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Human-Animal Interaction, Social Networks, and Health Status

Leslie Perez

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HUMAN-ANIMAL INTERACTION, SOCIAL NETWORKS,
AND HEALTH STATUS

A Thesis

by

LESLIE PEREZ

Submitted to Texas A&M International University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

May 2018

Major Subject: Sociology

HUMAN-ANIMAL INTERACTION, SOCIAL NETWORKS,
AND HEALTH STATUS

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ABSTRACT

Human-Animal Interaction, Social Networks, and Health Status (May 2018)

Leslie Perez, M.A., Texas A & M International University

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Using online survey data and applying a series of multiple linear regression analyses, this thesis unraveled a set of intriguing and unexpected results on the impacts of human-animal interaction (HAI) on human mental and physical health status, while leaving some aspects to be further explored and explained by way of future studies. The results of this study also provided insights on how human-human interaction (HHI) in the form of social networks impact college students in a U.S. southern border city. Results of this study indicated that while HAI positively impacted mental health (i.e., lowered depression score), it also was a risk-factor for physical health (i.e., increased body mass index). Furthermore, HHI was found to be a risk-factor to physical health in the sense that the more time spent with social networks the more likely one was to be overweight.

Although there are limited studies on HAI in regards to its impacts on human mental and physical health in general and among college students in particular, HIA is an emerging research topic within sociology, which has steadily gained appreciation and interest from many contemporary sociologists. The findings to this thesis advances the

theoretical knowledge base and the methodological techniques in the *sociology of HAI*. These findings also contribute to the *sociology of health* by producing the much-needed cases, data, and empirical evidence on how animal companions influence humans' health status.

A manifest message from this thesis is: animal companions impact a person's human health; however, this is observed only for canine (dogs) animal companions but not for feline animal companion (cats). But again, this might be an artifact of the sample and sample size, inaccuracies in measurements, the nature of the target population, or the culture of the study location. However, a latent message hinted by the results is that the type (canine, feline, etc.) of animal companion might have a conditioning (moderating) effect on a person's health status.

ACKNOWLEDGEMENTS

I would like to dedicate this thesis to all the animal companions who have inspired me to pursue this research and have impacted my life so significantly. This is dedicated to them. In particular, I would like to recognize the animal companions who had the most impact in my life: Hershey, Manu, and Bebo. I would also like to thank my graduate thesis committee members: Drs. Judith A. Warner, Peter F. Haruna, and Marivic B. Torregosa for their support; and most of all, my committee chair, Dr. Marcus Antonius Ynalvez, for guiding me through this process and being a mentor to me throughout this process.

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INTRODUCTION

Background

Humans often take for granted symbiotic and symbolic relationship that is developed with an animal companion (e.g., cats, dogs, and horses). Animal companions have existed since prehistoric times when dogs were utilized as hunting partners and as protection against larger carnivorous animals (e.g., tiger, bears). More recently, in a 2014 survey, it was reported that an estimated 91% of households in the United States have at least one animal companion (Charles 2014:715). That said, it is safe to say that it is more common than not to see at least one animal companion in someone's home including (but not limited to) canine, feline, avian, rodent, or reptilian species.

There are several reasons why people have and own animal companions: For some, having an animal companion means having a family whereby the animal is considered and treated as kin or a family member. For others, an animal companion is simply a guardian who provides protection and security. There are even yet other people who need service animals for support in carrying out simple tasks due to lack of mobility or a physical disability (e.g., being blind).

This thesis follows the model of *American Sociological Review*.

In life, humans experience grief in various and unprecedented forms such as sadness due to a heartbreak, depression due to bereavement, loneliness due to relocation and isolation, stigmatization and marginalization; post-traumatic stress disorder (PTSD) due to an impacting and/or tragic event, and many other situations that can result in physical trauma and emotional distress. Being someone who has had animal companions for over 28 years, I can certainly attest that the relationship between a human and an animal companion is extraordinarily and exceptionally meaningful and impacting.

Thus, humans have increasingly turned to animals as means of emotional and physical support (Peacock, Hansen, and Winefield 2012:292). These episodes, though far from being scientific and systematic and mostly anecdotal, provide social scientists with the inspiration to imagine the impact of animal companions on humans. These same episodes allowed me to imagine and to embark on a sociological research that is intent on collecting and building scientific evidence and generating scientific knowledge on the understudied social phenomenon of “human-animal interaction” (HAI). With this emergent form of relationship between humans and animals, HAI has become a topic of interest to a steadily growing number of social and behavioral scientists and researchers.

Unfortunately, many scientists and physicians do not recognize or accept the idea of HAI as a legitimate form of physical, social, and mental aide to humans for reasons that HAI’s efficacy and impact is difficult to measure and its results challengingly difficult to substantiate scientifically and methodologically. However, I argue that animal

companions are a gateway to human mental and physical health benefits. Their benefits can be assessed and evaluated through both qualitative (i.e., interviews, observations, etc.) and quantitative social research techniques (i.e., surveys, experiments, etc.) in a similar way that human-human interaction (HHI) and social networks has been assessed and evaluated using the same techniques and methods.

Following the October 1st 2017 Las Vegas massacre, support groups traveled from across the country alongside with their therapy dogs to provide consolation and emotional support to hospitalized victims and survivors who had been subjected to psychological traumas and injuries. While the scientific community has been cautious and conservative in studying HAI, contemporary society in general is increasingly accepting animals as positive enablers for human physical and mental health well-being. Today, we see an increase in the number of service animals assisting physically and mentally disabled humans in coping with the demands of everyday life. We also witness an upsurge of therapy animals integrated in individual and group counseling sessions where humans require mental and psychological support, and in situations where humans may be simply searching for a means to ease stress (e.g., school, work, etc.).

In this thesis in sociology, I delve into aspects of HAI, and how human interaction with animals might positively impact human physical and mental health status. Unfortunately, there is limited research available on the topic of animal companions and their impact on human's mental health status (e.g., depression) and physical health status

(e.g., obesity). These knowledge gaps have inspired me to work on this topical area so that I may provide guidance to those wishing to explore scientifically and sociologically the topic of HAI further.

My goal is (1) to contribute to the theoretical and methodological literature through extensive quantitative sociological analysis and (2) to understand how animal companions impact humans in a socially meaningful manner that has implications for health and illness. In a way, the theoretical sociological ideas and principles that underlie my thesis come from the idea systems of Georg Simmels' quantitative approach to micro-level sociology (i.e., social interaction), and the ideas of Mark Granovetter (1973), Claude Fischer (1982), and Peter Marsden (2003) on ego-centric social network analysis. The core sociological concepts I engage are those of social interaction, social network, and symbolic interaction.

Statement of the Problem

College students are surrounded by stress factors that have the potential to negatively impact mental and physical health status (Bland *et al.* 2012) including social relationships in family, at work, with friendships and even animal companions. Physical activities among young college students have significantly declined throughout the years. This has become a health concern to the point that college students are increasingly becoming overweight and obese (Vitztum 2012). One of the leading causes of death in

the United States is cardiovascular disease that results from low variability in heart-rate, stress, anxiety, loneliness, depression, and being overweight (Polheber and Matchock 2014:860).

Also, considering that internet usage has increased within the last two decades, students are now less motivated to exercise (Melton *et al.* 2015:510-11). It is more likely than not that students spend most of their free-time socializing through the internet than playing sports, exercising, or engaging in physical activities. The combination of stress, poor diet, and high internet usage is a risk-factor for physical health status. When students are surrounded by social networks with similar behavioral patterns, this can be detrimental to their health (Freidman and Aral 2001:411)

Many classical sociologists, like Emile Durkheim, argued that strong and supportive social groups are enabling factors that positively influence human behavior as there is a common bond that exists and guide action. Essentially, strong social bonds that reside in social networks have positive effects on human behavior and action resulting in improved physical and mental health. Thus, a constellation of social networks -- a central vehicle of human-human interaction (HHI) --is positively correlated with mental and physical health status.

George Herbert Mead argued that the interaction between humans and animals cannot be considered sociological because animals do not have the ability to speak. Without the ability of animals to verbally express their emotions, they cannot be

considered sociologically relevant or meaningful (Sanders 2007:330). However, Alger and Alger (1997), Irvine (2001), and Sanders (2003) all argue that interaction between animals and humans is significant considering that there is an emotional response from the human when interacting with an animal. Once an emotional response towards the animal companion is developed in a human, a symbolic interaction between the human and animal companion is initiated – the emotional response can happen immediately or it can be an evolving sentiment. Sanders also argues that from the moment a human assigns a name to an animal, he has individualized it and placed it into a category where the animal is no longer just an object but a companion, which is also within the conceptual space of what it means to have symbolic interaction (2003:411).

In this thesis, I will provide answers to the following research questions:

- (1) Does human-human interaction (HHI) impact mental and physical health status? (2) Does human-animal interaction (HAI) impact mental and physical health status? And (3) Does human-animal interaction (HAI) condition the impact of human-human interaction (HHI) on human mental and physical health status?

Objective of Study

In this thesis, my research objective is to assess and evaluate the impact of HAI and HHI on human mental and physical health status. I do this by generating my own version of a *name-generator* and *name-interpreter* (Marsden 2003) applied to an individual's

set of animal companions. Theoretical inspiration for this technique derives from the work of Marsden (2003) who describes a *name-generator* as a tool used to measure egocentric social networks which was first introduced in 1985 through the General Social Survey. *Name-generators* allow for the detailed accounting of an individual's network and the network member's (alters) characteristics (Bailey and Marsden 1999; Marsden 2003). In tandem with a *name-generator*, I also created and used a *name-interpreter* through which I gather detailed information based on the relationship between my respondents and their animal companion in the case of evaluating HAI, and their human friends in the case of HHI.

Significance of Study

Although HAI is not seriously regarded as a core topic of study in sociology by many classical (and in some cases, contemporary) social scientists, HAI as a concept continues to steadily inspire research for those who argue in favor of its effectiveness in improving human mental and physical health. HAI is an emerging topical area of study that is still underrated and/or unfavored in medicine and even to sociology. However, initial early research results in regards to the health benefits of HAI have steadily weakened and dampened the "intellectual disregard" for the topic of HAI as a legitimate topical area in sociology and in the sociology of medicine.

If people can find an aide in remedial support that will result in less dependency on opioids and less visits to doctors, which in turn will result in less money spent by patients, then why should we cease to pursue this evolving new but promising research direction? Why should an aspiring sociologist like me focus not pursue an area of study that is underrated and underappreciated with minimal research available to explore my hypotheses?

Most of my life, I have owned animal companions (mostly dogs), and the greatest benefit and consolation I received from these animals is knowing that, regardless of what physical and/or emotional distress I faced, I always felt a non-judgmental sense of love and unconditional support from my animal companions. With this personal experience and based on my reading of the extant literature on human-animal interaction, I argue that although HAI is a yet emerging topic of research, this subject should not go unnoticed, considering that animal companions have high potential of benefiting anyone who is willing to accept them as affective companions and/or kin. People are relentlessly in search for new methods of relief from health distresses; arguably, animal companions can provide support in enhancing health status with less dependency on doctors' visits and prescription costs.

By no means am I suggesting that animal companions are a replacement to medicine and to medical treatment, and to human companionship. What I am suggesting and forwarding in this thesis is animal companions have positive impacts on human

health and I, as an aspiring sociologist, would want to find out how and when HAI becomes a positive impacting factor on health outcomes. In this thesis, I forward and test the hypothesis that animal companions improve human mental and physical health well-being.

Through this thesis, I bring in a different perspective in regards to the benefits of HAI on mental and physical health status through my own original version of a *name-generator* and a *name-interpreter* which I created to capture the nuances of both HAI and HHI. I contend that these creations constitute a significant contribution to sociological theory and to social research methods in the topical area of HAI.

LITERATURE REVIEW

Human – Animal Interaction (HAI)

Symbolic interaction is a sociological, theoretical tradition that focuses on micro-level, social interaction and social exchanges within humans, but with a disregarded and marginalized recognition of animal-related interactions. Is there such a sociological study as symbolic interaction between humans and animals? Is it fair to argue that a sociology focused on humans and animals cannot exist because of the “fact” that animals do not acquire what George Herbert Mead referred to as *self* or a *social self*? Perhaps the more fitting and focused question is: can humans develop a symbolic interaction with animals, and how does this interaction shape the physical and mental health status of humans?

Before we begin to understand how animals are instruments of social activity in a social environment, it is imperative that we understand how their mind is connected to the sociological theory of the *self*. But what do contemporary sociologists consider a *self*? According to Irvine, Mead’s interpretation of the *self* is being conscious of our existence and self-aware of our behavior through language and emotion, and because animals do not have the ability to speak nor are they self-aware of their behavior, they cannot be considered within the same category as humans in regards to *self* (Irvine 2007:5).

Irvine and Bryant argued that animals indeed do acquire the ability of self-awareness, not through language but through emotion, and as a result have already

acquired a *self*, which is why HAI should be regarded as a legitimate study in sociology (Irvine 2007, 2009). The *self* of an animal is defined through the emotional responses developed by the human when interacting with the animal. Another argument that leads these sociologists to believe that animals are sociologically significant is at the moment a human assigns a name and develops an affective relationship with the animal, the animal has already become a symbolic object and has acquired symbolic meaning (Irvine 2007, 2009). Based on this information, I argue that animals do in fact acquire a *self* or a *social self*.

Contemporary sociologist Clifton Bryant (1979) was one of the first scholars to address HAI through a sociological study. He argued that animals create symbolic influence on human behavior (Bryant 1979:399; Irvine 2012:126) through relationships including (but not limited to) having an affective relationship with animal companions, integrating animals in the workforce for police, government officials, and military, and even in subjecting animals to slaughterhouses and treating them as laboratory specimens (Bryant 1979:399). However, unlike humans, animals do not have direct influence on human behavior; these are behaviors influenced by the human's emotional response towards the animal. Having an affective emotional response towards an animal allows the human to behave positively towards the animal; having a negative response towards the animal will subject the animal to a negative behavioral response from the human.

