we consider that Regis is predominately female (61.8% female in the 2012-2013 academic year; Gaurmer, 2013), the statistics look even more grim, as *over half* of female college students report overwhelming anxiety (American College Health Association, 2012). Just as AAT relieves depression, animals affectively relieve anxiety in people with anxiety disorders (Barker et al., 2011; Berget et al., 2011). Animals further benefit those without disorders, working to relieve anxiety in response to mental stressors (math tests, which cause stress in many college students—including Regis students required to take a math course to graduate; Allen, Shykoff, and Izzo, 2001), people exposed to stressful situations (such as finals; Shiloh, Sorek, & Terkel, 2003), and even college freshmen dealing with stress associated with leaving home (Adamle & Riley, 2010). By helping college students to manage the overwhelming stress that interferes with their academic work, animals can affectively nurture the mind by enhancing the ability of other techniques, such as therapy, to relax students.

With respect to care for the mind, Regis itself can seek *magis* by expanding opportunities it offers students to interact with animals—the opportunities it offers students to nurture their minds. Regis does offer counseling to help college students deal with their depression and anxiety, and by no means am I suggesting that this counseling is not valuable; however, I am suggesting that we can do more—that we can seek *magis* by expanding the number of opportunities that we offer students to nurture their minds. As mentioned above, animals do not

just relieve anxiety in patients with mental illnesses, but they relieve this stress beyond what therapy and medications can do alone. Therefore, expanding access to AAT—for example, by encouraging more counselors to certify dogs for AAT so that we have more than one counselor with one dog that comes in on one day of the week—can dramatically improve students' ability to nurture their minds both psychologically and academically.

Animals and the Body. Not only can AAT nurture the human mind, but HAI can also nurture the second tenant of *cura personalis*, the human body. A variety of research demonstrates that pet ownership improves human health. For example, petting animals decreases blood pressure and heart rate (Vormbock & Grossberg, 1988), and this effect is greater when the individual *owns* the pet (Astrup, Gantt, & Stephens, 1979). Decreases in heart rate then confer a variety of secondary benefits for human health, including decreased risk of heart attack and stroke. Further, owning animals also decreases frequency of minor physical ailments such as dizziness, headaches, and colds (Serpell, 1991)—common complaints amongst college students. Therefore, research shows that pet ownership improves human health, thereby nurturing the human body—another reason we ought to expand students' opportunities to interact with animals.

Animals and the Spirit. "A dog is the only thing on earth that loves you more than he loves himself" (Billing, 2013). Dogs thus love as we ought to love, they live as we ought to live. Extending this notion from dogs to other animals (defined in the colloquial sense, as predominately furry mammals), animals serve as role models for how we ought to love and live. Therefore, by living with animals, we can learn to love others—to love unconditionally, to be empathetic, to be compassionate. This is the central role that animals play in nurturing the spirit: they teach us to have compassion and empathy.

The importance of compassion. Far too often, we hear stories that seem to point out humanity's pitfalls. People steal from each other, torture each other, kill each other. However, in the midst of all the human error, we also hear stories of great heroism—stories in which people fight for and save each other, stories of undying loyalty and service and grace. What is the difference between these different kinds of people in the stories of humankind—between people who choose to steal and people who choose to give, between people who torture and people who heal, between people who kill and people who save?

While there may be many differences between these kinds of people, a key difference is rooted in each type of person's capacity for and level of compassion. While it may be difficult to define, compassion is arguably one of the most important and universal human virtues. According to philosopher Andre Comte-Sponville, compassion revolves around sharing in others' suffering (2003). By sharing in others' pain, compassion becomes that virtue that makes humans humane, for it is the ability to share in others' suffering that allows us to give to the poor and starving, that allows us to heal those in pain, that allows us to save lives. In fact, compassion is so important to humanity and to the soul that Fr. Kolvenbach, S. J., recognizes it as a virtue that students *must* learn in Jesuit schools. Fr. Kolvenbach, S.J., explains:

> Students, in the course of their formation, must let the gritty reality of this world into their lives, so they can learn to feel it, think about it critically, respond to its suffering, and engage it constructively. They should learn to perceive, think, judge, choose, and act for the rights of others, especially the disadvantaged and the oppressed. Campus ministry does much to foment such intelligent, responsible, and active compassion, compassion that deserves the name solidarity. (24)

In this passage, Fr. Kolvenbach, S. J., explains the central role of compassion in the mission of a Jesuit University. According to Kolvenbach, a Jesuit institution—through services such as campus ministry—must teach its students to be compassionate. It is only through this compassion that they will act for the rights of others, especially the disadvantaged and the oppressed—for it is only through this compassion that students will learn to feel the gritty reality of the world, share in the suffering of others, and, in doing so, be motivated to inspire change.

HAI teaches students this compassion necessary to nurture the soul. And not only does HAI increase compassion in students, but my Honors in Neuroscience thesis shows that it increases this compassion in *Regis* students. In the experimental portion of my thesis, I showed that petting rats increases humans' compassionate love of humanity and compassionate love of specific close others—but only after *consistently* interacting with an animal. Further, I showed that these results lasted over two weeks—that these increases in compassion were long-term. Thereby, my research shows that HAI is a way that we can increase students' compassion and empathy—emotions that nurture their spirits by nurturing that central spiritual component that is compassion.

Animals and cura personalis. Combining the findings from all of this research shows that HAI truly nurtures the whole person—mind, body, and spirit—thereby fulfilling *cura personalis*. Therefore, in order to better help students to implement *cura personalis* in their lives, we should increase the number of opportunities for HAI. Further, in order to help students nurture their spirits more fully and in a way that has the potential to cause long-term increases in compassion—which, in terms of *cura personalis*, confers long-term spiritual benefits—we should increase students' opportunities to *consistently* interact with animals. A major way to

fulfill both requirements—thereby helping students to implement *cura personalis* in their lives—is to allow animals to live on certain areas of campus.

Why Pet Ownership Confers More Benefits than AAT. Although AAT can improve psychological health by relieving stress, which then may lead to physical benefits, pet ownership is preferable over AAT for students' HAI. With respect to nurturing the mind, pet ownership would be preferable to AAT because this ownership would allow the human to interact with the pet during his/her stressor (something not available with AAT alone because AAT requires coordinating with a therapist and working around his/her schedule)—an interaction that can provide dramatic emotional benefits. What's more, pet ownership requires students to take themselves away from their stressor (e.g. school work) long enough to feed, walk, and play with the pet—a distraction that can dramatically improve both mood and stress levels (in fact, distracting its human is one task a psychiatric service animal is trained to perform because it confers such great psychological benefits for someone suffering from an overwhelming amount of stress; National Alliance on Mental Illness, 2013). Further, benefits of pet ownership above AAT, including the emotional support that animals naturally provide, are the basis for the legal protection of Emotional Support Animals (ESA's; Bazelon Center, 2012)—legal protection that implicates animals', and, more specifically, pet ownership's, profound ability to improve the psychological well-being of their people, animals' profound ability to nurture their people's minds. Thus, pet ownership can nurture people—can help students achieve *cura personalis*—more than a one-time HAI.

With respect to nurturing the body, pet ownership, but not merely petting animals, is linked with additional and greater benefits to human health. In fact, ownership (above HAI) is the factor linked to improved physical health—improved health reflected in decreased incidence

of minor illnesses (Serpell 1991). Further, although HAI without pet ownership can decrease blood pressure, the effect is greater when participants own the pets (Astrup, Gannt, & Stephens, 1979). Therefore, pet ownership nurtures the body more than simply interacting with animals.

Lastly, with respect to nurturing the spirit, my research suggests that pet ownership can have greater impacts on the human spirit than one-time HAI. Although petting animals increases human compassion, this effect was only seen when participants *consistently* interacted with the animal (once a day for a week); conversely, petting the animal one time did not impact empathy or compassion at all. Therefore, because pet ownership provides more consistent interaction than AAT, my research suggests that pet ownership can nurture students' spirits more than AAT. Thus, ultimately, pet ownership is a better method of nurturing *cura personalis* than AAT or sporadic HAI because it provides a wider array of benefits, serving to nurture the mind, body, and spirit in additional and more profound ways than AAT alone.

