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The Role of Attention, Attitude, Culture, and Social Expectancies in the Human-Animal-Bond: A Biopsychosocial Approach

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Abstract

The human-animal bond may positively impact human health. However, employing the human-animal bond in human health and behavioral treatments strategies faces several unresolved issues. Challenges facing human-animal bond research include accepting a theoretical model that encourages systematic organization of human-animal bond research, and investigating the human-animal bond's underlying mechanisms. Using eye-tracker technology and various social measures, the goal of the current research was to investigate the role of attention, attitude, culture, and social expectancies in the human-animal bond. Participant's eye movements were monitored as they examined photographs depicting various levels of human-animal interaction. Participants also rated their impressions of the human in each photograph for several characteristics. Results showed that participants attended differently to varying levels of human-animal interactions and made more positive judgments about humans interacting with an animal versus the mere presence of an animal. Biological, psychological, and social factors may be important to how humans relate to and benefit from social interactions with animals.

The Role of Attention, Attitude, Culture, and Social Expectancies in the Human-Animal-Bond: A Biopsychosocial Approach

The human-animal bond is the dynamic relationship between humans and animals where humans and animals influence the psychological and physiological state of one another (Anderson, 2007; Odendaal & Meintjes, 2003). For definition clarity, the term "human" is defined as members of the genus and species *Homo sapiens*. Conversely, the term "animal" refers to all members of the biological kingdom Animalia, excluding *Homo sapiens*. Empirical research has recently investigated the physiological and psychological mechanisms of the human-animal bond; however human fascination with animals and interest in the human-animal bond can be traced into the earliest records of human history. One recurring theme in the human-animal bond is how the relationship influences human health and wellness.

The use of animals in the therapeutic process designed to enhance human health is known as animal-assisted intervention (Kruger & Serpell, 2006). Recent research has shown that animal-assisted interventions may positively impact various aspects of human health (see Nimer & Lundahl, 2007). However, there are several unresolved issues surrounding human-animal bond research and the appropriate use of animal-assisted intervention strategies. "The field of animal-assisted interventions…lacks a unified, widely accepted, or empirically supported theoretical framework for explaining how and why relationships between humans and animals are potentially therapeutic" (Kruger & Serpell, 2006, p. 25-26). In order for animal-assisted intervention to be supported as a valid therapeutic option for positively affecting human health, the effective mechanisms

of the human-animal bond must be clarified and a consistent theoretical basis for predicting health outcomes from the human-animal bond must be identified.

The relationship between humans and animals may be influenced by a variety of biological, psychological, and social factors. Theories of personality (e.g., Odendaal, 2002), evolution (e.g., Wilson, 1984/1993), and social relationships (e.g., McNicholas & Collis, 2006) have been proposed as underlying factors in the human-animal bond. Therefore, the Biopsychosocial approach may be an appropriate perspective for evaluating current and future human-animal bond research. A review of human-animal bond history, current empirical research, and proposed human-animal bond theories provides a background for interpreting the human-animal bond in terms of the Biopsychosocial model. A series of experiments were also conducted to investigate how attention, attitude, culture, and social expectancies influence human perception of the human-animal bond. The overall goal of the research was to provide a better understanding of how humans perceive social relationships between humans and animals, and provide further support for the interpretive role of the Biopsychosocial model in the human-animal bond.

Ancient Origins of the Human-Animal Bond

From mankind's earliest evolutionary origins, the presence of animals represented a unique adaptive challenge. Animals were crucial instruments of selection and adaptation for ancestral humans because encounters with animals, as predators and prey, held immediate repercussions for human survival (Barrett, 2005). The nature of the predator-prey relationship may have also played a pivotal role in certain human cognitive adaptations. Unlike other aspects of early hominid environments, animals as predators

and prey represented "intentional agents…[or] animate, sentient beings that process information and behave in the service of specific goals, goals that they are well-adapted to achieve and that are in direct opposition to those of humans either as prey or as hunters" (Barrett, 2005, p. 202). This unpredictable and volatile human-animal relationship may have partially influenced the adaptation of the human agency system: a set of cognitions and behaviors that help make social inferences about social and nonsocial agents. Although animals as predators or prey would be considered nonsocial agents, many elements of predator-prey interactions (e.g., gaze detection and tracking, belief-desire reasoning) are also important components of human social behavior. The ability to judge and predict the behaviors of potential predators and prey would have posed considerable adaptive significance for humans; therefore, some researchers speculate that remnants of this primitive human-animal bond are still present in modern day human cognitive functioning and behavior (Barrett, 2005).