The impact an animal has on a human depends solely on the emotional response exuded by the human. This can mean that the emotional response towards the animal can be affective, instrumental, or both (Charles 2014:716). An affective relationship is when a human considers the animal companion friend or kin and develops feelings of love and admiration towards the animal; in other cases, the animal companion is considered a child. An instrumental relationship with an animal would disregard any emotional attachment from the human towards the animal and only utilize the animal for home protection, laboratory testing, and any other situations where the animal is regarded only as a commodity.

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HAI can have a positive influence for both mental and physical health status in such a way that the interaction with the animal companion becomes a factor for lowering

stress levels in humans (Polherber and Matchock 2014:860). However, in order for HAI to positively impact health status, humans must develop an affective relationship with the animal companion and accept the animal as significant. When humans begin to regard animals as social actors and minded creatures, animals then become sociologically significant (Sanders 2003; Irvine 2007). Humans who do not build an affective relationship with an animal companion will likely not gain a positive impact in their mental and/or physical health status. For example, if a human is scared of dogs, the emotional response towards the dog will likely generate increased levels of nervousness or autonomic responses in the human (Polheber and Matchock 2014:860).

In the sociology of animal-related interaction, it is difficult to understand the emotional attachment to the human. To have a clear, objective, point of view from the animal itself is not feasible. Thus, we must cope with different and sometimes complicated methods by studying the social and symbolic impact humans develop with the animals based on how humans interact, and the emotional attachment towards these animals (Sanders and Arluke 1993:378). Humans interact with animals on a daily basis. In some cases, the interaction is non-symbolic (e.g., seeing a bird while walking outside), and in other cases it is symbolic (e.g., hugging a pet).

Most homes have at least one animal companion like a dog or a cat, and about 85% of animal owners regard them as family members and/or companions (Walsh 2009:481).

Society has progressively regarded the increasing number of animal companions and the

evolving affective relationships between humans and animals by allowing admissibility of animal companions at locations of business (e.g., restaurants, stores) (Charles 2014:717). Animals have their own spas, day cares, boarding facilities, clothing lines, doctors, menus at animal friendly restaurants, and dog parks which molds into the ever-evolving society of human-animal interaction (Irvine 2009:372). Humans who regard their animal companions as kin will likely allow the animal companion to sleep indoors (sometimes in the same bed), they will converse with the animal companion, spoil them with toys and clothes, and in some cases, include the animal companion in their trips and agenda (Cerulo 2011:776). This type of human-animal interaction builds an emotional bond that transcends species (Ryan and Ziebland 2012).

Americans are increasingly accepting the relationship with their animal companions to be more significant than the relationship with their own family members or significant others (Cerulo 2011:776). This by no means is an argument suggesting that animal companions are better suited for emotional support than humans in all cases; furthermore, humans who are favorable to the emotional acceptance of an animal companion than to a human will likely show improved physical and mental health status when a human is cohabiting with the animal companion. In fact, when humans have strong, healthy relationships with their animal companion, they are more likely to have improved mental and physical health status than those individuals who only acquire an instrumental relationship with the animal companion (Charles 2014; Walsh 2009).

Dogs are likely considered as the favorable animal kin because of their lack of non-critical and non-judgmental mindset versus other animals (Johnson 2013:198). Canines, in particular, are commonly known as “man’s best friend”. Humans have owned dogs since the earliest of times, when they first recognized the benefit of having wolves as hunting and gathering partners. This essentially opened up the relationship between humans and animals. Slowly, humans started to domesticate wolves and crossbreeding began in Europe. Eventually royal families began to welcome the resulting "tamer wolves" (dogs) into their homes as animal companions (Netting *et al.* 1987:60). Dogs were initially introduced in the homes as commodities like hunting companions and guardians, but now it is unusual for humans not to have a dog in their home. Clinton R. Sanders argues that dogs do indeed have the capacity to gain individualistic, self-awareness of human emotion (2010:207). In other words, dogs are receptive and have the ability to respond to a human’s emotional response.

Health Benefits of Human–Animal Interaction

Animals were first introduced in therapeutic settings back in 1792 in York, England for human patients with mental health diseases (Netting *et al.* 1987:60). The method was carried out as an attempt to integrate a humane process for the patients. Clinics initially introduced small animals, like rabbits, into the setting (something small so to not create anxiety for patients); eventually, other institutions began to emulate this

practice by incorporating rabbits and essentially other small animals like birds, cats and small dogs (Netting *et al.* 1987:60).

In the 1940s, this new form of therapy was eventually introduced in the United States as an aide to encourage veteran soldiers with PTSD to interact with farm animals; later dogs were introduced (Netting *et al.* 1987:60). Animals were a success being that many patients felt that interacting with a non-judgmental animal helped develop an emotional connection between the human and animal, thus satisfying a human's nurturing desire and eventually recognizing animals as motivators for improved emotional support (Serpell 2004:S147). According to Barker and Wolen (2008), humans who own animal companions have shown significant improvement in cardiovascular and general health (2008:487). There is also growing evidence wherein humans who own animal companions have reported proven benefits for both mental and physical health status (Ryan and Ziebland 2015:67).

Methods that have developed to test the hypothesis on the health benefits of HAI include stress tests, depression tests, and overall health tests (all tested before and after HAI), qualitative and secondary research analysis, statistical data, and surveys requesting information on respondent's viewpoint and overall health status as a result of HAI. Contemporary sociologist James Serpell, who is well known for studying sociology of animals, confidently argues that owning an animal companion can generate positive mental and physical health benefits for the humans which include: motivation to exercise

(such as walking) and improved general health scores as tested in the General Health Questionnaire scores (tested prior to and 10 months after owning an animal companion) which measures the person's emotional state (Serpell 1991:717). His results concluded that owning a dog is significantly related to more exercise and physical activity versus not owning a dog, and there were less reported health physical issues when owning a dog (Serpell 1991:719).

In a previous study conducted by Pat Sable, results of a participant survey concluded that 12 of 15 participants who were patients for cancer treatments agreed that animals helped them improve their emotional state, while other participants agreed that animals have helped them cope through moments of bereavement and separation from spouses (1995:335). In therapy sessions, patients feel obligated to share their thoughts with a therapist or focus groups, which can become an uncomfortable situation. Integrating an animal into the environment creates a relaxing ambiance which allows patients to feel less self-conscious and more non-judgmental support (Serpell 1991:335). Integrating an animal can open up feelings of comfort when expressing emotions without the feeling of judgment or criticism.

Physical and Mental Health Benefits of Owning an Animal Companion

The health benefits of HAI come in many forms. Animals can certainly provide emotional and physical assistance to those willing to accept the support (Ryan and

Ziebland 2015; Wood *et al.* 2007:43). Physical benefits of owning a dog are considerable. Less than half of adults in the United States are physically active. However, people who own animal companions (such as dogs) are more likely to engage in physical activities than those individuals who do not own an animal companion being that humans are motivated to walk their dog (Richards 2016:323; Wood *et al.* 2007). When humans choose to walk their dog, the activity develops a symbolic bond between the two which can benefit the human both physically and mentally (Vitztum 2012:30).

Sandra Barker (1991) reported that humans who share their lives with an animal companion show lower levels of systolic blood pressure, triglyceride and cholesterol levels than those who do not own animal companions. Patients recovering from cardiovascular failure not only showed significantly faster improvement rates, but patients with an animal companion proved to have a survival rate of an additional year longer those patients who only relied only on their social networks (Polheber and Matchock 2014:860).

A qualitative research study that included an interview with 61 participants who reported long-term health (chronic) conditions concluded that the participants had a deep, emotional bond with their animal companion, which helped them cope with their illness (Ryan and Ziebland 2015:78). Other factors that are accountable for cardiovascular disease are weight disparity; in many cases being overweight is due to lack of physical activity which can eventually lead to obesity (Richards 2016:323).

Although, owning and maintaining an animal companion will require additional time and resources, the possible expenses incurred by doctor visits, medications and other medical services for humans in support for mental physical health, are costlier. Studies have shown that patients are less likely to spend time and money on doctor visits and prescription drugs when a person shares their life with an animal companion (Wood *et al.* 2007:44). In an Australian research study performed to a random sample of participants over the age of 16, who were a mix of both animal companion owners and non-owners, results showed that the group of participants who did own animal companions had less reported doctor/hospital visits and were less likely to have medications in their household (Heady 1998:235). In a 1998 study, the total cost savings for people who had animal companions in their homes was \$988 million overall (Heady 1998:241). It can be concluded that not all people benefit from animal companions. Thus, the health benefits of HAI are beneficial to human mental and physical health by increasing happiness and decreasing stress levels (Ryan and Ziebland 2015:68).

In addition, HAI has also shown to moderate the impact of HHI to human mental and physical health status by encouraging humans to engage in social activities (Johnson 2013:198; Heady 1999; Sable 1995). A human is likely to interact and socialize with other networks when they are motivated by a positive enabler like an animal (Heady 1999; Sable 1995). Feelings of happiness and contentment allows a person to be more sociable with others, including friends and strangers. Opening up to social networks indirectly

helps human well-being by lessening feelings of isolation and thus engaging humans in socialization (McNicholas *et al.* 2005:331). Adults who are emotionally distressed have shown significant signs of improvement in their mental health state when owning a dog, and additionally are more likely to engage in social activities (Edney 1995:704P).

In a previous study of 1,011 respondents, people felt less lonely when they bonded with their animal companion and were more likely to make connections with other people when they had their animal companion by their side because having the animal companion supported in social engagement (Headley 1998:235). Animals enable communication between humans that can result in evolving friendships and lasting relationships (Headley 1998:235).

Animal Companion Ownership, Considerations, and Concerns

Even though owning animal companions has shown positive results in human mental and physical health status, there are also some considerations that humans need to take into account prior to allowing an animal into their home. Often, a person can experience bites and scratches from his/her animal companions. This can happen when the animal becomes nervous or anxious, so that the reaction of the animal can lead to injurious behavior. Additionally, we must also consider that animals can cause accidental injuries to a person such as tripping over the animal which can be extremely dangerous for elderly owners and especially if they live alone (Edney 1995:706).

We see benefits in owning dogs as animal companions for elderly folks, adolescents with depression, military personnel with PTSD, single women, and any human being who is open and accepting of a dog (or animal) as a companion. We can also consider that the exposure to animal allergens can cause asthma in young children (McNicholas *et al.* 2005). Babies may not only be at risk of allergens and dander from dogs, but they may also be at risk of animal attacks or bacterial infections from the saliva of the animal (McNicholas *et al.* 2005). Dogs have a lot of bacteria in their saliva and exposure to bite marks can be dangerous for children with low immunity levels. In contrast, it is argued that babies exposed to dog allergens between the ages of 0-12 months may help build the baby's immunity levels (McNicholas *et al.* 2005).

Social Networks and Human-Human Interaction

Social networks are the web of relationships among a set of people that have both an indirect and/or immediate impact on one's way of thinking and decision-making behavior (Granovetter 1973). An individual's perspective and social world operate and is motivated by the self (ego) (Cricher, Dunning, and Rom 2015:400). According to Freidman and Aral, there are three types of social networks: *risk-potential networks*, *egocentric networks* and *sociometric networks* (2001). Risk-potential are networks that are potentially at risk of negatively impacting each other, for example, drug and alcohol abuse, sexually transmitted diseases, and anything that can have a demeaning or harmful

impact. More likely, these networks are not closely intertwined or supportive towards one another. (Freidman and Aral 2001:411).

Egocentric social network refers to the ego (or the self) as the center of the network. Social networks can impact individuals positively, negatively, both or neither. Individuals integrated in a close social circle have the possibility to emulate the behavior of friends depending on how close the friendship is. The closeness of the friendship means how much the individual trusts someone with secrets, personal matters and life-changing events. When referring to an egocentric social network, this refers to the alters that are impacting the ego. Depending on the network that a person surrounds themselves with and how tightly knit that network is, it will have an impact on the ego. (Freidman and Aral 2001:412).

Individuals are guided by the needs of their ego. People tend to want to be happy and thus, will behave according to what is satisfying for their own ego (Pescosolido 1992:1096). For example, an individual who is walking into a building may hold the door open for a stranger walking behind him, which could be deemed as a respectful gesture, but the motive behind the gesture is not to satisfy the stranger, the individual acts out so that he/she will not be perceived as rude and thus, satisfying the ego.

Social networks are primarily concentrated within family members and close social/ethnic groups and the closeness of the relationship will determine how the individual is influenced. A set of individuals that is closely integrated will have a more

prominent impact to the self, whether it is positive or negative, than a group that has minimal contact or intimacy (Fisher 2005:20). Pescosolido argues that an individual's decisions and choices are influenced by the closeness of an ego to his/her social network. She further contends that it is important to maintain a social network as this allows one to understand not only about our own self but also the needs, strengths, and weaknesses of others. By doing so, one gets to understand about his or her alters, and allows the self to build confidence to confront everyday situations (1992:1096).

Properties of Social Networks

We see our *self* as impacted by the social network that surrounds us and the older we get the more we are aware of that impact. As children, we do not operate to satisfy our ego so much as we do to satisfy our alter/s and even though we tend to outgrow our childish, selfish tendencies, we continue to subconsciously act out to satisfy our ego (Epley *et al.* 2004:327). Adults are more cognizant of the feelings of their *alters* by avoiding actions and interactions that can impact others negatively (or positively if that is what the ego chooses), nonetheless, the decisions maintain egocentric. The perceptions people have of the world or society are not actual reflections, but constructions of what ego envisions, more so, it is a vision of egotistical proportion that is not only wrong but also differs from how other people view the world (Epley *et al.* 2004:327).

A key property of social networking is *size* and *range*. *Size* refers to the number of alters (i.e., friends) an ego (respondent) has in an egocentric network, or the number of individuals in a network. *Range* allows for diversity within the network (Ynalvez and Shrum 2010:206). For example, a broad range network in terms of occupation of alters may include a carpenter, truck driver, a soldier, and professor. A narrow range network in terms of occupation, will be most alters being professors. *Homophily* is the degree of likeness between *ego* and alter. When we say network is gender homophilous, it implies that the gender of an *alter* is the same as that of ego, and by transitivity means that alters would have the same gender.

Multiplexity relationship between alter and an ego means that there is much variety in the nature of support provided by an *alter* (i.e., friend or friend of respondent) to ego (i.e., respondent). For example, an *alter* could be providing ego with financial, emotional, and many other types of support. That would be described as a multiplex relationship.