Proposal to Adopt a Pet-Friendly Policy

How ought we to live?: the Jesuit question. How ought we to live?: the question we must live and breathe to become men and women in service of others. How ought we to live?: the call to serve. How ought we to live?: the question that Regis University asks all students to pursue through their classes, through their service, through their lives. "How ought we to live?" is the question that we, under the instruction of a Jesuit university, ask ourselves day after day, week after week, month after month, year after year. It is the call that echoes in our minds in every class, in every major life decision. It is the battle drum that beats out the rhythm of our lives, as we figure out how to live as we ought to live—and then live it.

"How ought we to live?" is the battle drum of our lives only because Regis University, as a Jesuit institution, requires us to ask it of ourselves so often—only because Regis aims to give us the tools to answer this call. If we really expect students to *begin* to be able to answer this question, we have to give them the tools to do so—not only through classes, but also through living situations. We should make Regis-sponsored housing a place where students can implement *cura personalis* in their daily lives. Regis can help students live how they ought to live by giving them access to the animals that nurture their minds, bodies, and spirits. Thus, based on research showing that pet ownership nurtures the mind, body, and spirit at a level greater than merely interacting with animals occasionally, I propose Regis allow animals to live on campus. As radical as this proposal may sound, several other colleges allow animals to live on campus, and they have implemented pet-friendly policies without any reported problems. This proposal is based on the successful pet policies at these other schools.

Restrictions. Firstly, for the safety of students and animals, this proposal comes with a number of restrictions. (For a sample of a student pet-ownership contract, see page 82.) For

example, although I am proposing that Regis allow animals to live on campus, I am proposing that Regis only allow *one* section of Residence Village (the RV's; e.g. the 400's) to adopt a pet-friendly policy. Residence Village is optimal for a pet-friendly policy because it consists of a variety of separated, spacious units. The separation prevents problems arising from issues such as allergies, and the space provides ample room for an animal, such as a dog, to thrive. Additionally, Regis would need to restrict areas of campus where the pets are allowed to go, maintaining the current policy to not allow animals in the student buildings (in order to ensure safety of pets and students, and to prevent allergy attacks).

In addition to the location on campus, there would also need to be restrictions on both the type and number of pets that residents are allowed to keep. Stephens College restricts the types of pets allowed to dogs (of any breed except pit bulls, Rottweilers, German shepherds, chows, and Akitas, in accordance with county regulations), cats, rabbits, hamsters, rats, mice, gerbils, sugar gliders, guinea pigs, lizards, and birds. The college further prohibits snakes and spiders, and residents are restricted to one pet per room (Stephens College, 2013). Similarly, Eckerd College restricts the type of pet students are allowed to own, and, in addition, the college specifies that animals should weigh less than 40 pounds when full-grown (Eckerd College). I propose that Regis slightly modify and combine the Stephens and Eckerd policies in order to create a tailored pet policy that students, staff, and pets can benefit from at Regis. Firstly, at least in the first few years of implementation, no exotic animals of any kind should be allowed (including sugar gliders). This modification of the Stephens College policy would make implementing and managing a pet policy less complicated. However, the layout of Residence Village provides room for more than one pet per RV, but less than one pet per room. Therefore, I propose that each RV *unit* be allowed to keep one pet such that the number of pets in any one

complex never exceeds two (pets). This restriction both makes the policy easy to regulate and ensures that there is enough space for both students and animals to thrive. Thus, ultimately, I propose that Regis allow cats, dogs, ferrets, rabbits, guinea pigs, hamsters, domestic mice, and domestic rats to live in one section of Residence Village, with no more than one pet per floor.