Although predator-prey relationships may have had a crucial adaptive impact for humans, some researchers suggest that another determining force in the development of the human-animal bond included early human-animal cooperative social relationships. Early organisms may have organized into symbiotic social systems for resource and energy conservation (Odendaal, 2002). Although organisms are fully capable of impacting one another in a direct fashion, there is also a reciprocal effect when those same organisms, whether in competition or mutual exchange, continuously share the same environment.

The perspective that organisms are related to one another and their environments through multifaceted relationships is echoed in the work of mathematicians and scientists

exploring living systems theory. According to living systems theory, all aspects of life, from basic cells to complex social systems, are open and self-arranged into repetitive reciprocal patterns of continuous energy exchange that maintain a perpetual state of order (Miller, 1978). In order to fully appreciate the multiple levels of complex intercourse that occur in a living system, traditional linear reasoning should be abandoned for the recognition that all phenomena – biological, physical, psychological, social and cultural – are inextricably interrelated and simultaneously influence all aspects of life (Capra 1982, 2002). A comprehensive appreciation of the human-animal bond's complex nature should therefore consider the influence of competitive and cooperative human-animal relations.

How did the relationship between humans and animals transcend beyond predator-prey to include more mutually beneficial social arrangements? Two key features that allowed humans to succeed as hunters and avoid becoming prey may have also helped build the symbiotic bond between humans and animals: a keen visual system and the ability to observe and engage in social relationships. Diligent observation of an environment teeming with animal life coupled with rapidly developing intuitive abilities for judging the actions and emotions of others may have permanently influenced how humans relate to the presence of animals (Olmert, 2009). Evolutionary biologist E. O. Wilson recognized the adaptive significance of early human-animal relationships, stating that mankind's ancestral emersion in the natural world developed into an "innate tendency to focus upon life and other lifelike forms, and in some instances to affiliate with them emotionally" (2002, p. 134). Wilson called the tendency for humans to attend to animals and other properties of living systems *biophilia* (Wilson, 1984).

Based on archeological evidence, the time period when humans and animals began using cooperative strategies was the Pleistocene epoch, or Ice Age, and the first animal to traverse the human-animal bond was the wolf (Serpell, 2006; Anderson, 2008). Historians hypothesize that access to food and water resources became limited during this time, and may have forced humans and wolves into closer contact (Serpell, 1996). The presence of wolf remains in human settlements indicates that, as early as 400,000 years ago, humans and wolves may have been living and working together for extended periods of time and over multiple generations. During this time, humans may have learned improved cooperative hunting strategies by observing wolves, the wolves, in turn, may have ventured closer to the fringes of human camps to scavenge and form partnerships with human hunting parties (Serpell, 2006; Anderson, 2008; Olmert, 2009). One theory is that wolf cubs found by early human hunters were adopted and raised by tribal women alongside their own children. Evidence for the practice of rearing orphaned animals in this manner continues to be observed among surviving Indian tribes in the Amazon (Erikson, 2000). Ultimately, it is unknown which species initiated contact; however, historical remains coupled with observations from modern day hunter-gatherer tribal cultures indicate that humans and animals shared an intimate bond that may have enhanced survival and held permanent evolutionary consequences.

The Human-Animal Bond in Early Systems of Human Health, Culture, and Society

The role of the human-animal bond in social and cultural development appears in ancient and classical belief systems regarding human health and wellness. On every continent where early human groups formed, archeological remains show that animals were important in diagnosing and treating human illness and malady (Serpell, 2006;

Anderson, 2008). Cave paintings left behind by Paleolithic humans depict animals, such as horses, aurochs, and dog-like animals, as central figures of interest. Some of these images depict humans as being half transformed into animals (Anderson, 2008). Scholars believe these half-human, half-animal renderings represent the animist belief system that was characteristic of early hunting and foraging societies. Animism is the belief that all living organisms possess an invisible spirit or "essence" that animates the body, and any misfortune or illness that occurs is a result of an attack against that organism's spirit (Serpell, 2006). For example, some early civilizations believed that the spirits of hunted animals could seek vengeance for their death; therefore, all animals were treated with respect and honored through various rituals lest they seek revenge by attacking a human's soul. Conversely, other societies sought the patronage of animal spirits to serve as guardians, with different animals offering varying levels of spiritual influence and power (Serpell, 2006).