Consequences of Social Networks

The effect of having strong and supportive social networks (or HHI) is directly and indirectly correlated with better mental and physical well-being. However, the impact of HHI can also include risk-potential factors, which signifies that an individual's social network has the potential to negatively impact mental and physical health status. A risk-

potential network is a linkage between the social network and the individual; essentially, if an individual is part of a social network engaged in deviant behavior, that individual will likely emulate a similar pattern (Freidman and Aral 2001:411).

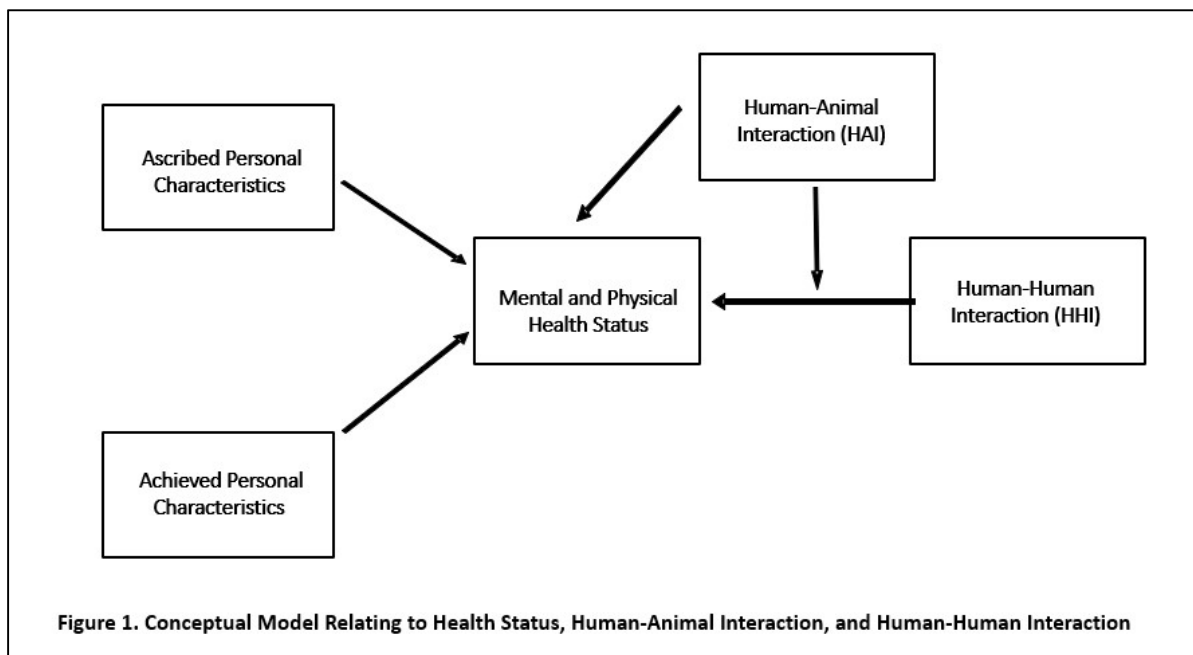
When an individual is surrounded by risk-potential networks, this can have a negative effect on their physical health with patterns like bad-eating habits and engaging more in social media as opposed to physical activities. The direct influence from HHI, as opposed to HAI, is linked to a human's ability of emulating deviant behavior, and humans having the ability to influence through words. The closer we are to our social networks the higher chance we have to emulate their behavioral and attitudinal patterns. This can be either positive or negative. For example, teenagers who tend to interact with social networks who are engaged in deviant behavior will more than likely emulate the similar behavior. The behavior of a person can be argued that is impacted by the social network and through personal life influences that the self has encountered (Carrasco *et al.* 2008:963). Groups that tend to be educated past a college degree, have an established career and tend to be more cognizant of their behavior, are more likely to socialize and interact with similar networks.

Furthermore, a person who interacts with supportive networks will feel less lonely or depressed. Anxiety and stress levels will decline and their level of happiness and contentment will be higher. As social beings, we tend to attach to certain types of individuals that make us smile and laugh because we feel the need to satisfy our ego with

joy by surrounding ourselves with networks that positively validate our emotions (Phung *et al.* 2013:1316). As egocentric human beings, we take it for granted and we do not realize how important it is to surround ourselves with positive social networks. Those networks that are less significant to each other, are less likely to positively support and interaction, are perceived to alter the ego negatively and can even be linked to depression (Kawachi 2001:458).

CONCEPTUAL FRAMEWORK

My conceptual framework consists of five core concepts; these are framed at the micro-level and applied to the individual. In this thesis, the individual college student was unit of analysis. The five core concepts were the individual's *mental and physical* health status, interaction with animals as manifested by animal ownership/companionship (*HAI*), *social network* as manifested by the set of alters closely associated with the individual (*ego*), *ascribed personal characteristics* (e.g., age, gender, religion) and *achieved personal characteristics* (e.g., marital status, having kids, college year level, income, and occupation), and finally, the moderating effect of HAI on the impact of HHI on mental and physical health (Figure 1).



In casting these concepts into a conceptual model, the focal dependent concepts are the individual's mental and physical health status, which extant literature has shown to be influenced positively or negatively by antecedent factors such as an individual's interaction with animals (HAI) and that individual's social networks (HHI). While social networks are construed as a source of various types of social support and social resource, ownership and close interaction with animals have not yet gained the same ascendant and central status in the sociological literature. In my conceptual framework, I extend the notion of social support and social resource base to an individual's relationship with their animal companions.

In addition to these two antecedent factors -- animal companionship (HAI) and social networks (HHI) -- that influence mental and physical health status, I also account for the impact of the individual's set of ascribed and achieved status. The extant sociological literature is replete with findings that documented how an individual's age, gender, and religious beliefs impacted access to health care and health service, and healthy status and illness behavior. The sociological literature also documented how socioeconomic status shaped one's access to health care and services, health, longevity, and healthy lifestyle; it also is an important factor in how situations are perceived as stressful or not.

Although I argue that health status is impacted by both close association and interaction with others (social network) and by animal companions, their joint

independent effects and their interaction effect have yet to be examined given the paucity of cases and studies that focus on these factors and their joint and interaction effects on human health and illness. Although, human health is still predominantly viewed from the biological and the physical aspects, the tandem of mental and physical health on the one hand, and social network and animal companionship have yet to be systematically researched and fully understood. The sociological perspective on the influence of social and cultural factors on the individual suggest that a socio-cultural item has both direct and indirect impact, positive and negative influences, or has both functions and dysfunctions.

Sociologist Emile Durkheim posits that social facts have both functional and dysfunctional consequences on other social facts, the social group and even individuals. The impact on the individual is very much a reflection of the neo-Durkheimian take in regards to the nexus between the macro and the micro.

While the original Durkheim rendition of causality between social facts was casted in the macrological sense, I followed the neo-Durkheimian approach of casting my conceptual framework at the micrological level of the individual and apply both Simmelian and Granovetterian ideas to my micro-level sociological approach. While the casting of my concepts emphasized that social networks and interaction with animals have an impact on health status both physically and mentally, the sociological concepts of achieved and ascribed traits were also taken as meaningfully impacting and relevant

which need further examination and elucidation. *The resultant exploration implied by my conceptual framework expands on the physical and mental health impacts of human-animal interaction (HAI) and human-human interaction (HHI construed via social networks).*

Social networks represent the notion of human-human interaction. By this, aspect of friendships and professional relationships come to the fore, while animal companionship represented the emergent notion of human-animal interaction. In terms of health status, the mental aspect referred to level of depression and of anxiety that may lead the various phenomena associated with suicidality, a topic native and inherent to the founding of sociology as an academic discipline. As far as physical, I focus on the body mass of the individual. Similarly, the same concept of human health status was examined in relation to the concept of human-animal interaction. The relationship an individual has with their animal companion was assessed in terms of their impact on an individual's physical (indicated by body mass) and mental (indicated by depression) health status.

The propositions I forwarded through my conceptual framework are the following: (a) health status is shaped by relationships, both positively and negatively; (b) an individual's relationship with an animal companion impacts that individual's mental and physical health status; (c) an individual's or (ego's) personal relationship with others (or alters) impacts that individual's mental and physical health status; and (d) aspects of

an individual's relationship with an animal companion and with alters interplay to independently and jointly impact that individual's mental and physical health status.

METHODS

Study Location

The study location I focused on in my hypothesis was the campus of Texas A&M International University (TAMIU) in Laredo, Texas. Laredo is located in southwest Texas along the U.S. Southern border which connects with Mexico. Laredo is recognized as a top, industrialized city that has expanded from international trade. TAMIU is located about nine miles east of the World Trade Bridge, which is the top inland port in North America. TAMIU has successfully become one of the top universities for international business, with its population made up of local and international students; there were over 7,000 students enrolled in 2016. TAMIU is made up of four main colleges of study: Arts and Sciences, School of Business, Education, and Nursing and Health Sciences. TAMIU is recognized as the number one school with the highest Hispanic population enrollment in the United States. It offers 70 Bachelor's, Master's and Doctorate degrees and is recognized as the nation's top public master's-level university when it comes to student retention – retention considers academics, affordability and social factors. (Anon. n.d.)

Target Population

The target population of my research was the set of undergraduate students who were enrolled at TAMIU in the spring semester of 2017. I concentrated my study on

undergraduate college students who were considered adults (18+ years) and were enrolled in a full-time semester. Ownership of an animal companion (dog, cat, or other) was not considered as a stratification variable but was definitely one of the control variables in my regression models. Further detailed discussion was carried out with my committee members in terms of the nuances of the sampling scheme in terms of clustering and stratification techniques that I applied.

Sample

Respondents were cluster sampled with classes as the *primary sampling unit (PSU)* and with all students within selected classes surveyed (Note: IRB oversight has been applied for and requested; no research activities took place without IRB clearance). Prior to the sampling of PSUs, stratified sampling of PSU was carried out where stratification was based on the size of the class. Students in randomly selected classes received an email from their professors with a message that invites everyone to participate, and in the email, a link was provided directing them to a survey generated by Survey Monkey.

I visited a few classes to extend the invitation for whoever is an undergraduate, full-time student, to participate (considering those applicable). No specific degree was required. The total number of students targeted to receive an email was around $n=700$ (roughly 10% of TAMIU's student population). List of students, which served as the sampling frame, were requested from the Registrar's Office after IRB oversight and

clearance was secured. All respondents were at least 18 years old and had 15 days to complete the survey. This survey was both anonymous and confidential; that is to say, no names or student IDs were requested.

Data Collection Method

For data collection, I employed an on-line survey. The survey questionnaire consisted of 59 questions – these questions inquired about background (or demographical) information regarding achieved and ascribed traits such as age, gender, religion, socioeconomic status, employment status, marital status, etc. Following the socio-demographic questions, the survey focused on mental health status (e.g. depression measure using Beck's Depression Scale Version II) and physical health status (e.g. body mass index (BMI)).¹

In order to obtain information regarding mental health status, I also provided the Beck Depression Inventory – Second Edition (BDI-II), which is a scale to measure a person's level of depression, or if depression even exists. As for physical health status, I asked questions regarding respondent's weight and height. I used these weight and height measurements to calculate BMI. The latter part of the survey focused more on

¹I created a *name generator* and *name interpreter* for HHI and HAI, details are in the measurement section below.

information about human-human interaction (or HHI) and human-animal interaction (HAI).

Once participants had completed the socio-demographic background questions (e.g., age, gender, and year level), weight and height information, mental health questionnaire, and the HHI and HAI questionnaire, the survey closed. The survey took approximately from 20–30 minutes to complete. To ensure the validity and reliability of the survey questionnaire, including the clarity and appropriateness of language and format delivery, I conducted a dry run and/or pilot test of the survey questionnaire to a set of about five students, and solicited feedback. This feedback guided me through any revisions and further clarification as well as enhancements to the survey questions, format, and navigational toolbars prior to opening up the survey to respondents.

Dependent Variables

The measurement of health status was made along two dimensions: (a) mental health, and (b) physical health because each can have significant impacts on an individual's well-being; without proper care for either or both would have the potential to lead to serious illness or death. Mental health was measured using the Beck Depression Index (BDI-II). BDI-II is comprised of 21 statements based on the individual's mindset and determines whether the participants were considered depressed. For purposes of this study, I only considered 19 statements. The two statements that were eliminated: (15)

Changes in sleep pattern; and (18) Changes in appetite (BDI-II questionnaire located in appendix). The BDI-II questionnaire focused on the participant's symptoms within the last two weeks and is casted on a 4-point scale (Whisman and Richardson 2015:900). This test helped identify how many college students are considered depressed and at what level.

The BDI-II scale solicited responses at the ordinal level with each answer per statement being measured from 0, 1, 2, 3. Depending on how high the total score is from all the answers accumulated, this will determine if the depression exists and if so, at what level. For example: 0-13 cumulative points of the entire questionnaire means the level of depression is minimal (Beck 1996:590). Physical health was measured by using the body mass index (BMI) calculator. BMI is obtained by calculating respondent's weight divided by the square of height with the unit of measure consistently in either metric system (kilogram, meter) or English system (pound, feet).

Control Variables

The other two sets of variables that may impact physical and mental health status are those pertaining to achieved and ascribed traits; these comprised my control variables. The information I gathered were respondent's age, gender, and religious preference all of which measured *ascribed traits*. As far as *achieved traits*, information

gathered were respondent's marital status, if they had kids, employment status, household income, and college year level.

Independent Variables

In order to measure human-human interaction (HHI; or social network), I created a *name generator* through which respondents were able to identify the name of up to 4 closest friends within their network (confirmed by the respondent; respondent is allowed to confirm only their friend's initials). A *name interpreter* followed, which asked questions in regards to the personal characteristics and the relationship with the friends. Questions such as: gender of friend, times a day respondent interacts with friends, years known friend, etc. According to Marin and Hampton, the use of a *name generator* allows for better accounting of total number of friends and enhances reliability when the naming of close relationships is integrated in a survey research (2006:8).