In addition to these restrictions, Regis would need to ensure that any pet brought to and kept at Regis is healthy. Pet-friendly colleges have ensured the continued health of their pets by mandating registration of all of the pets (Eckerd College, Principia College, and Stephens College). Registration would require up-to-date veterinary records (Eckerd College), and each pet would be registered for only one academic year. Limiting the amount of time a pet is registered allows Regis to mandate that pets remain up-to-date on their pets' vaccinations and preventative flea and parasite treatments by requiring students to provide evidence of updated records each year. To further ensure health and safety of people and animals, several colleges also require that students bathe their pets regularly (Eckerd College, Stephens College, Principia College)—a policy that Regis can also mandate, and a policy that is easy to fulfill in the RV's, where there is space to bathe animals.

Additionally, at pet registration, each dog and cat (essentially, each uncaged animal) would be issued a Regis Pet ID tag that it must wear at all times (modeled after Eckerd's policy). The ID tags ensure that, should a pet get out of the RV, it can be returned safely to its owner. It also would allow Regis to track which pets get out, and when, in order to ensure that the same pets do not escape multiple times (which could be indicative of a care problem, and, therefore, could result in mandating that the student find alternative living arrangements for his/her pet). Pet-friendly colleges further require a pet deposit, with Eckerd requiring pet owners to each pay $125 for cats, dogs, ferrets, and rabbits. Regis could also charge this pet fee and use the money to

make the ID tags; alternatively, Regis could charge only cat and dog owners the pet deposit such that only owners using the tags have to pay for them. In this way, Regis can ensure safety of the pets without incurring costs.

Challenges and Logistics. When instituting any pet policy, there are a number of concerns that need to be addressed in order to ensure both human and animal health, safety, and well-being. Some of the most common concerns deal with risk of allergies, dislike of animals, keeping campus clean, and local legislation regarding pets. A university's pet-friendly policies can account for all of these concerns through the restrictions and mandates placed on pet owners.

Allergies and Phobias. Colleges are made up of a diverse set of people, each with their own medical conditions, dislikes, and fears. As such, implementing a pet policy often raises concerns about people with allergies being around pets, in addition to concerns about forcing people with animal phobias (and people who otherwise dislike animals) to interact with animals. However, the proposed policy has several restrictions in place to prevent both allergy attacks and forced interaction.

The biggest safeguard against both issues is the restrictions on where, on campus, animals can be (including restrictions on which buildings they can enter). I propose that Regis only allow animals to live in one section of the RV's. The location of the RV's, away from the school buildings, makes it easy for people with animal allergies and people who dislike animals to avoid them. Further, the prohibition of animals from the academic buildings—an existing policy at Regis—further prevents people who do not like or who are allergic to animals from coming into contact with them. Regis pet-owners would still be subject to the same rules. Therefore, restricting where pets would be allowed on campus would prevent both allergy attacks and forced interaction.

How Regis can ensure that everyone living with a pet wants to be. Similar to forced interaction, implementing a pet policy raises concerns about people being forced not just to interact, but also to live, with pets. However, Regis has a roommate-matching system, and the university can use this system to match people who want pets (with others who want pets) and people who do not (with others who do not want pets). As an added question to the surveys (the surveys people fill out as they create their roommate profiles), Regis can have RV applicants state whether or not they wish to have a pet. When forming groups (of six people who will live in the same unit), this would then be a question that people discuss and take into account. Regis could further remind people to talk about whether or not they want a pet (and whether or not they would like to apply for the special pet housing) as they form their residential groups. By differentiating which RV section (e.g. the 400's) would be pet-friendly on the room selection computer program, Regis can further ensure that groups know that they are signing up for a pet-friendly RV. In these ways, this proposal has safeguards in place to ensure that nobody "accidentally" signs up for a pet-friendly RV.

In addition to ensuring that there is no forced interaction with pets, implementation of a pet policy also has to address who gets selected to live with pets should there be more people who sign up for pet housing than there are designated pet-friendly housing slots. If there are too many groups that want pets, Regis could match groups to RV's on a first-come, first-serve basis (and tell hopeful pet-owning residents about this policy before they sign up). Thus, by using a roommate-matching system and accepting residents for pet-friendly housing on a first-come, first-serve basis, Regis can ensure fair selection of pet-owners, and Regis can ensure that these pet owners all know that they are signing up for pet-friendly housing.