One aspect of animism that pertained to human health was the role of the shaman (Serpell, 2006). A shaman was believed to be skilled in communicating with the spirit realm and acted as an intermediary between the spirit and human worlds. Through a series of ritual practices, shamans entered an altered state of consciousness to release their essence into the spirit world. This allowed them to divine the future, interpret events in the natural world, and treat illness in other humans caused by malign spiritual forces (Serpell, 2006). Recently, archeologists discovered a 12,000 year old burial site in Israel believed to contain the oldest known remains of a female shaman from the Natufian culture. Various animal remains were found within the grave arranged around the woman's skeleton, including fifty tortoise shells, a leopard's pelvis, and the wing tip of a

golden eagle. Researchers believe that these animal remains are reflective of the shamanic role that the tribal woman played and the animal spirits to which she was most closely associated (Hebrew University of Jerusalem, 2008). Although rare, animism and shamanic customs endure in a few remaining tribal societies, such as the Mayan people of Chamula located in the Chiapas highlands of Mexico (Serpell, 2006). Researchers believe that observing the spiritual and health practices of these tribes will lead to a better understanding of human-animal relationships from ancient times.

As time passed, the association between animals and human health endured. For example, ancient Egyptian and Greek cultures were dominated by animistic images related to spirituality and health (Serpell, 2006). In the Egyptian pantheon, gods and goddesses were viewed as possessing various animal characteristics. One noteworthy figure is the Egyptian god Anubis, who had the body of a man and the head of a jackal. Anubis' responsibilities included guiding souls through death and the afterlife, acting as a physician to the other gods, and guarding the secrets of mummification and reincarnation (Serpell, 2006).

In the tableau of Greek mythology, gods and goddesses were reported to transform themselves into animals in order to move among and interact with mortals (Serpell, 2006). Greek mythology also had several animal representatives performing as mediators between life and death. A prominent figure in Greek art and literature was Cerberus, the three headed hound who guarded the gates of the underworld to prevent souls from escaping (Anderson, 2008). Additionally, canines and serpents were important figures in the healing cult of the Greek god Asclepius (Serpell, 2006). Depicted as carrying a serpent entwined staff (an image that remains a symbol of medicine in the

modern world), Asclepius, son of Apollo, was the god of healing, medicine, and physicians. Supplicants of Asclepius would travel to healing temples associated with the god to receive medical treatment for assorted ailments (Serpell, 2006).

In addition to the relationship between animals and human health, the human-animal bond had a direct impact on the social and economic well-being of ancient and classical civilizations. More than any other culture, the Egyptians attempted to form significant and mutually beneficial relationships with animals (Olmert, 2009). For example, the Egyptians venerated and respected cats above all other animals. Humans from ancient settlements around the world may have attempted to domesticate felines as early as 9,500 years ago; however, historians support that cats were domesticated in Egypt approximately 4,000 years ago for the primary purpose of protecting grain stores from vermin (Olmert, 2009). Cats were so highly esteemed by the Egyptian culture that they were accorded high social status among the pantheon and pharaohs of Egypt and killing a cat was considered a crime punishable by death (Anderson, 2008).

As civilizations grew larger and shifted away from hunting and foraging into agrarian based societies, a new form of social and physiological stress emerged: developing successful agriculture and animal husbandry strategies. During this time, people who exhibited a talent for working with plants and animals may have enjoyed considerable social and monetary advantages (Olmert, 2009). The domestication of the auroch by the ancient Egyptians is an example of how important animals were to daily life in ancient times and the lasting consequences that came from such intimate relationships between humans and animals. Prior to the Egyptian culture, captive cattle herds were kept primarily for slaughter (Olmert, 2009). Larger and considerably more

dangerous than modern day cattle, caring for these ancient herds was a perilous task. The earliest evidence that cows were used to harvest milk is residue from a bowl in a 5,000 year old Egyptian tomb (Olmert, 2009). Through selective breeding and close human contact, the ancient Egyptians appear to have gradually cultivated the process of animal domestication, placing humans and animals into closer physiological and psychological proximity. These bonds were exalted for their spiritual and social significance, as well as their role in the daily success of evolving agricultural societies.