As far as the measurement for human-animal interaction (HAI) is concerned, I had to be creative for this one as well since *there is virtually no research using this name generator and name-interpreter technique* for the measurement of HAI. I argue that one effective way of measuring HAI is through the interaction between the human and the animal companion, just like the measurement for respondent's egocentric social network or HHI. Hence, I created and utilized a *name-generator* and *name-interpreter* for human-animal interaction (HAI). Animal companions all have names and thus, I created a personalized

version of the *name-generator* and *name interpreter* asking information of up to four animal companions that the respondent had in their household. Some questions were in the *name-interpreter* included the following: type of pet; years owned pet; average times a day respondent interacts with pet; type of support (affective, instrumental, both); etc., (pet = animal companion).

When measuring HAI, I considered how close the respondent is to the animal companion or if the respondent considers the animal companion as part of the family. A person who recognizes their animal companion as kin will likely provide preferential or other special treatments for the animal companion such as allowing them to sleep indoors and providing emotional support to the animal companion. This can also mean that if the human has an affective relationship with the animal companion, the interaction time is considerably high being that the animal companion generates emotional support.

Coding and Recoding of Variables

In order to measure the impact on health status based on the respondent's demographic information, I created dummy variables for each. Age was calculated by subtracting respondents' year of birth from the survey year (2017). I also created dummy variables for gender (*female where 1=female and 0=male*), religion (*Catholic where 1=Catholic and 0=not*), marital status (*ever married where 1=yes and 0=no*), having kids (*have kids where 1=yes and 0=no*), college year level (*senior where 1=yes and 0=no*); and the ordinal level

variable employment (*employment status where 0=unemployed, 1=part-time employed, and 2=full-time employed*). I measured *household income* by generating an ordinal level variable: 0=\$10K, 1=\$30K, 2=\$50K, 3=\$70K, 4=\$90K, and 5=>\$100K.

In order to measure the constructs of HHI and HAI, I created a *name-generators* and a *name-interpreter* (Marsden 2003). With these, I generated measures that allowed me to analyze their impact on health status. With my name-generator and name-interpreter I asked respondents to verify a set of statements in regards to their relationship with friends and animal companions. Key HHI variables included: *Total number of friends (0-4)*, *Median hours per week respondent interacted with friends (1-30 hours)*, and *Median times a day respondent interacted with friends (1-10 times)*. Key HAI variables were the following: *Total number of pets per respondents (0-4)*, *Median hours a week respondent interacts with pets (0-20 hours)*, *median times a day respondent interacts with pets (1-19 times)*, *respondent owns a dog (1=yes, 0=no)*, *respondent owns a cat (1=yes, 0=no)*, *respondent has an affective relationship with pet (1=yes, 0=no)*, and finally, *respondent has an instrumental relationship with pet (1=yes, 0=no)*.

Research Hypotheses

1. **Main Effect:** Controlling for ascribed and achieved traits, affective HAI positively impacts mental and physical health status.

2. Main Effect: Controlling for ascribed and achieved traits, supportive HHI positively impacts mental and physical health status.
3. Interaction Effect: Controlling for ascribed and achieved traits, HAI impacts mental and physical health status, and that impact is conditioned by HHI. More specifically, an affective HAI under the conditions of a supportive HHI will positively impact mental and physical health status.

Analytical Strategy

To test my hypotheses and answer my research questions, I employed a multiple linear regression approach. This approach captures the casual relationship between a normally distributed dependent variable and a set of independent variables, which can be nominal, ordinal, and interval-ratio. Given that there was a moderating effect tested, interaction terms between HAI and HHI were computed and tested via a strategy referred to as *taxonomy of models* (see Tables 2 and 3). However, these interaction terms proved not to be significant. Hence, for expediency, these terms were not shown in the regression-result tables. For test of hypothesis, 10%, 5%, 1%, and 0.1% type-I error rates were applied.

RESULTS

Table 1: Descriptive Statistics for all Variables of the Study

Variables	N	Minimum	Maximum	Mean	Std. Deviation
iBMI	213	15.7	54.6	26.8	6.6
BDI_19	213	0.0	39.0	9.5	9.5
Age (in years)	222	19.0	57.0	25.6	6.4
Female (1=yes, 0=no)	221	0.0	1.0	0.8	0.4
Catholic (1=yes, 0=no)	222	0.0	1.0	0.6	0.5
Ever Married (1=yes, 0=no)	222	0.0	1.0	0.3	0.4
Has Kids (1=yes, 0=no)	222	0.0	1.0	0.3	0.4
Employment Status (0=unemployed, 1=part time, 2=full time)	220	0.0	2.0	0.9	0.8
Household Income (0=\$10K, 1=\$30K, 2=\$50K, 3=\$70K, 4=\$90K, 5=>\$100K)	208	10.0	100.0	37.4	30.6
College Year Level (1=senior, 0=non-senior)	216	0.0	1.0	0.5	0.5
Total Number of Friends of Respondent (0-4)	292	0.0	4.0	2.1	1.8
Median Hours per Week Respondent Interacts with Friends (1-30 hours)	171	1.0	30.0	9.7	7.7
Median Times a Day Respondent Interacts with Friends (1-10 times)	174	1.0	10.0	4.2	2.6
Total Number of Pets of Respondent (0-4)	292	0.0	4.0	1.3	1.5
Median Hours per Week Respondent Interacts with Pets (1-20 hours)	137	1.0	20.0	8.5	5.8
Median Times a Day Respondent Interacts with Pets (1-19 times)	142	1.0	19.0	5.8	4.8
Respondent owns a Dog (1=yes, 0=no)	166	0.0	1.0	0.9	0.3
Respondent owns a Cat (1=yes, 0=no)	166	0.0	1.0	0.2	0.4
Respondent has an Affective Relationship with Pet (1=yes, 0=no)	166	0.0	1.0	0.3	0.4
Respondent has an Instrumental Relationship with Pet (1=yes, 0=no)	194	0.0	1.0	0.1	0.2
Valid N (listwise)	121				

*BDI_19: Only 19 of the 21 statements were used in this research

Table 1 shows the descriptive statistics of all the variables that were considered in this study. The total effective sample size was 292. However, my data set also had many missing values (see Table 1 under column N). The first two variables listed are my dependent variables which measured the physical (body weight) and the mental (depression) health status, respectively. The first measure of health status (i.e., dependent variable) was the respondent's body mass index (measured as BMI). BMI scores had a minimum value of 15.7 and a maximum value of 54.6, which already exceeds the obesity level of BMI=30. Based on the BMI calculator I used, the average healthy BMI rating is between 18.5 – 24.9. The average (or mean) BMI value from my sample was at 26.8, which

is already considered overweight. The standard deviation for BMI was registered at 6.6 which means that respondent's BMI fluctuated between $26.8 - 6.6$ and $26.8 + 6.6$, on average.

The second dependent variable listed in Table 1, a measure of health status, which is the Beck Depression Inventory version II (BDI-II) score. Theoretically, responses for BDI_19 can range from 0 – 57. Based on Table 1, there were 213 BDI_19 responses with the minimum score of 0 (meaning minimal to no level of depression detected) and a maximum score of 39 which means there is a substantial depressive state existing. However, it did not reach the total number of units considered at a severely depressive state (a score of 57). For my sample, the mean BDI_19 was at 9.5 with a standard deviation of 9.5 units. In other words, the BDI_19 scores were centered at 9.5 and fluctuated between $(9.5 - 9.5)$ and $(9.5 + 9.5)$, on average with the assumption that scores were normally distributed.

As shown in Table 1, the following three variables measured respondents' ascribed traits. These variables are age in years, respondent is female, and respondent is Catholic; the latter two variables were in the form of dummy variables. The minimum age was 19 while the maximum was 57, with the average at 25 years and a standard deviation at 6.4 years. This means that age fluctuated from the average by $(25 - 6.4)$ and $(25 + 6.4)$. The next variable, *female* (1=yes, 0=no), is a measure of gender. Based on Table 1, the minimum value was 0 and the maximum value was 1 with an average of 0.80. This

means that 80% of my respondents were females. The next variable, *Catholic* (1=Catholic, 0=non-Catholic), was a measure of religious preference of the respondent. This variable had a minimum value of 0 and a maximum value of 1 with an average of 0.60; meaning, majority (60%) of respondents was Catholics.

The following variables served as measures of individuals' achieved traits, as listed in Table 1. The first measure of achieved trait, (sixth variable as listed in Table 1) *ever married*, had a minimum value of 0 and a maximum value of 1 with an average of 0.30. In other words, 30% of respondents had ever been married, implying that majority (70%) were single. The variable *has kids* had a minimum value of 0 and a maximum value of 1 with a mean at 0.30. Again, this means that 30% of respondents confirmed that they had kids, and again the majority (70%) did not have kids.

The ordinal-level variable *employment status* had a minimum value of 0 and a maximum value of 2 with an average of 0.94. This means that the typical respondent held a part-time job. *Household income*, categorized by the average yearly income reported by the respondent, had minimum of 0 (\$10,000) and maximum of 5 (>\$100,000), with a mean of \$37,400 and a standard deviation of \$30,600. This means that the average household income fluctuated between \$30,600 - \$37,600 and \$30,600 + \$37,600 per annum. The dummy variable *college year level* had a minimum value of 0 and a maximum value of 1 with an average of 0.50, meaning that that 50% of respondents were seniors and the other 50% were non-seniors.

In regards to HHI in the form social networks, and HAI (or respondents set of animal companions), both were hypothesized to impact health status. Variables used to measure HHI include total number of friends of respondent, median hours a week the respondent interacts with friends, and median times a day the respondent interacts with friends. *Total number of friends of respondent (0-4)* had a minimum value of 0 and a maximum value of 4. The average number of friends was at 2.1 with a standard deviation of 1.8. Meaning that averaged number of friends fluctuated between $(2.1 - 1.8)$ and $(2.1 + 1.8)$, or between having no friends to as many as 4 friends.

Median number of hours a week respondent interacts with friends had a minimum value of 1 hour and a maximum value of 30 hours with a mean of 9.7 hours and a standard deviation at 7.7. Once again, this signifies that hours fluctuated from the average $9.7 - 7.7$ and $9.7 + 7.7$. The last HHI variable, *median times a day respondent interacts with friends (1-10 times)*, had a minimum value of 1 and a maximum value of 10 with the median at 4.2 and a standard deviation at 2.6. Once more, this indicates that the number of times a day a respondent interacts with friends fluctuated from the average between $4.2 - 2.6$ and $4.2 + 2.6$.

The final set of measures pertains to HAI. This set includes *total number of pets (animal companions) of respondent, median hours a week respondent interacts with pets, median times a day respondent interacts with pets, respondent owns a dog, respondent owns a cat, respondent has an affective relationship with the pet, and finally, respondent has an instrumental*

relationship with the pet. Total number of pets (animal companions) of respondent (0-4), had a minimum of 0 pet and a maximum of 4 pets, with a mean at 1.3 and a standard deviation at 1.5. This indicates that the number of animal companions per respondent fluctuated from the average by $(1.3 - 1.5)$ to $(1.3 + 1.5)$. Median hours per week respondent interacts with pets (or animal companions), had a minimum of 1 hour and a maximum of 20 hours with an average of 8.5 hours and a standard deviation at 5.8 hours. Again, these results indicate that hours per week varied from the average by $(8.5 - 5.8)$ and $(8.5 + 5.8)$.

*Median times a day respondent interacts with pets (1-19 times) had a minimum value of 1 and a maximum value of 19, with an average of 5.8 and the standard deviation at 4.8. Once again, the standard deviation signifies that times a day varied from the average between $4.8 - 5.8$ and $4.8 + 5.8$. The next variable, *respondent owns a dog* (1=yes, 0=no), had a minimum value of 0 and a maximum value of 1 with an average of 0.90. This signifies that an overwhelming majority (90%) of the respondents owned a dog. *Respondent owns a cat* (1=yes, 0=no), had a minimum value of 0 and a maximum value of 1 with an average of 0.20. This means that only 20% of respondents owned a cat.*

The final two HAI variables classified the respondent's relationship with the animal companions. *Respondent has an affective relationship with the pet* (1=yes, 0=no), had a minimum value of 0 and a maximum value of 1, with an average of 0.03. This signifies that only 30% of respondents considered having an affective (or emotional) relationship with their animal companion. *Respondent has an instrumental relationship with their pet*

(1=yes, 0=no), had a minimum value of 0 and a maximum value of 1 with an average of 0.10. Once again, this signifies that only 10% of respondents considered having an instrumental (non-emotional) relationship with their animal companion. From this information it is clear that 60% of respondents treated their animal companions in both an instrumental and affective manner.