Damages and Campus Condition. Another common concern when implementing a pet-friendly policy is what to do if the pet damages the room or if pet owners fail to clean up after their pets. Regis can address both concerns by requiring pet owners to pay a safety deposit for their pets (as at Principia College). Principia charges a $100 deposit for each dog and cat to cover any pet-related damages (such as chewed/scratched furniture). Regis can adopt the same policy. Regis can further use this deposit to cover clean-up for accumulated wastes. Not only would this ensure that Regis has the money to clean up after pets should campus condition become an issue, but it also gives further incentive for pet owners to clean up after their pets. Thus, Regis University can plan for any potential damages by charging either all pet-owners or owners of uncaged animals.

Bad Pet Behavior. Just as students would be responsible for any pet damages (in the form of not receiving their safety deposit), students would be responsible for the behavior of their pets. As at other pet-friendly colleges, repeated bad behavior on the part of the pets would result in requiring the student to make alternative arrangements for the pet (requiring the student to bring the pet home). Principia allows students to be brought to judicial hearings regarding repeated pet-related offenses. Similarly, Regis can integrate pet behavior into the pet policy, with noise violations (e.g. dogs barking), frequent escapes, and any other pet behavior that interferes with normal campus life and functioning punishable with judicial charges built into the point system. Like the other colleges, Regis can maintain the warning system the institution currently has for offenses such as these (when they are committed by humans—e.g. with noise violations, the first violation is a warning, the second leads to action). Thus, Regis can ultimately prepare for bad pet behavior by holding students responsible for this behavior—including bringing judicial charges against owners with pets who habitually interfere with campus life.

Pet safety and well-being: At Regis, in addition to asking what we can do to improve students' lives, we ask the costs to these improvements. Therefore, when discussing a pet policy, it is also important to look at how a Regis pet-friendly policy would affect the animals. One of the most prominent questions regarding pet well-being in the dorms regards the amount of space. It is true that there is not enough space for a pet to thrive in O'Connell. Similarly, there is not enough space for a pet to thrive in DeSmet or even West Hall. However, Residence Village offers sizable rooms that can comfortably accommodate a pet and, therefore, if pet ownership is restricted to Residence Village, space should not interfere with the animals' well-being.

On a college campus, it is also important to consider how pets might be affected by their owners going to classes and to work. To ensure the safety of the pets, other colleges (including Stephens and Eckerd) require pets to be restrained while the owner is not in the room. This would mean that caged animals such as rabbits and hamsters would have to be in their cages while alone (something that, because these animals are caged animals anyway, would not reasonably affect their well-being). Similarly, dogs and cats would have to be crated or allowed to roam in an X-pen. This requirement would ensure that the animal does not get hurt while the owner is out. Additionally, the set-up of the RV's—in which six people are in one unit—prevents the animal from spending most of its time in a cage, crate, or X-pen. A policy in which students in the same unit would also discuss, before-hand, pet ownership and related responsibilities would further prevent the animal from spending too much time in a cage.

Both of the above considerations get to the question of the costs to the pet. However, space and time spent in a cage do not address the larger question about how HAI impacts the animal as a whole. With respect to this larger question, Research shows that HAI is not just beneficial for the human involved, but it is also beneficial for the animal. Odendaal (2000)

showed that HAI increased animals' levels of five different neurochemicals that are positively associated with mood. He further found that oxytocin increased more in dogs when they interacted with their owners than when they interacted with strangers. Therefore, these results imply that having and interacting with an owner promotes the well-being of the animal by increasing levels of trust hormones. As an additional way to benefit the animal, Stephens College advocates fostering pets. This program allows students to take in pets from shelters, thereby getting them out of their cages and giving them a loving environment to live in. Regis is surrounded by several shelters with fostering programs (including the HoBo boxer rescue, MaxFund, and the Dumb Friends League). These fostering programs can allow Regis students, as pet owners, to improve the life of the animal (service to another) while nurturing their own minds, bodies, and spirits. Thus, ultimately, HAI improves the well-being of animals, and, because space and time spent away from home are likely to not be issues in the RV's, it is likely that living in a the RV's will be no worse for the animal than living in another home—and living in an RV would improve the living situation of fostered animals.