Another key aspect in the human-animal bond's history is the individual human emotional experience that came from keeping animals as personal companions, or pets. Although pet ownership has been verified as a cross-cultural phenomenon, there is little evidence regarding the motivation that led humans to engage in this custom (Anderson, 2008). In order to better understand the enthusiasm humans have demonstrated for pet ownership, Bodson (2000) examined pet epitaphs from the ancient Greek and Roman civilizations, where the practice of keeping pets was widespread and popular. Through a careful review of surviving pet grave markers, Bodson made several speculations about ancient human motivations for pet-keeping. First, unlike later civilizations that demarcated separate burial grounds for humans and animals (e.g., pet cemeteries), animal burial sites in ancient Greece and Rome were intermixed with human burial grounds. Additionally, many burial sites were lavishly designed and carefully maintained. Second, pet keeping was not restricted by class or social status. People of all ages and gender, from the lowest trade to the highest aristocrat, went to considerable effort to leave lasting records of their affection their animal companions. These records were carefully developed prose engraved on the pet's tomb or sarcophagus. After reviewing the literary

content of these epitaphs, Bodson concluded that personal pleasure and satisfaction from the relationship was the primary reason for pet ownership. Even in ancient times, humans appreciated the extraordinary nature of the human-animal bond and mourned for that bond when it was lost.

The Dark and Shifting History of the Human-Animal Bond

Historically, the human-animal bond was an instrumental and celebrated part of human culture, spirituality, and health; however, there is a darker aspect of human behavior towards animals that must be considered. If humans have displayed a natural inclination towards animals, then they have also demonstrated equally strong aversions to animals as well. For example, humans and many primates universally demonstrate fear towards certain animals, such as snakes and spiders (Ohman, Dimberg, & Ost, 1985). One explanation for this behavior is that humans and their genetic ancestors evolved in an environment where aversions to these animals provided a significant adaptive survival advantage (Ohman & Mineka, 2001).

With the adoption of agricultural lifestyles, human survival depended on the ability to literally and figuratively "dominate" nature through the cultivation of land and livestock. Time periods that experienced the greatest agricultural and industrial development coincide with increased periods of human violence against animals and nature (Serpell, 1996). Specific examples of when animal cruelty reached its height include the ancient Roman culture, which was noted for merciless displays of mass animal carnage as a public entertainment venue, and medieval Europe, which reveled in demonstrations of animal fighting and slaughter (Serpell, 1996). Despite the positive

portrayals of animals in the classical and pre-modern world, animals and the natural world were also considered peculiar and terrifying.

Another shift in the relationship between humans and animals occurred as societies rejected animism for organized monotheistic religion. The emerging ecclesiastical institutions (e.g., Judaism, Christianity, and Islam) held that animals were inferior to humans and the relationship shared with God. The tenets of these establishments supported human superiority over all animals and relegated them to roles of servitude and sacrifice (Menache, 2000). Despite the emerging views of the religious sector, traces of animism and shamanism endured into the earliest years of the monotheistic era. For example, St. Francis of Assisi, St. Anthony of Padua, St. Roch, St. Christopher, and St. Bernard were all noted figures in Christianity who were recognized for their benevolent association with animals and their practice of the healing arts (Serpell, 2006).

The decline of the human-animal bond's role in cultural and spiritual practices related to human health was a gradual but systematic process. The telling blow for many ancient belief systems steeped in the human-animal bond occurred in the thirteenth century during the Inquisition (Serpell, 2006). Throughout the course of the Inquisition, customs and beliefs related to pagan and pre-Christian practices were systematically annihilated. Furthermore, historians suggest that the last remaining practitioners of animism and shamanism, such as isolated nature cults and local folk healers, were destroyed between the fifteenth and seventeenth century (Serpell, 2006). These individuals were denounced as witches, and animals were cast as familiars capable of causing supernatural harm to other people. By the end of the seventeenth century, "close

association or affinity with animals, once a sign of shamanic power or budding sainthood, became instead a symptom of diabolism" (Serpell, 2006, p.11).