Table 2: Multiple Linear Regression Results for BMI Score

Independent Variables	M1			M2			M3			M4		
	B	SE	PVALUE	B	SE	PVALUE	B	SE	PVALUE	B	SE	PVALUE
Intercept	18.46 ***	2.71	0.000	23.69 ***	3.06	0.000	20.38 ***	3.78	0.000	16.57 ***	4.13	0.000
Age (in years)	0.26 **	0.09	0.003	0.08	0.12	0.521	0.09	0.12	0.483	0.08	0.13	0.558
Female (1=yes, 0=no)	1.15	1.55	0.458	1.29	1.53	0.403	1.00	1.54	0.515	1.42	1.61	0.380
Catholic (1=yes, 0=no)	0.99	1.20	0.408	1.94 *	1.19	0.107	1.77	1.20	0.142	1.69	1.27	0.186
Ever Married (1=yes, 0=no)	-	-	-	-0.11	2.22	0.962	-0.07	2.26	0.974	-0.02	2.30	0.991
Has Kids (1=yes, 0=no)	-	-	-	5.58 *	2.61	0.035	5.78 *	2.69	0.034	5.53 *	2.89	0.058
Employment Status (0=unemployed, 1=part time, 2=full time)	-	-	-	0.42	0.81	0.605	0.55	0.83	0.505	0.65	0.85	0.442
Household Income (0=\$10K, 1=\$30K, 2=\$50K, 3=\$70K, 4=\$90K, 5=>\$100K)	-	-	-	-0.05 **	0.02	0.007	-0.05 **	0.02	0.005	-0.06 **	0.02	0.003
College Year Level (1=senior, 0=non-senior)	-	-	-	-1.55	1.16	0.186	-1.18	1.19	0.322	-1.26	1.22	0.302
Total Number of Friends of Respondent (0-4)	-	-	-	-	-	-	0.54	0.56	0.334	0.61	0.61	0.320
Median Hours per Week Respondent Interacts with Friends (1-30 hours)	-	-	-	-	-	-	0.15 *	0.09	0.093	0.19 *	0.10	0.068
Median Times a Day Respondent Interacts with Friends (1-10 times)	-	-	-	-	-	-	-0.03	0.25	0.911	-0.06	0.26	0.822
Total Number of Pets of Respondent (0-4)	-	-	-	-	-	-	-	-	-	-0.47	0.55	0.400
Median Hours per Week Respondent Interacts with Pets (1-20 hours)	-	-	-	-	-	-	-	-	-	0.03	0.15	0.828
Median Times a Day Respondent Interacts with Pets (1-19 times)	-	-	-	-	-	-	-	-	-	0.04	0.17	0.803
Respondent owns a Dog (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	4.68 *	2.26	0.041
Respondent owns a Cat (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	0.47	1.54	0.763
Respondent has an Affective Relationship with Pet (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	-0.34	1.35	0.803
Respondent has an Instrumental Relationship with Pet (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	-2.36	2.47	0.342
adj. R-square	0.05			0.13			0.14			0.14		

* = pvalue <.10, ** = pvalue <.05, *** = pvalue <.01, **** pvalue <.001

Table 2 presents the taxonomy of regression models for one of my measures of health status; that measure is about the physical aspect of health as indicated by body mass index. Model 1 (M1) includes all the measures for respondents' ascribed status, namely: *age*, *female* (a measure of gender), and *Catholic* (a measure of religious preference). From M1, it is clear that *age* is positively associated with BMI (B=+0.26, p<.003). This signifies that a one-year increase in age is associated with a tendency for BMI to increase by 0.26 units. In M1, it is also apparent that being *female* and being *Catholic* does not have

an impact on BMI. In other words, male and female do not differ in their average BMI. The same can be said between Catholics and non-Catholics.

Model 2 (M2) adds the variables pertaining to respondent's achieved traits along with ascribed traits. It is interesting to note that *age* does not have any significant impact on BMI as it did in M1. Though, being *Catholic* did reflect a positive significant impact on BMI ($B=+1.94$, $p<0.107$) as opposed to M1. This means that respondents who identified as *Catholic*, were more likely to have an BMI score of 1.94 units higher than non-Catholics.

M2 also shows that having kids has a positive significant impact on BMI ($B=+5.58$, $p<0.035$). This means that having kids increases BMI score by 5.58 units compared to not having kids. *Household income* also reflects an impact; however, this is a negatively significant impact on BMI ($B=-0.05$, $p<0.007$). This indicates that as *household income* increases, BMI score decreases.

Model 3 (M3) in Table 2, includes the variables pertaining to Human-Human interaction (via social networks). Results indicate that *has kids* similarly resulted in a positively significant impact on BMI ($B=+5.58$, $p<0.035$), meaning that respondents who have kids are likely to have a score of 5.58 units higher in terms of BMI than those who do not have kids.

The variable *household income*, again, resulted in a negatively significant impact on BMI ($B=-0.05$, $p<0.005$) just as in M2 which signifies that as the household income increases, BMI score decreases by 0.05 units. Additionally, *median hours per week*

respondent interacts with friends has a positively significant impact on BMI ($B=+0.15$, $p<0.093$). This means that an additional one-hour interaction with friends in a week increases BMI score by 0.15 units.

In Model 4 (M4) of Table 2, I included the measures pertaining to Human-Animal interaction. The results in M4 show that *has kids* and *household income* retain their significant impact on BMI (*has kids*: $B=+5.53$, $p<0.058$; *household income*: $B=-0.06$, $P<0.003$). Again, these indicate that respondents who have kids are likely to have BMI score 5.53 units higher than those who do not have kids, and, as household income increases, BMI score will decrease by 0.06 units in terms of BMI.

Median hours per week a respondent interacts with friends also retains its positively significant impact ($B=+0.19$, $p<0.068$), which again, indicates that an additional one-hour interaction with friend will increase BMI score by 0.19 units. The only variable reflecting a significance that represents Human-Animal interaction is *respondent owns a dog*. This variable has a positively significant impact on BMI ($B=+4.68$, $p<0.041$). Once again, this signifies that owning at least one dog will increase the respondent's BMI score by 4.68 units versus non-dog owners.

In summary, Table 2 indicates that while none of the variables of ascribed traits are impacting factors on BMI, achieved traits do show a significant impact. Results for *household income* show that the higher the reported income, the more likely BMI score will decrease and, having kids negatively impacts BMI score. Meaning, those who have kids

are likely to see a decrease in their BMI score than those who do not have kids. I speculate that those who have a higher household income are more likely to have accessibility to resources that support physical activities such as sports, gyms, etc., hence, lower BMI scores. As for the variable *has kids*, I can hypothesize that respondents who own kids are likely to have BMI scores lower than those who do not have kids considering that caring for children is a physical motivator.

In terms of human-human interaction, the *median hours per week respondent interacts with friends* has a significant impact on BMI meaning, that at least one-hour of interaction with friends can increase BMI score. Contrary to existing research that indicates human-human interaction (or social networks) are likely to impact physical activity, I hypothesize that the group study in this research are all full-time college students, which indicates that many are focused more on scholarly activities (such as reading, writing, research, homework, etc.), which limits their time spent on physical activities. I also speculate that majority of students spend their free time interacting more through social networking sites (e.g., Facebook), which clearly does not involve physical activities.

Intriguingly, contrary to existing research that showed animals (namely, dogs) impacting physical activity health status, my results indicated that having a dog was significantly associated with high BMI score! Perhaps, because the target population I focused on were full-time college students who may not have time to walk or opportunity to have physical activities with their animal companions. Equally intriguing from the

results in Table 2 is the non-significant impact of having a cat on physical health status. That is, having a cat as an animal companion did not significantly associate with BMI scores of respondents. The results of Table 2 send the message that the type of animal companions matters in whether they will impact health status or not.

Table 3: Multiple Linear Regression Results for BDI-II Scores

Independent Variables	M1			M2			M3			M4		
	B	SE	PVALUE	B	SE	PVALUE	B	SE	PVALUE	B	SE	PVALUE
Intercept	14.10 ***	4.19	0.001	10.36 *	4.76	0.032	11.78 *	5.98	0.051	20.96 ***	6.28	0.001
Age (in years)	-0.19	0.13	0.155	-0.08	0.19	0.678	-0.08	0.19	0.683	-0.07	0.20	0.735
Female (1=yes, 0=no)	3.53	2.40	0.144	5.38 *	2.39	0.026	5.43 *	2.43	0.028	4.01 +	2.45	0.105
Catholic (1=yes, 0=no)	-3.13 +	1.85	0.093	-4.35 *	1.86	0.021	-4.26 *	1.90	0.027	-3.41 +	1.93	0.081
Ever Married (1=yes, 0=no)	-	-	-	7.02 *	3.46	0.045	7.02 *	3.58	0.053	7.19 *	3.50	0.043
Has Kids (1=yes, 0=no)	-	-	-	-11.88 *	4.07	0.004	-11.82 **	4.26	0.007	-11.18 **	4.40	0.013
Employment Status (0=unemployed, 1=part time, 2=full time)	-	-	-	2.39 +	1.27	0.063	2.43 +	1.31	0.067	2.59 *	1.29	0.048
Household Income (0=\$10K, 1=\$30K, 2=\$50K, 3=\$70K, 4=\$90K, 5=>\$100K)	-	-	-	-0.03	0.03	0.270	-0.03	0.03	0.270	-0.02	0.03	0.559
College Year Level (1=senior, 0=non-senior)	-	-	-	0.26	1.82	0.886	0.12	1.88	0.947	0.45	1.85	0.810
Total Number of Friends of Respondent (0-4)	-	-	-	-	-	-	-0.28	0.89	0.753	-0.38	0.93	0.679
Median Hours per Week Respondent Interacts with Friends (1-30 hours)	-	-	-	-	-	-	0.02	0.14	0.894	0.07	0.16	0.670
Median Times a Day Respondent Interacts with Friends (1-10 times)	-	-	-	-	-	-	-0.16	0.39	0.679	-0.26	0.40	0.528
Total Number of Pets of Respondent (0-4)	-	-	-	-	-	-	-	-	-	0.87	0.84	0.307
Median Hours per Week Respondent Interacts with Pets (1-20 hours)	-	-	-	-	-	-	-	-	-	-0.28	0.23	0.222
Median Times a Day Respondent Interacts with Pets (1-19 times)	-	-	-	-	-	-	-	-	-	0.02	0.27	0.946
Respondent owns a Dog (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	-9.77 **	3.44	0.005
Respondent owns a Cat (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	1.35	2.35	0.565
Respondent has an Affective Relationship with Pet (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	-2.38	2.06	0.251
Respondent has an Instrumental Relationship with Pet (1=yes, 0=no)	-	-	-	-	-	-	-	-	-	0.30	3.77	0.936
adj. R-square	0.20			0.09			0.06			0.13		

* = pvalue <.10, * = pvalue <.05, ** = pvalue <.01, *** pvalue <.001

Table 3 similarly presents the taxonomy of regression models for the second measurement of health status. This measure is about the mental (or depressive level) aspect as indicated by BDI-II adjusted in this thesis to only include 19 of the 21 items. The regression model in Table 3 follows the same pattern of regression model taxonomy of independent variables hypothesized to impact BMI score. In Table 3, the first model (M1) shows the impact of ascribed traits on BDI₁₉ scores.

The variables included are *age* in years, *female* (1=yes, 0=no), and *Catholic* (1=yes, 0=no). Based on the results of M1, age does not have any significant impact on mental

health status. Being *female* does not have any significant impact on mental health status. However, M1 shows that being *Catholic* has a negative impact on mental health status. This means that by being Catholic, BDI_19 scores were lower by 3.13 units compared to not being Catholics ($B=-3.13$, $p<0.093$). This impact of religion on mental health has long been noted in the sociology of health and by Emile Durkheim in his study of suicide.

In model 2 (M2) of Table 3, variables pertaining to achieved traits are being added to the baseline model, M1. Based on the results of M2, it is clear that there is a positive significant impact on mental health status if the respondent is female ($B=+5.38$, $p=0.026$). What this means is that females are 5.38 units higher than males in terms of BDI_19. Similarly, being *Catholic* continues its negative impact with a more prominent significance ($B=-4.35$, $p<0.021$). This signifies that respondents who identify as *Catholics* are now 4.35 units lower than non-Catholics in terms of BDI_19. The variable *ever married* shows a positively significant impact on BDI_19 which signifies that respondents who have ever been married tend to score 7.02 units higher than non-ever married respondents with respect to BDI_19 ($B=+7.02$, $p<0.045$). *Has kids* however, shows a negatively significant impact on depression which according to the results in M2, signifies that respondents who have kids will score lower on BDI_19 by 11.88 units than those without kids ($B=-11.88$, $p<0.004$). As for *employment status*, M2 results indicate a positively significant impact on the BDI_19 score. Once again, this signifies that

respondents who are employed have BDI_19 scores that are 2.39 units higher than those who are unemployed ($B=+2.39$, $p<0.063$).

In model 3 (M3), variables pertaining to human-human interaction (HHI) are added. These variables are *total number of friends of respondents*, *median hours per week respondent interacts with friend* and lastly, *median times a day respondent interacts with friends*.

In M3, there is a continuing significant impact in the same variables of achieved and ascribed traits as are shown in M2. Being *female* continues to show a positively significant impact on BDI_19 score ($B=+5.43$, $p=0.028$), which as previously mentioned, signifies that *females* tend to have a higher score by 5.43 than males in terms of BDI_19. That is, females tend to be depressive than males. Being *Catholic* also continues a similarly negative impact on BDI_19 ($B=-4.26$, $p<0.027$), which again, indicates that respondents who are *Catholic* are likely to score 4.26 units lower in BDI_19 than those respondents who are non-Catholics. Meaning, Catholics tend to be less depressive than non-Catholics.

Ever married continues a similar positively significant impact on BDI_19 ($B=+7.02$, $p<0.053$). Again, this signifies that respondents who have ever been married will score 7.02 units higher in terms of BDI_19 versus those respondents who are non-ever married. Meaning, being married is associative with having high depression scores than not being ever married. The variable *has kids* also maintains a consistently negative impact on BDI_19 ($B=-11.82$, $p<0.007$), indicating that respondents who have kids tend to score 11.82 units lower than those respondents who do not have kids. *Employment status* retains its

positively significant impact ($B=+2.43$, $p<0.067$). This indicates that those respondents who are employed are likely to score 2.43 units higher on BDI_19 than those who are not employed.

As far as the human-human interaction variables, there was no significant impact on BDI_19, meaning social interaction (or friends) does not have any impact (whether positive or negative) on BDI_19 scores. This is unexpected as I hypothesized that interaction with close friends or one's social network would have alleviated or reduce feelings of depression especially so that social networks are typically seen and construed as supportive.

The final model (M4) in Table 3 includes variable relating to human-animal interaction's impact on mental health state. The variables added in M4 are: *total number of pets of respondent*, *median hours per week respondent interacts with pet*, *median times a day respondent interacts with pets*, *respondent own a dog*, *respondent owns a cat*, *respondent has an affective relationship with pet*, and finally, *respondent has an instrumental relationship with pet*.

Similarly, as in M2 and M3, there is a continuing impact on mental health status based on the achieved and ascribed traits. Being *female* retains a positively significant impact on BDI_19 ($B=+4.01$, $p<0.10$). Once again, this indicates that females are likely to score higher on BDI_19 by 4.01 units than non-females. The variable *Catholic* also retains its negatively significant impact on BDI_19 ($B=-3.41$, $p<0.08$) as it does in M3. This

signifies that respondents who identify as Catholic are likely to score 3.41 units lower in terms of BDI_19 than those who are non-Catholic.