Denver laws. In addition to the common concerns of pet ownership, a Regis pet-friendly housing policy would need to address city and county laws regarding pets. The Denver city ordinances allow domestic cats (so long as the cat is not a cross-breed between a domestic and a non-domestic cat), domestic dogs (except those trained for fighting), domestic ferrets, Mongolian gerbils, guinea pigs, hamsters, domestic laboratory mice, domestic rabbits, domestic laboratory rats, Central African hedgehogs, Algerian hedgehogs, and sugar gliders (Sec. 8-2. Keeping wild or dangerous animals prohibited). Denver also prohibits ownership of any pit bull, including: American pit bull terriers, American Staffordshire terriers, Staffordshire bull terriers, any other dog displaying the majority of the physical traits of these breeds, and any other dog that

substantially meets the American Kennel Club or United Kennel Club standards for these breeds (Sec. 8-55. Pit bulls prohibited). Taking these laws into account, any pet-friendly policy at Regis should only allow cats, dogs, hamsters, guinea pigs, Mongolian gerbils, ferrets, and domestic rabbits. Regis should further prohibit all pit bulls and all dogs that resemble pit bulls (until and unless city ordinances change), as well as all cats with a non-domestic parent. Further, as at other pet-friendly colleges, Denver requires licenses for all dogs and cats; therefore, like these other pet-friendly colleges, Regis may also require students to register their pets with the City and County of Denver before registering their pets at school. So long as Regis follows these rules, it is within the regulations of the City and County of Denver.

Conclusion. How ought we to live?: the Jesuit question. How ought we to live?: the question that Regis University asks all students to pursue through their classes, through their service, through their lives. How ought we to live?: the question we must live and breathe to become men and women in service of others. How ought we to live?: the call to serve. "How ought we to live?" is the question that we, under the instruction of a Jesuit university, ask ourselves day after day, week after week, month after month, year after year. It is the call that echoes in our minds in every class, in every major life decision. It is the battle drum that beats out the rhythm of our lives, as we figure out how to live as we ought to live—and then live it.

To really make "How ought we to live?" the battle drum of students' lives, we have to provide them with ample opportunities to truly nurture their minds, bodies, and spirits. Pet ownership is one such opportunity students need to truly achieve *cura personalis*, as it nurtures all three tenants of the human soul, of *anima*, beyond what therapy and academics can do alone—beyond what other opportunities can do alone, pet ownership can help students to achieve *cura personalis*, and, in doing so, live as they out to live.

Thus, to help students live how they ought to live, I propose that Regis allow cats, dogs, ferrets, hamsters, guinea pigs, gerbils, and rabbits to live in one section of Residence Village. By placing restrictions on where the animals are allowed to go, Regis can effectively prevent problems due to animal allergies and phobias. By ensuring pet registration, Regis can ensure that the animals are fit for life at Regis by ensuring that they are healthy. By providing ID tags, Regis can effectively keep track of the animals registered to students. By writing animal behavior problems into the student handbook (such that students know they are responsible for any and all misconduct of their pets), Regis can ensure that the pets do not detract from the academic environment. Enacting this pet-friendly policy would not only help students to implement *cura personalis* in their lives as they receive the mental, physical, and spiritual benefits of caring for an animal, but it would allow them to do so *by serving another*, the animal. In this way, pet ownership can help Regis to further instill its Jesuit values by allowing students to care for themselves while teaching them to care for others. Ultimately, it is through pet ownership that Regis can truly achieve its mission of making men and women in service of others.

Sample: Regis Student Pet Policy Contract

Residence Village Pet Program Agreement

Please read the entire document before signing, and be sure that you fully understand the requirements and restrictions of the Regis University Pet Program. You are responsible for being familiar with these policies.

The continuance of this program is contingent on owners' compliance with these policies.

Introduction: This contract has been established for the purposes of:

1. Promoting health and safety of all community members, pet-owners and non-pet owners alike
2. Promoting health and safety of all animals.