From the eighteenth century to the mid-twentieth century, the presence of animals, especially related to concepts of human health and culture, appears to have been largely ignored. One of the few areas where the human-animal bond was viewed as potentially beneficial was mental health. Some clinicians believed that animals served as nurturing and socializing influences for children, the mentally ill, and those suffering from long-term, chronic illnesses (Serpell, 2006). On the whole, however, society primarily viewed animals and their relationship to human wellness as abstract and symbolic. For example, Sigmund Freud proposed that animals represented human instincts and uncontrolled impulses, and mental illness occurred when these inner impulses erupted into conscious behavior (Serpell, 2006). Freud's perspective on the relationship, or lack thereof, between humans and animals is representative of the viewpoint that dominated Western ideas of medical and behavioral research. Any lingering ideas regarding metaphysical or psychospiritual links between humans and animals were discarded for more scientifically validated theories (Serpell, 2006). The human-animal bond, once accepted and celebrated for its role in human health and wellness, was virtually banished by academia and scientific research until the end of the twentieth century.

The Human-Animal Bond in Contemporary Empirical Research

During the mid-1900's, clinical child psychologist Boris Levinson noticed a phenomena during his therapy sessions with children. When counseling children who were particularly uncommunicative or withdrawn, Levinson found that the presence of

his pet dog increased incidences of positive interaction between himself and the child. Levinson believed this occurred because "the pet served as a transitional object to aid in facilitating a relationship between the patient and the human therapist" (Chandler, 2005, p. 10). Levinson expounded on these ideas in several publications, including *Pet-oriented child psychotherapy* (1969) and *Pets and human development* (1972). Being the first professionally trained clinician to formally research the potential benefits of human-animal interactions earned Levinson the title of founder and father of pet-facilitated therapy (Chandler, 2005; Serpell, 2006).

Empirical research into the health benefits of the human-animal bond initially focused on how animal companion relationships (e.g., pet ownership) influenced human health issues. This approach was based on the hypothesis that pet owners had lower incidence and severity of chronic diseases associated with stress, anxiety, and depression as a result of their association with companion animals. A groundbreaking study was conducted by Friedmann, Katcher, Lynch, and Thomas (1980), who examined the recovery rates of cardiac patients who had been hospitalized. The results showed that after controlling for demographics, social and psychological status, the severity of the cardiovascular disease, and the presence of human social support, pet owners were significantly more likely to survive beyond one year of their discharge date from a coronary care unit. Friedmann and Thomas (1995) replicated the study and produced similar results. Several other studies have supported the theory that owning pets may be beneficial to human health and welfare. Cross-culturally, people who own pets report fewer medical visits that non-owners (Siegel, 1990, Headey, Grabka, & Kelly, 2002).

Also, people who had adopted a pet from an animal shelter reported a significant decrease in minor health problems one month following the adoption (Serpell, 1991).

In addition to pet ownership having a positive impact on human health, researchers have also found that the health benefits of the human-animal bond are not restricted to pet ownership. Friedmann and Tsai (2006) examined the epidemiological effects of different types of human-animal interactions and came to several conclusions. First, the potential health benefits of human-animal interactions can be divided into long-term and short-term effects. Long-term benefits are associated with continuous contact with animals, typically through pet ownership. The short-term benefits of the human-animal bond are related to brief intervals of human-animal interactions that may or may not be spread out across a period of time.

Regarding the short-term benefits of human-animal interaction, Friedmann and Tsai (2006) reviewed three levels of short-term interaction: explicit animal observation, implicit observation in the presence of an animal, and direct human-animal interaction. Explicit observation of animals, such as in pictures or videos, showed that watching animals could positively influence people's moods and perceptions (e.g. Lockwood, 1983; Rossbach & Wilson, 1992) and decrease physiological arousal (e.g. Katcher, Friedmann, Beck, & Lynch, 1983). Similar effects were observed with implicit animal observation. In these studies, people were placed in situations where an animal was present, but they were not instructed to attend to the animal. Results showed that the mere presence of an animal lowered measures of physiological arousal, particularly if a person had a positive preexisting attitude toward the animal (e.g. Friedmann, Katcher, Thomas, Lynch, & Messent, 1983; Friedmann, Locker, & Lockwood, 1990).