Ever married also retains a positively significant impact in terms of BDI_19 ($B=+7.19$, $p<0.04$), which means that respondents who have ever been married are likely to score 7.19 units higher than those who have never been married. In M4, *has kids* also continues to negatively significant impact on BDI_19 ($B=-11.18$, $p<0.01$). This means that respondents who have kids are likely to be 11.18 units lower, in terms of BDI_19, than those who do not have kids. Lastly, *employment status* also retains a similarly significant impact on BDI_19 as M3 ($B=+2.59$, $p<0.04$). This signifies that respondents who are employed are likely to score 2.59 units higher on BDI_19 than those who are unemployed. Considering variables of human-animal interaction now, the only variable that has any significance is *respondent owns a dog* ($B=-9.77$, $p<0.005$). The significance in this variable indicates that respondents who own at least one dog are likely to score 9.77 units lower, in terms of BDI_19, than those who did not confirm they own a dog. In other words, having a dog as animal companion lowers the chances of depression. The same cannot be said about having a cat. Having a cat does not impact depression scores.

Overall, the message from Table 3 indicated that respondents who are female *were* more likely to score higher in terms of BDI_19 than those who are male; and, being *Catholic* has lower BDI_19 score than those who were non-Catholics. I speculate that being Catholic aids in better mental health state because it encourages positivity, and being a

Catholic-based community, there is a large network where support is easily attainable. Respondents who reported *ever married* are more likely to impact BDI_19 scores negatively, while those who responded to having kids were positively impacted on BDI_19 scores. Basically, Table 3 results suggest that having kids improves mental health while being married will result in a higher BDI_19 score, thus affect mental health state negatively. In other words, having kids lowers depression scores but having been ever married or married heighten depression scores.

Lastly, as a set of variables relating to human-animal interaction, *respondents who own a dog* showed a negatively significant impact to mental health state. Meaning owning at least one dog will result in a lower BDI_19 score. Existing research shows that owning and interacting with a dog can help improve mental health. However, Table 3 does not show any correlation between the respondent interacting with the animal companion and BDI_19. The significance only exists for respondents owning a dog. Human-human interaction (or social networks) did not show any impact (whether positive or negative) to mental health state. Durkheim's study has proven that social groups are positive influencers; however, in Table 3, human-human interaction had no impact to BDI_19 (neither positive nor negative).

DISCUSSION

How do Achieved and Ascribed Characteristics Impact Physical Health?

Generally, physical and mental health are impacted by an individual's social environment (e.g., family and peer) and personal characteristics (e.g., age, gender, religion) in ways that can either promote or hinder health status and well-being (Cockerham 2016). Previous studies have established theories why college students are at risk for being overweight: food consumption high in sugar, fat, and carbohydrates, sleep deprivation, and reduction in physical activity (Zagorsky and Smith 2011:1393).

One of the personal characteristics that impacts physical health status is household income. The results of this study show that higher income status translates to better health status; in other words, higher income is associated with low BMI scores. One explanation may be that the simultaneous demands of school (100% are full-time students) and work (the typical student at TAMIU works part-time) give students less time to "burn" these calories. That said, my results show that my assumption (higher income is correlated with being overweight) was inaccurate. It could be that families with higher income have the financial capacity to enroll in physically intensive activities (gyms, dance classes, yoga, and sports) and to consume healthy meal plans.

Unfortunately, obesity and stress are positively correlated especially for those who are in low-middle class status which is typical of TAMIU students (Wisman and Capehart

2010:939). Low-middle class college students are more likely to experience more stress than those in higher socio-economic status. Many of these students are not only full-time college students, but they are also part-time employees. As for TAMIU college students, being employed is almost an expectation due to familial financial demands. This is a situation that creates additional stress.

Financial assistance granted to low-middle income students is more often insufficient to cover collegiate costs (Tevington, Napolitano, and Furstenberg 2017:729). The financial burden leads to the popular low-cost dietary options – the *fast foods* and the *junk foods*. It is well-established in scientific literature that these food options are higher in saturated fats, empty calories, and sugar contents (Knol *et al.* 2017:248). This notion of food insecurity occurs when quality meal options are limited, specifically for low-middle income students. Students who consciously allocate money for food are forced to choose affordability to meet quantity and negate healthful benefit.

Another social characteristic that negatively impacts physical health is being a parent. Results in this study indicate that having a child is a risk factor for increased body mass. It is likely that, as student-parents, time to participate in physical activities is limited. In addition to being a full-time student and at least part-time employed, there exists an added-on responsibility of being a full-time parent. Being a parent means dedicating time and effort for doctor visits, daycares or schools, means of financial support, and emotional availability. Considering that most of the respondents are under

25 years of age, it is likely that their kids are quite young; I can safely argue that most of these kids may even be young enough to still wear diapers. Hence: having kids is a risk-factor for being overweight, and thus will increase body mass index.

HAI showed that this type of interaction is a risk factor for being overweight. Based on Granovetter (1973) and Marsden (2003), social networks promote positive health, but my results concluded otherwise. My results showed that social networks, or HHI, actually increases body mass index. My expectation lies on the ever-evolving trend in which youth and adolescents acquire a dependency on internet and smart devices so heavily that these result in minimal engagement in physical activity. Internet usage has significantly increased within the last 20 years. In 2009, 63% of college students reported being heavy internet users (>2 hours per day); and the percentage of obese college students grew from 15% in 2000 to 18% in 2010 (Melton *et al.* 2015:510-511).

According to Freidman and Aral, social networks that are at risk of negatively impacting another individual are considered risk-potential networks (2001:411). Considering this population of TAMIU college students, HHI has shown to negatively influence health status to the extent that it can be considered a root cause for overweight and obesity. In an evolving, technologically dependent society, college students today are so consumed with their devices, like smart phones and tablets, where the dependency of social media is vast to the extent that their physical activity is declining. HHI dependency on technology has resulted in a significant negative impact to physical

health. In most cases, interaction exists mainly through internet and technology (phones, social media, etc.). Thus, considering that majority were immersed in internet usage and social media, if a respondent's social networks are inclined more towards internet dependency and less on a physical lifestyle, it is likely that the respondents will imitate a similar behavior (Carrell, Hoekstra, and West 2010:657). In this case, this is an imitation of a non-physically active lifestyle.

Sanders (2003) and Irvine (2007) argue that developing an affective relationship with animal companions generates symbolic interaction and as a result, physical health in humans improve considering that animal companions function as an indirect motivator to exercise. Although James Serpell (2004) also argues that HAI is a promoter for physical activity, which can result in improved health status, my results showed the opposite. My results for HAI indicated that owing a dog is a promoter for being overweight, while owning a cat had no influence! The linkage between owning a dog and increased body mass index was intriguing in the sense that unlike HHI, HAI does not have the ability to create a direct impact to human health status. In other words, social networks have the ability to directly impact human behavior through spoken word – animals only produce indirect influences to physical health in the sense that the human will be motivated to walk the dog which results in exercise for both. Furthermore, humans will only be motivated to walk the dog when an affective relationship actually exists (Irvine 2007:5).

Though the average respondent is already above the overweight level, my results showed that owning a dog is actually a risk-factor for being overweight. My results also showed that less than half of respondents agreed to have a solely affective relationship with their dog. According to Charles (2014), the impact of HAI on physical health status will result in a positive impact only when an affective and meaningful relationship between the human and animal exists (2014:715). When an affective relationship with the animal companion exists, the human will likely participate in events and activities in settings such as parks, events, and stores that welcome animal companions.

Activity communities are increasingly including animal friendly activities in animal friendly locations that motivate humans to participate with their animal companions, such as animal companion costume contests. When humans are emotionally connected to their animal companions, leaving the animal companion at home will not be a favorable option; a most viable option for the human is being physically active or integrated in any and all activities where animal companions are accepted. Rejecting an affective relationship will likely result in loss of motivation to cater a dog's desire and necessity to exercise, and furthermore, result in minimal to no exercise for the human. Hence, lack of exercise results in weight gain.

Unfortunately, there was not enough empirical evidence, or otherwise, to substantiate why owning a dog was a risk-factor to being overweight for college students; though the population considered in previous research is not limited to only college

students but rather it is a study of a general population. As far as achieved and ascribed traits, being a female had a higher probability of increasing depression but it had no impact on physical health status. Being Catholic was a promoter to mental health status but did not have an impact on physical health status either. However, having kids had an impact to both mental and physical health status. This variable showed that having kids was a risk-factor to physical health status but a promoter for mental health status.

The implications that HAI had a negative influence on a population of college student's physical health status is a study that requires further development, considering that existing research suggests that owning a dog is a promoter to overall health for a general population. In fact, previous research claims that owning a dog is actually a promoter to physical health status being that the human is motivated to walk the dog, and thus enables exercise. My results were not in keeping with this expectation. Expanding research on the negative impacts to physical health status for young, college students who own a dog can be a major contribution to sociology by identifying additional risk factors that negatively impacts the health of college students.

How do Achieved and Ascribed Status Impact Mental Health?

Unfortunately, college students are not only at risk of being overweight, but according to Beiter *et al.* (2015), they confirm that in the United States alone, there were reportedly 10% of college students diagnosed with depression within a 12-month span

(2015:90). Risk-factors for depression in college students comprise various factors, but in my results the variables that impacted mental health status were gender (being female), being ever married and employment status. Promoters of mental health include religion (being Catholic) and having kids.

Oddly, my results did not show any linkage between HHI and mental health status considering that sociologists have long argued that social connections are positive enablers for an individual. As expected, and based on previous research, the results on HAI showed that owning a dog is a promoter for mental health status as argued by John P. Polheber and Robert L. Matchock (2014). Polheber and Matchock (2014) argue that compared to human social networks, the presence of a dog has shown significant improvement in human health by lowering cortisol (also known as the “stress hormone”) blood pressure, and heart rate all which are stress factors.

According to Smith *et al.* (2015), gender plays a major role in mental health status. In a study, one of the main impacting factors for depression in college females is body perception and weight management. Compared to college males, college females are more distracted with body perception to the extent where they become so distracted with methods on how to lose weight that it results in unhealthy methods of weight loss (e.g., under-eating, weight loss enhancers, drugs, alcohol, etc.). In addition, females’ constant worry of losing weight can ultimately lead to an unsatisfactory lifestyle, and thus will result in a higher state of depression than males (Smith *et al.* 2015:3).

As a former undergraduate college student, I can certainly attest that body image becomes more prevalent after high school considering that there are additional stress factors in college. By the end of my first year in college, my weight increased by about 10 pounds. Homework and studying, in addition to having the free-will of choosing what to eat, in most cases fast food since it is highly obtainable on campus, are all risk factors for gaining weight. In addition, there is an existing stress factor now that, as an adult, there is less parental guidance (Boyce and Kuijer 2015). With minimal parental guidance or supervision, college students are at will to choose how they want to manage their eating habits. For the most part, food choices are not the healthiest because they are the least expensive option. These added stress factors of being on my own are considered risk factors to mental health.

Holliday *et al.* (2016) indicated that while females are at high-risk for depression, Hispanic females have an even greater risk considering that they are being compared to non-Hispanic college females. Holliday *et al.* (2016) argues that Hispanic females are at higher risk of depression in relation to stress and anxiety, due to low socio-economic status which can eventually lead to lower grade point averages than those of other subpopulations. Considering this group of TAMIU college students who are predominantly Hispanic, my results indicated that while most of the respondents were female, the average household income was reported within the low-middle, socio-

economic status, creating an additional stress factor and thus, being female resulted in a high risk-factor for mental health.

As a predominantly Hispanic community, it is not uncommon for this group of college students from TAMIU to identify with and practice Catholicism. The Catholic religion plays a significant role within the Hispanic community. According to the Burke *et al.* (2014), college students who consider themselves religious or have a spiritual guidance were likely to be at lower risk of deviant behavior, like consumption of alcohol, drugs and tobacco, all while significantly improving mental health status (Burke *et al.* 2014). Catholicism is a religion that frowns upon deviant behavior. Burke *et al.* (2014) argues that religious or spiritual students who have a more conservative outlook, are likely to assess the consequences of their actions based on their spiritual beliefs prior to making decisions which will guide them away from participating in unhealthy or dangerous activities. The principles of Catholicism teach its followers the notion of good vs. evil in the sense that doing something evil will lead to consequences. Since the abstinence of alcohol, tobacco and drugs is a promoter for mental health, students who refrain from consuming mind-altering substances are more focused in their academia all while reducing the chances of being depressed. When students are guided by their spirituality, they are less likely to engage in deviant behavior.

As an active member of a congregation, some concepts that are taught to church members is love, caring and obedience. In essence, prayer is a form of meditation.

Through stressful situations and feelings of resignation, prayer and religion are essentially spiritual guidance which promotes reassessment of feelings from sadness and withdrawal, to feelings of joy and peace. Having a spiritual guidance that encourages people to love and find peace, can most certainly provide comfort to students who are struggling with college, and other stress related activities, and thus result as support for mental health. According to Longo and Kim-Spoon (2013), religion has a positive influence on mental health status of college students who are more likely involved in religious services and supportive religious groups (Longo and Kim-Spoon 2013:489). Many individuals utilize Catholicism as a tool of meditation. Although, the amount of time spent participating in religious activities was not measured, still, the impact on health status for respondents who did report they were Catholic proved to be a promoter for mental health.

On the matter of marital status, it is rare that college students are married. Results also showed that *being ever married* had a negative impact on mental health status, that is to say that ever married respondents had lower mental health status. Sherman (2017) argues that socio-economic status is a risk-factor for young, married couples in the sense that struggling to obtain a means of financial support will cause a strain within the marriage and eventually result in loss of marital satisfaction (Sherman 2017:659). Generally, when couples are married, especially young college students, they lavish in the idea of being emancipated from their parents, living without parental control, and

having free-will. However, being separated from parents also indicates a search for financial means to support in monthly expenses like rent, groceries, utilities, and in most cases, tuition and other college expenses. Marriage requires one or both partners to hold down a job because it is highly unlikely that first-time college students will be offered a job that incurs a high salary.

In an evolving modern society, the stresses of making ends meet – financially –and asynchronous time schedules of couples, given work and school, will likely result in feelings of distress and dissatisfaction for the spouses (Sherman 2017:660). In other words, married couples not prioritizing time for one another because of factors that are getting in the way (e.g., work, school) will likely induce a strain in their marriage causing loss of interest and/or resentment. Thus, given these conflicting roles resulting to a conflicted situation between married couples becomes a risk-factor for mental health (i.e., depression, stress, hypertension and insomnia).