Rules and Regulations

1. Owning a pet within on-campus housing is a privilege, not a right. Should university officials (e.g. Campus Security or Residence Life), at any time, determine that owning pets is not in the best interest of the pet or the community, the university reserves the right to revoke the pet ownership privilege, and owners must find alternative arrangements for their pets.
2. **You are responsible for following laws and registration requirements of the County and City of Denver.** This means that, before arriving to campus, you should ensure that you are in compliance with these laws. This may include registering your pet with the County and City of Denver.
3. Upon arriving on campus on the first day of school, pet owners are required to register their pets with Residence Life. All pet owners are required to pay a $125 registration fee, in addition to the $100 safety deposit (see 7. below; thus, you will be charged a total of $225 when you register your pet). At this time, each dog and cat will be issued a university ID tag. Dogs and cats must wear this tag at all times. Registration with the university is valid only for the duration of the academic year.
    a. To register your pet, you must provide an up-to-date record from your veterinarian, including proof that your pet is up-to-date on all vaccinations and parasite prevention medications (including ongoing treatment to prevent fleas). You must also provide proof that your dog or cat has been fixed.
4. Pet owners that do not live in university-owned housing are not required to register their pets with the university.
5. Pets allowed in Residence Village Pet-Friendly Housing are dogs, cats, rabbits, ferrets, guinea pigs, hamsters, and aquatic pets.
    a. In accordance with the City and County of Denver Municipal Code, Chapter 8, students may not own any pit bull, including American Pit Bull Terriers,

American Staffordshire Terriers, Staffordshire Bull Terriers, any other dog displaying a majority of the physical traits of any of these breeds, and any other dog displaying a substantial amount of American Kennel Club or United Kennel Club standards for any of these breeds.

b. Due to space constraints, dogs must weight no more than 40 pounds when fully grown.
c. In accordance with City and County of Denver Municipal Code, Chapter 8, students may not own any cat that has a parent that is of a non-domesticated breed. Bengal cats are the only exception to this rule.
d. **All dogs and cats living in on-campus housing must be fixed. No exceptions.** You must provide evidence of these procedures (neutering or spaying) upon registering your pet.

6. Due to space constraints and for the well-being of pets, only one pet is allowed per RV unit. In units with two separate RV units (i.e. three rooms and a kitchen both downstairs and upstairs), one pet is allowed per RV unit. In units with the floors attached (one central kitchen, one room on one floor, two rooms on the other floor, and two and half baths), two pets may be kept (one for each floor, as in the other units). The exception to this rule is that you may have multiple fish in one aquarium.
7. Pets must be groomed regularly to ensure health and safety of all people and pets.
8. Unless you receive prior approval, overnight pet guests are generally not allowed, even in Residence Village.
9. At no time is a student allowed to keep a pet for breeding.
10. Pet owners are responsible for any damages their pets may cause. Upon registering your pet, you will be asked to pay a $100 safety deposit to cover any pet-related damages that may occur during the academic year. These damages include, but are not limited to, scratched furniture, chewed furniture, and torn up carpets (from cats scratching). If there is no damage after Residence Life, Maintenance, and any other individual the university deems reasonable to inspect your room after check-out, your safety deposit will be paid back to your student account. Rooms will also be inspected before you move, in order to ensure that you are charged only for pet-related damages from your pet.
11. When outside, pets are required to wear their university-issued ID tags at all times. Students are instructed to call campus security when they find pets roaming. If your pet is found roaming multiple times, you may be asked to make other arrangements for your pet.
12. When outside, pets must be on a leash at all times.
13. **Pets are not allowed on athletic fields.**
14. Dog owners are responsible for cleaning up after their pets. Should there be a problem with pet owners not cleaning up after their pets, the university reserves the right to keep the safety deposit, and to use these funds to pay for campus clean-up.
    a. To assist in eliminating odors, pet waste should be disposed of in outside dumpsters and not in the indoor trashes. Regular use of training pads is highly discouraged.

b. Failure to clean up after your pet, either outside or inside, will result in a warning for the first offense, a $50.00 fine for the second offense, and loss of pet deposit and being asked to take your pet home for the third offense. The university further reserves the right to pursue action through the university judicial system.