Studies examining the physiological and psychological effects of direct contact between humans and animals have produced mixed results. Several studies have found that friendly interactions between humans and animals have stress-moderating effects. For example, Odendaal and Meintjes (2003) compared blood samples from people before and after they engaged in a quiet reading activity or a positive interaction with a dog (specifically, sitting quietly and petting a dog). Compared to the reading condition, the human-animal interaction condition yielded significantly greater reductions in mean arterial blood pressure and serum cortisol levels, as well as increases in blood plasma levels of β-endorphin, oxytocin, prolactin, phenyl acetic acid, and dopamine. Odendaal and Meintjes concluded that positive interactions with animals were effective for decreasing physiological indicators of stress and increasing neurochemicals associated with social affiliation and bonding. Results from other studies have supported these conclusions. Having an aquarium in a hospital room with patients awaiting heart transplants significantly lowered self-reported levels of stress and anxiety (Cole & Gawlinski, 2000). Also, children receiving post-operative treatment in a hospital ward who interacted with canine visitation teams reported decreased levels of pain compared to a control (Sobo, Eng, & Kassity-Krich (2006).

Despite the data demonstrating a positive role for the human-animal bond in human health and wellness, a significant number of studies have also produced conflicting and unpredictable results. For example, researchers examined whether human-animal interactions would affect the mood, health, and coherence of patients receiving radiation therapy (Johnson, Meadows, Haubner, & Sevedge, 2008). Patients were randomly assigned to groups that either received visitations from a human-canine

team, visitation from a human only, or engaged in a quiet reading activity. The results showed no significant effects for measures of mood, levels of fatigue, or health of the cancer patients in any condition.

Other human-animal interaction studies have produced similarly conflicting results. Straatman, Hanson, Endenburg, and Mol (1997) found that participants who had a friendly interaction with a dog prior to delivering a televised speech experienced no significant differences in cardiovascular stress responses compared to a control. Additionally, Baun, Bergstrom, Langston, & Thoma (1984) found that although cardiovascular measures related to stress decreased when participants interacted with their own pets, the same effect did not occur when they were asked to interact with an unfamiliar pet. The mixed evidence surrounding the role of the human-animal bond in human health has led researchers to question the underlying mechanisms of the human-animal bond and the future direction of human-animal bond research.

Future Directions for Human-Animal Bond Research

Current challenges facing human-animal bond researchers include difficulties in designing studies that explore how the human-animal bond influences human health and an overall lack of organization under a unified theoretical framework (Kruger & Serpell, 2006). These issues, coupled with the conflicting nature of existing data, has led several authors and scientists to petition human-animal bond researchers to develop a more organized approach towards investigating the underlying mechanisms of the human-animal bond. Recurrent themes from these appeals include defining relevant terms associated with human-animal bond research, developing high-quality, empirically based research strategies, and developing an appropriate theoretical base that will unify human-

animal bond research within existing models of clinical medicine (Beck & Katcher, 2003; Wilson, 2006; Wilson & Barker, 2003).

Efforts have been made to operationally define terms associated with the human-animal bond. The *human-animal bond* has been identified as the dynamic relationship that exists between people and animals where humans and animals influence the psychological and physiological state of one another (Anderson, 2007; Odendaal & Meintjes, 2003). Other important terms include human-animal interaction, animal-assisted activity, and animal-assisted therapy. Human-animal interaction is a generic term that can be used to refer to any form of therapy, intervention, or contact between humans and animals (Wilson, 2006). The Delta Society (2009), an organization established to advocate for the research and practical application of the human-animal bond, established the definitions for animal-assisted activities and animal-assisted therapy. Animal-assisted activities include any human-animal interaction that delivers educational or therapeutic benefits to individuals with no predetermined treatment goals. Animal-assisted activities are typically supervised by paraprofessionals or trained volunteers. Animal-assisted therapy is a goal directed intervention strategy that is coordinated by a health or human service processional and includes specific therapeutic objectives that are progressively evaluated (Delta Society, 2009). The development and continued use of these terms has greatly assisted in continuity of communication within the human-animal bond research community.