While married life is depressive for college students, having kids is actually a promoter to mental health. In other words, for college students, being married is a risk-factor of depression but having kids is a protection against depression. According to Myrskylä and Margolis (2014), they argue that having a positive outlook on parenting, or becoming a parent, as opposed to a negative attitude, will influence the trajectory of the parent's satisfaction in having a child (Myrskylä and Margolis 2014). Parents are more satisfied when they have a pre-conceived notion that having a child or children will

positively influence their well-being, and additionally, people who have planned births, and are more economically and emotionally stable, will show significant improvement in their life satisfaction which will lower depression.

Majority of respondents are at least part-time employed, and according to my results, respondents who are employed are likely to have more stressors and poor mental health. Being employed does not necessarily mean financial stability. Furthermore, compounding this with the demands of being a student, then respondents find themselves in a conflicting situation of job and school. Employment status can impact health status in various forms: (1) students feel isolated from participating in college activities; (2) grades suffer because students do not have enough time to study; and (3) social relationships at work become stress-factors if they are considered ambivalent ties.

Ambivalent ties, according to Vaughn *et al.* (2016), are networks in the workplace that can have both a positive and negative impact on an individual's mental health status (Vaughn *et al.* 2016:27). The workplace is filled with different personalities, some positive and some negative. Students who are already dealing with school-related stress can also be affected by coworkers who are often producing a negative environment. A coworker can trigger a negative environment through actions such as gossips, bad-mouthing, sharing negative personal life situations, and complaining about job activities or relationships. These situations are negatively impacting the person or people

surrounding that ambivalent tie and ultimately, the workplace can be considered a negative environment and detrimental for the student's mental health.

Another stress-related factor of being employed, according to Vaughn *et al.* (2016), is exclusion from college-hosted events because of job demands. Colleges and universities host semester beginning-to-end events for all student participation that include free gifts, food, beverages, and activities; all intended to create a stress-free environment. Unfortunately, not all students have the time to attend these activities, again because of their commitment to their job. Thus, exclusion from these activities can result in feelings of isolation and depression.

Another factor is a decline in grades cause students to drop courses which may lead to a decline in their mental health status. Even if students still make time to study and complete homework, this will further impact their mental health state considering that their time to sleep is cut short and thus, creating an additional stress-factor. Furthermore, students who have limited time to study, complete homework, or even rest, will be negatively impacted in their mental health state and resulting in depression.

How do HHI and HIA Impact Physical and Mental Health?

In my results for HAI, mental health was significantly improved for respondents who owned dogs. However, there was no link between respondents who owned cats.

This is a curious and interesting result. Why might this be so? According to Clifton Bryant

(1979) and Leslie Irvine (2007), they argue that animal companions in general are symbolically significant in the sense that any animal that is emotionally accepted by the human can motivate mental health.

According to Johnson (2013), dogs (compared to cats) are likely the most desired animal companion considering that they are highly sociable and receptive to human emotion. In other words, dogs are more friendly and approachable animal companion than cats. For over 28 years, I have lived with an estimated 15 dogs, some short-term and others long-term. During the time I spent with these dogs, I have undergone feelings of protection, love, emotional support, and entertainment – the term “man’s best friend” is quite fitting but certainly an understatement considering that I have valued these animal companions as more than just a friend; I consider my dogs as kin.

Polheber and Matchock (2014) both argue that while humans induce autonomic responses (i.e., promote nervousness), dogs support in reducing anxiety. Being in a situation where humans encounter a person with a dog, the human is more likely to gravitate and interact with dogs (Polheber and Matchock 2014). Additionally, interaction with a dog has been shown to lower blood pressure and improve heart rate variability for the human. When a human is put in a situation where they interact with a stranger, this can promote feelings of nervousness being that the human is worried about being judged. Being around dogs, however, reduces the feeling of judgment.

Edney (1995) argues the mental health benefits of owning a dog will result in less emotional distress and allow more acceptance of an individual. As a result, this has also shown significant improvement in stress levels for humans. When humans participate in animal friendly activities, it opens up an opportunity for humans to socialize resulting in lower stress and more life satisfaction (McNicholas *et al.* 2005:331). Although Polheber and Matchock argue that social networks (HHI) can induce autonomic responses, McNicholas argues that these networks can actually promote mental health. In other words, humans who interact with other humans who share a common interest, like having an affection and admiration for dogs, will likely create bonding and thus, result in lower levels of depression.

The non-impact of having a feline animal companion on both physical and mental health was particularly curious and intriguing. Was this result because only 20% of the sample we studied owned a cat and that there was not enough statistical power and degrees of freedom to provide a definitive set of results? Or was it really the case that cats did not have any impact on human health? These are questions that immediately came to mind given the results of this study.

There are clear differences in the behavior and temperament between dogs and cats. And owners claim that their respective animal companions can be a source of stress relief and of joy and companionship. There are those who claim that dogs are more social than cats. Might these differences have mattered and made salient if the sample size for

cat owners were as large as those of dog owners? Clearly, this thesis is unable to respond to these questions, and that future studies will need to address these set of interestingly important questions with better sampling techniques and instruments.

What is clear is that animal companions impact health, and assuming that sample size was sufficient in size so as to enable statistical power, then a message from this study might be that the impact of animal companions on human health status may well depend and be conditioned by the type of animal companion a person has. The scientific literature on this topical area is sparse, and will definitely need to be engaged and populated by researchers in various disciplines such as biology, kinesiology psychology, etc. This thesis takes on the initiative to jump start this line of research with the hope that others will pick up on it as a research topic and agenda.

CONCLUSION

This thesis in sociology provides a set of intriguing and unexpected results, while leaving some aspects to be further explored and explained by way of future studies. Because respondents in this study were full-time college students, it is difficult to generalize these results to other populations (e.g., non-students) and social contexts. College students are focused primarily on school work and activities, and for the most part employment and familial obligations given the tight-knit culture of being Hispanic; this focus limits their time to interact with their animal companions, if and when they do have animal companions.

My results did, however, provide interesting solid evidence on the impact of HAI on mental health status given that majority of students had at least a dog and yet had minimal interaction with it. Based on my overall results, HAI with dogs did have an impact on both the mental and the physical health status of respondents. According to my results, HAI with dogs was a promoter of human mental health status (i.e., enhances health status by lowering depression). At the same time, HAI with dogs was a risk-factor for physical health status (i.e., being overweight). My thesis revealed that between canines (dogs) and felines (cats), the only animal companionship that had impact on both physical and mental health status was canine ownership, albeit in very different ways and directions, at least for this target population and social context.

The results of this study indicated no evidence to support the claim of a moderating impact of HAI on HHI. This means that the impact of HAI on health status was independent and not conditioned by respondents' HHI. For some reasons, the impact of animal companions and human friends were seemingly orthogonal and independent of each other. In technical terms, there was not statistical interaction between HHI measures and HAI measures.

My results also showed that HHI negatively impacted physical health status without any interaction effect from HAI, with the only HHI-impacting measure being number of hours a week the respondents interacted with their friends. HHI had no significant impact to mental health status; friends did not matter in regards to depression. Oddly, owning a cat had no link with mental or physical health status for this population of college students. The non-health impact of owning a cat is a situation that requires further exploration on a larger and more diverse population because previous research has shown that cats, too, can promote mental health status for those who are more receptive to cats than to dogs.

In summary, my research contributed the following to the sociology of human-animal interaction:

(1) It has explored and examined the impact of HHI and HAI on physical and mental health.

(2) It has generated a *name-generator* and *name-interpreter* that served as an instrument to measure HAI (e.g., number of times spent with animal companions).

(3) It has opened the path to the possibility of thinking that the type of animal companion matters in regards to their impact on human health status.

(4) It has documented the fact that animal companions do impact human health status albeit in different ways.

I encourage further investigation of the impact of feline (cat) companions to mental health status for college students by expanding the population to multiple locations being that the population of cat owners is smaller than dog owners. This is reflected from my survey whereby only 20% of respondents had cats. I suggest that future research on mental health impacts of owning cats for full-time college students who are 1) first-time college attendees; 2) are employed; 3) live outside of their parent's home; and 4) are from low socioeconomic backgrounds as this population was a small segment in the present study and hence may have not had the adequate statistical power to detect.

Considering that there was a scarcity of literature available to support in justifying the results of these conflicted and intriguing results that fell short of a fully developed explanation, I recommend continued research on the impacts to physical health for students who own an animal companion in general. Furthermore, I encourage others to investigate this idea and direction in depth, perhaps within a college community where obesity is a high concern.

Since the transition from high school to college can be a highly stressful shift for young adults, it is behooving to expand on this research. Meaning, there should be more studies on first-time college students who are 1) not living with parents; 2) are from low socioeconomic backgrounds; 3) are employed; 4) have animal companions (dogs, cats, etc.); and 5) have kids. In order to expand on the impact of owning an animal companion.

I would also recommend to further develop research on the health status of college students who 1) are married and have an animal companion; 2) are married with no animal companions; 3) have kids and an animal companion; 4) have kids but no animal companion; 5) are married, have kids, and an animal companion; and 6) are married, have kids, but no animal companions. Being that the percentage of college students who are married and/or have kids is low, the study will have to expand to more than one location.

Considering that having kids can also be considered a stress factor, I would recommend further investigation on the relationship between having kids, and mental and physical health status. There is existing research showing that having kids is a risk-factor to poor mental health but limited research explaining why having kids could support in lowering depression for college students. I would also recommend further exploring the idea why and how ever being married would cause college students to be depressed.

I would suggest developing a research on college students who are married vs. college students who are not married, and similarly for college students who have kids vs. college students who do not have kids. My recommendation is to further expand on the notion of college students who 1) have ever been married with no kids; 2) have ever been married with kids; 3) have never been married and no kids; and 4) have never been married but have kids.

My findings contribute to the sociology of health and illness by producing the much-needed empirical evidence on how animal companions might enhance mental health status for full-time college students. Finally, with ongoing and developing research on the benefits of HAI for mental and physical health status using quantitative research methods, I contribute to the improvement of health status of college students who are affected by their social environments, personal traits, and the overall demanding life of school.

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APPENDICES

Appendix 1. Participant Survey

INFORMATION SHEET

To be eligible to continue with the survey information and material, you must be at least 18 years old.

1. Are you 18 years or older

Yes

No

Information Sheet

PLEASE READ

Title of Project: Human-Animal Interaction, Social Networks and Health Status

Principal Investigator: Leslie Perez

Introduction:

You are being asked to participate in a research study. This form provides you with information that may affect your decision as to whether or not you would participate in this study. If you decide to participate in this study, this form will be used to record your participation. The Principal Investigator (PI) or her representative will provide you with an additional information that may be needed, and will answer questions you may have. Before deciding whether or not to take part, **PLEASE READ** the information below. If you have any questions, please do not hesitate to contact us. Your participation is entirely voluntary and you **CAN REFUSE** to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled.

What is the purpose of this study?

We are requesting you to take part in a study on the physical and mental health impacts of human-animal interaction and social networks on full-time, undergraduate TAMIU college students. We want to understand what the impacts of human-animal interactions have on physical and mental health status and compare to those of social networks (human-human interactions). Our goal is to determine whether human-animal interactions have a more significant physical and mental health impact on college students than social networks alone. We also want to understand the impacts of human-animal interactions on the social networks. We are asking you to take part in this study because you are an undergraduate, full time college student. We are expecting to extend this survey to anywhere up to 700 students throughout TAMIU.

What will you be asked to do?

If you participate in this study you will be asked to take a 45-minute long survey that includes questions from demographic information, to a depression test taken from the Beck Depression Inventory Version II (BDI-II), a Body Mass Index (BMI) calculator which will ask you to confirm your weight and height, and a name generator which will ask specific questions about your closest friends and your companion animals (if applicable). A LINK to the survey on Survey Monkey will be emailed to you through your course Blackboard email. This survey will be accessible up to May 15, 2017. Please engage this survey only once.

Information Sheet

What are the possible discomforts and risks in this study?

The risks associated with this study may be psychological and / or emotional distress (e.g. embarrassment). As there are no invasive procedures in the data collection method, risks are considered minimal. That said, you will be asked questions regarding your level of depression, attitudes about yourself, and physical information such as weight and height. You have the right to refuse any question that you find objectionable, and should you feel the need for counseling following your participation, we will refer you to the TAMIU Stress Center which offers free services including to trauma victims and the general public: TAMIU Stress Center, 915 Zaragoza St., Laredo, TX, 956-326-3060. In the event of an emergency including potential harm to self, please dial 911.

What are the possible benefits for taking part in this study?

None.

What are the possible benefits to society from this research?

The knowledge gained from this study will contribute to our understanding on the mental and physical health status effects of human-animal interaction for those who feel the need of medical intervention.

* 2. Do you agree to continue?

- Yes
 No

Information Sheet

Do I have to participate?

No. You are not required or obligated to participate in this study. You can agree to be in the study now and change

your mind later without any penalty. This research study will take place on your own time and which ever location you wish to complete it (e.g. home, school, etc.).

What if I do not want to participate?

You must agree to participate in the study. If you do not want to participate, you will not be included in the study and there will be no penalty. If you initially agree to be in the study, you can change your mind later and withdraw from the study without penalty.

Who will know about my participation in this research study?

Data will NOT contain anything to connect you with your information; the on-line survey will be 100% anonymous. Data will be coded and will be kept in password-protected and encrypted digital drives which will be kept in a secured cabinet in Dr. Marcus Antonius Ynalvez' s office at TAMIU. Research records will be stored securely and only Dr. M. Ynalvez will have access to the records. Your research records will not be released without your consent unless required by law or court order. Your records may be viewed by the Institutional Review Board, but the confidentiality of your records will be protected to the extent permitted by law. The data resulting from your participation may be used in publications and/or presentations but your identity will NOT be disclosed.

Information Sheet

How can I withdraw myself from this research study?

If you wish to stop your participation for any reason, please contact the following: PI Leslie Perez (lesliekper@hotmai.com) and/or Dr. Marcus Antonius Ynalvez (mynalvez@tamiu.edu). Throughout the study, project members will notify you of new information that may become available and that might affect your decision to remain in the study.

Whom can I contact with questions about the research?

If you have any questions now, you may feel free to contact the PI Leslie Perez (lesliekper@hotmai.com) or Dr. Marcus Antonius Ynalvez (mynalvez@tamiu.edu).