15. **Pets are allowed only in *designated areas* of Residence Village. Pets are not allowed in any building other than your residence**. To avoid health concerns with allergies, phobias, etc., pets are not to be brought into any academic or athletic buildings. Pets are also not allowed in the RV Commons, or in non-designated areas of Residence Village, due to health concerns. The only exceptions to this policy are certified service animals.
16. In order to ensure safety of the pets, all pets must be restrained when left alone. This means that all animals that are typically caged (ferrets, rabbits, hamsters, and guinea pigs) must be in a cage while alone. This also means that cats must be crated while alone, and that dogs must be crated or put in an X-pen while alone.
17. Pet owners are responsible for their pets' behavior, and the university has the right to hold the student responsible for any disruptive pet behavior in accordance with the policies of the Student Handbook. This includes, but is not limited to, noise violations—for example, excessive barking and howling could result in the student being held in violation of the noise violation rule as outlined in the Student Handbook.
    a. Pets will be given a three-week grace period to adjust to campus life. After this time, if the pet still produces an excessive amount of noise, the student will be held according to the violation policy outlined in 19.
18. Pets are not to be left in student housing without their owners during breaks, including Thanksgiving and Winter Breaks. Any violations of this policy will result in a fine and in you being asked to make alternative living arrangements for your pet. If you are staying with your pet over a long break, such as Thanksgiving break or Fall break, you are responsible for notifying your Resident Assistant and the Residence Life Staff.
19. Ignoring and/or violating these policies will lead to Campus Security and Residence Life reviewing and re-assessing the pet owner's privilege. The university reserves the right to enforce fines and to require you to find alternative arrangements for your pet (to send your pet home).
    a. For all minor violations (e.g. noise policy), students will first be provided with a verbal warning, then with a written warning, before being charged with policy violations. This is in accordance with similar violations in the Student Handbook.
    b. The university reserves the right to bypass the warning system for major violations (e.g. leaving a pet alone over break).
20. Regis recognizes that community members may feel they have a responsibility to care for abandoned and stray animals.
    a. If you find an abandoned or stray animal on campus, or if you bring an abandoned or stray animal onto campus, notify Campus Security. They may suggest local shelters that will then provide the animal with the care it needs and allow the animal to be reunited with its owner. If you would like to keep an abandoned or stray animal, you must first ensure that you are incompliance with Denver City and County rules and ordinances. If you live in a pet-friendly designated area, you

may apply to keep that animal. Generally, students will only be allowed to keep one animal per RV unit due to space constraints. Although exceptions may be made, the university maintains the right to refuse any such appeal, at which point the student would be required to take the animal to a local shelter for care.

b. If you find an animal roaming on campus, call Campus Security.

Enforcement

1. In conjunction with Campus Security, Residence Life will enforce these policies for all animals on campus.
2. If an animal displays violent, dangerous, or aggressive behavior, university officials may meet with the owner to determine appropriate action.
3. The university reserves the right to fine owners for pet-related offenses. Finable offenses include, but are not limited to:
    a. A dog roaming, unsupervised, around campus more than once
    b. Bringing any pet into an unauthorized building
    c. Excessive noise violations (e.g. barking) after the three-week grace period
    d. Breeding pets
    e. Keeping pets in violation of the Denver City and County ordinances
    f. Failure to clean up after your pets.

I have read and agreed to the above pet policies. I understand my responsibilities, and I agree to all of the above responsibilities and requirements.

Name	Signature	Date

Note: This sample is heavily based on Stephen College's Pet Policy Student Contract, from: Stephens College. Pet Floor Program Agreement. *Stephens College*. Retrieved from http://www.stephens.edu/campuslife/housing/documents/PetFloorAgreement.pdf

This sample is also heavily based on Principia College's Pet Policy Student Contract, from: Principia College. Pet policies. *Principia College*. Retrieved from: http://www.principiacollege.edu/sites/default/files/attachments/page/PrincipiaCollegePetPolicy.pdf

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