Until recently, scientific understanding of the human-animal bond has primarily relied on anecdotal evidence and case study documentation. As technological availability and scientific interest in the human-animal bond has progressed, research methods have

included more observational and trial-based research (Wilson, 2006). Researchers must now develop a structured body of evidence supporting the human-animal bond as a beneficial component to human health and wellness. Challenges for developing high quality human-animal bond research designs include addressing the biases and philosophies of human-animal bond researchers, controlling extraneous variables related to human health, obtaining adequately representative population samples, difficulty in measuring outcome variables, and the development of effective human-animal intervention strategies that capitalize on the underlying mechanisms of the human-animal bond (Wilson & Barker, 2003). Dealing with each of these issues and developing sophisticated and controlled research methodologies will advance the authenticity of human-animal bond research.

The final issue for human-animal bond researchers is to accept a theoretical approach that will interpret existing human-animal bond results and provide a directional guide for future research. Attempts have been made to assess the underlying mechanisms of the human-animal bond using a variety of theoretical models (e.g., Kruger & Serpell, 2006; Odendaal, 2002; Wilson, 2006). To date, two theories have been vital to the ongoing effort to develop a conceptual framework for human-animal bond research (Wilson, 2006): Wilson's biophilia hypothesis (1984) and social support theory (Cobb, 1976).

The biophilia hypothesis is Wilson's (1984) hypothesis that humans possess an innate affinity for other living organisms. Additionally, Wilson proposed that human's inherent connection to the natural world is based on Darwin's (1859) theory of evolution. Evolution is the process where all organisms struggle for existence, and, through

heritable variation and natural selection, genotypes most adapted to survival are passed on to future generations of a species (Darwin, 1859). According to these principles, the effects of biophilia in humans may be the result of an ancestry built on survival through close relationships with the natural world. Biophilia may be one of the driving forces in the human-animal bond because the instinctual desire to maintain a connection with the natural world encourages humans to actively engage with other living organisms.

There is evidence to support the role of evolution and the biophilia hypothesis in the human-animal bond. Two previously reviewed examples are the dynamics of early predator-prey relationships and the lingering non-conscious human aversion for certain animal species. Other studies have also shown that humans are able to visually detect living organisms in a scene more quickly and more easily than non-living objects (Tipples, Young, Quinlan, Broks, & Ellis, 2002; Öhman, Flykt, & Eseves, 2001). Another example of evolution's role in the human-animal bond is artificial selection. Darwin (1859) described artificial selection as the deliberate manipulation of living organisms through reproduction, or breeding, to enhance certain desirable characteristics in plants and animals. Artificial selection may be of the driving forces in the domestication of animals by humans, and is evinced by the variety that exists within animal species in contemporary society (e.g., selective breeding of dogs to create species of multiple sizes, coloring, features, and temperaments).

In addition to the role of evolution, some researchers suggest that social support is an underlying factor in how the human-animal bond influences human health. Social support is based on the theory that social relationships provide protection from illness and enhance recovery through practical assistance and positive interpersonal regard (Cobb,

1976). Early investigations into social support's role in health outcomes focused primarily on benefits from the mere presence of supportive social relationships; however, current research has shown that a person's attachment style and the quality (not quantity) of a person's social relationships may be a stronger mediating factor of human health (Sarason & Sarason, 2006). The beneficial role of social support may therefore be more related to a person's perception of that relationship being positive and desired.

Recent studies have shown that short-term and long-term relationships between humans and animals may be perceived as providing beneficial social support. McNicholas and Collis (2006) conducted two studies that compared groups of pet owners to non-owners who were either patients undergoing breast cancer treatment or had been recently widowed. Several tests were administered to determine whether significant social value was placed on the presence of pets and whether participants who owned pets suffered fewer physiological and psychological effects from their treatment/bereavement. In each study, participants reported that they placed significant value on their relationships with their pets, and sometimes preferred the company of their pets to that of human companionship. Additionally, pet owners engaged in spousal bereavement longitudinally reported significantly fewer physical symptoms of grief and distress than non-owners. Pet-owners in the cancer treatment study did not self-report improvements in physical health, and actually reported more visits to their doctor than non-owners. However, a reanalysis of results showed that pet owners reported significantly higher feelings of control regarding disease treatment, and may have subsequently increased the frequency of accessing medical services as a positive coping mechanism (McNicholas & Collis, 2006).