Whom can I contact about my rights as a research participant?

This research study has been reviewed by the Institutional Review Board (IRB) at Texas A&M International University. For questions regarding your rights as a research participant, or if you have any complaints, concerns or questions about the research, you can contact Dr. Jennifer Coronado (English), IRB Chair, 956-326-3060 / irb@tamiu.edu, or Dr. Roberto Heredia (English / Spanish), 956-326-2637 / rheredia@tamiu.edu).

* 3. Do you wish to continue?

- Yes
 No

Information Sheet

Please be sure you have read the all the information, asked questions, and received answers to your satisfaction. By clicking the AGREE button, I, the undersigned, understand that my participation in this research project is VOLUNTARY, and that I may withdraw from participation at any time WITHOUT COST to myself. I freely choose to participate in this research project.

* 4. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction and I voluntarily agree to participate in this study.

- I DO agree to participate in this study.
 I DO NOT agree to participate in this study.

Demographic Information

This section will ask 15 questions based on demographic and personal information of the participant. This section may take about 5-10 minutes to complete. Please respond to the best of your ability, and remember that this survey is 100% anonymous.

* 5. What year were you born?

* 6. What is your gender?

Male Female Prefer not to answer

Other (please specify)

* 7. What is your sexual orientation?

Straight Gay Bi-sexual Prefer not to answer

Other (please specify)

* 8. What is your preferred language?

English Spanish Prefer not to answer

Other (please specify)

* 9. Are you Hispanic, Latino or Spanish origin?

Yes No Prefer not to answer

* 10. What is your race?

White / Caucasian	Black / African American	Native American / American Indian	Asian / Pacific Islander	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

* 11. What is your current marital status?

Single / Never Married	Married / Domestic Partnership	Widowed	Divorced	Separated	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 12. Aside from student, please confirm your current employment status.

Full-time Employed	Part-time Employed	Unemployed	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 13. Do you pay for your own bills? (e.g. rent, mortgage, utilities, etc)

No - None	Yes - Some	Yes - Most	Yes - All	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 14. Do you have any kids?

Yes	No	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 15. How many kids do you have?

* 16. Which religion do you most affiliate yourself with?

Protestant Christian	Roman Catholic	Judaism	Islam	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

* 17. What is your year level?

Freshman	Sophomore	Junior	Senior	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 18. Are you affiliated with any school related activities (sorority/fraternity, sports, honor society, etc.)?

Yes	No	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 19. How do you pay for school tuition?

Self	Parents	Scholarship	Loans	Financial Aid	Spouse	Prefer not to answer
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

* 20. Please confirm your current household income.

Mental Health Measurement

The following section is based on the 21 questions from the Beck Depression Inventory – Second Edition (BDI-II) in order to measure level of depression for anyone over the age of 13 years old. This section may take between 5 – 10 minutes to complete. Please answer to the best of your ability, and remember that this survey is 100% anonymous.

* 21. Sadness

- I do not feel sad
- I feel sad much of the time
- I am sad all the time
- I am so sad or unhappy that I can't stand it

* 22. Pessimism

- I am not discouraged about my future
- I feel more discouraged about my future than I used to be
- I do not expect things to work out
- I feel my future is hopeless and will only get worse

* 23. Past Failure

- I do not feel like a failure
- I have failed more than I should have
- As I look back, I see a lot of failures
- I feel I am a total failure as a person

* 24. Loss of Pleasure

- I get as much pleasure as I ever did from the things I enjoy
- I don't enjoy things as much as I used to
- I get very little pleasure from the things I used to enjoy
- I can't get any pleasure from the things I used to enjoy

* 25. Guilty Feelings

- I don't feel particularly guilty
- I feel guilty over many things I have done or should have done
- I feel quite guilty most of the time
- I feel guilty all the time

* 26. Punishment Feelings

- I don't feel I am being punished
- I feel I may be punished
- I expect to be punished
- I feel I am being punished

* 27. Self-Dislike

- I feel the same about myself as ever
- I have lost confidence in myself
- I am disappointed in myself
- I dislike myself

* 28. Self-Criticalness

- I don't criticize or blame myself more than usual
- I am more critical of myself than I used to be
- I criticize myself for all of my faults
- I blame myself for everything bad that happens

* 29. Suicidal Thoughts or Wishes

- I don't have any thoughts of killing myself
- I have thoughts of killing myself, but I would not carry them out
- I would like to kill myself
- I would kill myself if I had the chance

* 30. Crying

- I don't cry any more than I used to
- I cry more than I used to
- I cry over every little thing
- I feel like crying, but I can't

* 31. Agitation

- I am no more restless or wound up than usual
- I feel more restless or wound up than usual
- I am so restless or agitated that it's hard to stay still
- I am so restless or agitated that I have to keep moving or doing something

* 32. Loss of Interest

- I have not lost interest in other people or activities
- I am less interested in other people or things than before
- I have lost most of my interest in other people or things
- It's hard to get interested in anything

* 33. Indecisiveness

- I make decisions about as well as ever
- I find it more difficult to make decisions than usual
- I have much greater difficulty in making decisions than I used to
- I have trouble making any decisions

* 34. Worthlessness

- I do not feel I am worthless
- I don't consider myself as worthwhile and useful as I used to
- I feel more worthless as compared to other people
- I feel utterly worthless

* 35. Loss of Energy

- I have as much energy as ever
- I have less energy than I used to have
- I don't have enough energy to do very much
- I don't have enough energy to do anything

*** 36. Changes in Sleeping Pattern**

- I have not experienced any change in my sleeping pattern
- I sleep somewhat more than usual
- I sleep somewhat less than usual
- I sleep a lot more than usual
- I sleep a lot less than usual
- I sleep most of the day
- I wake up 1-2 hours early and can't get back to sleep

*** 37. Irritability**

- I am no more irritable than usual
- I am more irritable than usual
- I am much more irritable than usual
- I am irritable all the time

*** 38. Changes in Appetite**

- I have not experienced any change in my appetite
- My appetite is somewhat less than usual
- My appetite is somewhat greater than usual
- My appetite is much less than before
- My appetite is much greater than usual
- I have no appetite at all
- I crave food all the time

*** 39. Concentration Difficulty**

- I can concentrate as well as ever
- I can't concentrate as well as usual
- It's hard to keep my mind on anything for very long
- I find I can't concentrate on anything

*** 40. Tiredness or Fatigue**

- I am no more tired or fatigued than usual
- I get more tired or fatigued more easily than usual
- I am too tired or fatigued to do a lot of things I used to do
- I am too tired or fatigued to do most of the things I used to do

* 41. Loss of Interest in Sex

- I have not noticed any recent change in my interest in sex
- I am less interested in sex than I used to be
- I am much less interested in sex now
- I have lost interest in sex completely

Anthropometric Information (e.g. height, weight)

The following section is based on the calculation of the Body Mass Index based on your weight and height measurements. This section may take up to 1 minute to complete. Please answer to the best of your ability, and remember that this survey is 100% anonymous.

* 42. Please confirm your weight in pounds (e.g. 150):

* 43. Please confirm your height in feet/inches (ex. 5 feet 10 inches):

	Feet	Inches
Height	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>

Social Network Measurement

The following section is based on the measurement of social networks through the name generator. You will be asked to complete a questionnaire for up to 4 close friends, so this section may take up to 10 minutes to complete. It is not required to fill out all 4 friends but it is strongly suggested in order to obtain the most accurate results. Please answer to the best of your ability, and remember that this survey is 100% anonymous.

44. Please confirm initials of Friend #1.

45. Please answer the following questions based on Friend #1:

	Gender?	Own companion animal?	Years known?	Months known (if less than a year)?	Average times a day you communicate (phone, face-to-face, social media, etc.)?	Average hours per week you communicate (phone, face-to-face, social media, etc.)?	Where is he/she located?	Type of support?
Friend #1	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>	<input style="width: 40px; height: 20px;" type="text"/>

46. Please confirm initials of Friend #2.

47. Please answer the following questions based on Friend #2:

Gender?	Own companion animal?	Years known?	Months known (if known less than a year)?	Average times a day you communicate (phone, face-to-face, social media, etc.)?	Average hours per week you communicate (phone, face-to-face, social media, etc.)?	Where is he/she located?	Type of support?
Friend #2							

48. Please confirm initials of Friend #3

49. Please answer the following questions based on Friend #3:

Gender?	Own companion animal?	Years known?	Months known (if known less than a year)?	Average times a day you communicate (phone, face-to-face, social media, etc.)?	Average hours per week you communicate (phone, face-to-face, social media, etc.)?	Where is he/she located?	Type of support?
Friend #3							

50. Please confirm initials of Friend #4

51. Please answer the following questions based on Friend #4:

Gender?	Own companion animal?	Years known?	Months known (if known less than a year)?	Average times a day you communicate (phone, face-to-face, social media, etc.)?	Average hours per week you communicate (phone, face-to-face, social media, etc.)?	Where is he/she located?	Type of support?
Friend #4							

Human-Animal Interaction Measurement

The following section is based on the measurement of human-animal interaction through the name generator. You will be asked to complete a questionnaire for up to 5 companion animals (dogs, cats, & other), so this section may take up to 10 minutes to complete. It is not required to fill out all 4 friends but it is strongly suggested in order to obtain the most accurate results. Please answer to the best of your ability, and remember that this survey is 100% anonymous.

52. Please confirm name of Pet #1.

53. Please answer the following questions based on Pet #1:

	Gender	Type of animal	Years owned?	Months owned pet (if less than a year)?	Average times a day you interact (play, talk, walk/run with, etc.)?	Average hours per week you interact (play, talk, walk/run with, etc.)?	Role?	Location?	Type of support?
Pet #1									

54. Please confirm name of Pet #2.

55. Please answer the following questions based on Pet #2:

	Gender	Type of animal	Years owned?	Months owned pet (if less than a year)?	Average times a day you interact (play, talk, walk/run with, etc.)?	Average hours per week you interact (play, talk, walk/run with, etc.)?	Role?	Location?	Type of support?
Pet #2									

56. Please confirm name of Pet #3.

57. Please answer the following questions based on Pet #3:

	Gender	Type of animal	Years owned?	Months owned pet (if less than a year)?	Average times a day you interact (play, talk, walk/run with, etc.)?	Average hours per week you interact (play, talk, walk/run with, etc.)?	Role?	Location?	Type of support?
Pet #3									

58. Please confirm name of Pet #4.

59. Please answer the following questions based on Pet #4:

	Gender	Type of animal	Years owned?	Months owned pet (if less than a year)?	Average times a day you interact (play, talk, walk/run with, etc.)?	Average hours per week you interact (play, talk, walk/run with, etc.)?	Role?	Location?	Type of support?
Pet #4									

Appendix 2: Beck Depression Inventory Version II (BDI-II)

<Roch Beck Depression Inventory Baseline

V 0477 CRTN: _____ CRF number: _____ Page 14 patient initials: _____

BDI-II

Name: _____ Marital Status: _____ Age: _____ Sex: _____
Occupation: _____ Education: _____

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

<p>1. Sadness</p> <p>0 I do not feel sad.</p> <p>1 I feel sad much of the time.</p> <p>2 I am sad all the time.</p> <p>3 I am so sad or unhappy that I can't stand it.</p> <p>2. Pessimism</p> <p>0 I am not discouraged about my future.</p> <p>1 I feel more discouraged about my future than I used to be.</p> <p>2 I do not expect things to work out for me.</p> <p>3 I feel my future is hopeless and will only get worse.</p> <p>3. Past Failure</p> <p>0 I do not feel like a failure.</p> <p>1 I have failed more than I should have.</p> <p>2 As I look back, I see a lot of failures.</p> <p>3 I feel I am a total failure as a person.</p> <p>4. Loss of Pleasure</p> <p>0 I get as much pleasure as I ever did from the things I enjoy.</p> <p>1 I don't enjoy things as much as I used to.</p> <p>2 I get very little pleasure from the things I used to enjoy.</p> <p>3 I can't get any pleasure from the things I used to enjoy.</p> <p>5. Guilty Feelings</p> <p>0 I don't feel particularly guilty.</p> <p>1 I feel guilty over many things I have done or should have done.</p> <p>2 I feel quite guilty most of the time.</p> <p>3 I feel guilty all of the time.</p>	<p>6. Punishment Feelings</p> <p>0 I don't feel I am being punished.</p> <p>1 I feel I may be punished.</p> <p>2 I expect to be punished.</p> <p>3 I feel I am being punished.</p> <p>7. Self-Dislike</p> <p>0 I feel the same about myself as ever.</p> <p>1 I have lost confidence in myself.</p> <p>2 I am disappointed in myself.</p> <p>3 I dislike myself.</p> <p>8. Self-Criticism</p> <p>0 I don't criticize or blame myself more than usual.</p> <p>1 I am more critical of myself than I used to be.</p> <p>2 I criticize myself for all of my faults.</p> <p>3 I blame myself for everything bad that happens.</p> <p>9. Suicidal Thoughts or Wishes</p> <p>0 I don't have any thoughts of killing myself.</p> <p>1 I have thoughts of killing myself, but I would not carry them out.</p> <p>2 I would like to kill myself.</p> <p>3 I would kill myself if I had the chance.</p> <p>10. Crying</p> <p>0 I don't cry anymore than I used to.</p> <p>1 I cry more than I used to.</p> <p>2 I cry over every little thing.</p> <p>3 I feel like crying, but I can't.</p>
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Subtotal Page 1

Continued on Back

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NR15645

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**Beck Depression
Inventory****Baseline**

V 0477

CRTN: _____ CRF number: _____ 1 Page 15 patient initials: _____

11. Agitation

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

13. Indecisiveness

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decisions.

14. Worthlessness

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

15. Loss of Energy

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

15. Changes in Sleeping Pattern

- 0 I have not experienced any change in my sleeping pattern.
-
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
-
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
-
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

18. Changes in Appetite

- 0 I have not experienced any change in my appetite.
-
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual. _____
- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual. _____
- 3a I have no appetite at all.
- 3b I crave food all the time.

19. Concentration Difficulty

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

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_____ Subtotal Page 2

_____ Subtotal Page 1

_____ Total Score

NR15645

VITA

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