Studies have also shown that the presence of an animal may serve to facilitate social contact between humans. Previously reviewed research showed that the presence of an animal positively influenced people's moods and perceptions of other humans (Lockwood, 1983; Rossbach & Wilson, 1992). Additional studies have also shown that when an animal is present, people are more likely to interact socially with the person accompanying the animal, or handler (Messent, 1982; McNicholas & Collis, 2000). This effect is robust regardless of the appearance of the handler and the engagement level of the animal (active attempts at interaction with people versus no active solicitation for human-animal interaction). This evidence supports that animals may serve direct and indirect facilitating roles in social support systems. Similar to the biophilia hypothesis, the social support hypothesis offers important insight into the underlying mechanisms of the human-animal bond. In order for these theories to be applied towards integrating the human-animal bond into medical treatment strategies, they must be incorporated into a practical framework that can be used to assess and treat human health issues.

The Biopsychosocial Model: A Unified Approach to the Human-Animal Bond

The dominant theoretical model currently used by the modern medical community is the biomedical model (Sarafino, 2006). According to this model, human disease and physical disorders are related to malfunction of physiological processes, and are separate from psychological or social processes (Sarafino, 2006). Although the biomedical model has been indispensable in the advancement of medical technology and treatment, a growing number of researchers and practitioners have recognized that the nature of human illness often goes beyond human physiology. In 1977, George Engel proposed a new model, the Biopsychosocial model, which stated that human wellness was dependent

on interrelated biological, psychological, and social factors, rather than biological factors alone. Just as living systems theorists examine the world through repetitive patterns of reciprocal energy exchange, the Biopsychosocial approach treats human health as a dynamic entity, or system, with continuously interrelating components. Today, the goal of Biopsychosocial practitioners is to understand the interplay of each component in the Biopsychosocial model in order to treat "the whole person" (Sarafino, 2006). As the human-animal bond may be influenced by various biological, psychological, and social components, the Biopsychosocial model appears to be an appropriate theoretical approach for examining how the human-animal bond influences human health.

The biological component of the Biopsychosocial model includes all physiological elements of human health, such as genetic structure and physical systems (Sarafino, 2006). Several important biological components of the human-animal bond have been reviewed, including the effects of evolution in the human-animal bond and the various physiological changes that result from different levels of human-animal interactions. Two key concepts that illustrate the effectiveness of evaluating the human-animal bond with the Biopsychosocial model are the work of Odendaal and Meintjes (2003) and Olmert (2009). Odendall and Meintjes explored the blood serum profiles of humans engaged in direct human-animal interaction and found several neurochemical changes indicating a decrease in stress responses and an increase in social affiliation responses. Odendall and Meintjes' discovery that human-animal interactions lead to increases in blood oxytocin levels may be the biological cornerstone of to the human-animal bond's ability to positively influence human behavior and health (Olmert, 2009). Oxytocin is a critical hormone related to positive human social behavior. Oxytocin

activates nerves that release the neurotransmitter GABA. The tranquilizing effects of GABA influence the amygdala by reducing natural fear responses to new stimuli. Therefore, the increased presence of oxytocin and GABA enhance human social perceptions and influence people to become more open to positive social interaction (Odendall & Meintjes, 2003; Olmert, 2009). From a Biopsychosocial perspective, knowledge of a biological process related the human-animal bond (e.g., increases in blood oxytocin levels), enhances our understanding of other psychological and social behaviors that appear during human-animal interactions.

The psychological component of the Biopsychosocial model includes behavioral and mental processes related to human health, such as cognition, emotion, and motivation (Sarafino, 2006). One area where this applies to the human-animal bond is the motivation behind keeping companion animals as pets and the nature of human emotional attachment to animals. In 2004, the American Animal Hospital Association conducted a survey among pet owners that asked how likely a person was to risk their life to save their pet's life. The results showed 53% of pet owners were "very likely" and 37% were "somewhat likely" to risk their own lives for their companion animals (as cited in Anderson, 2008). Additionally, when compared to the grieving process people experience following the death of a friend or family member, the loss of a companion animal often results in similarly complex symptoms of mourning and grief. Research has shown that a prolonged or complex grief effect associated with the loss of a companion animal may be due to the nature of how the human-animal bond was severed (e.g., euthanasia) and the lack of human empathy and social support for the companion animal grief process (Sife, 2005). From an evolutionary perspective, a human's willingness to risk their own

survival to ensure the safety of a pet and the complex grief response to the loss of a companion animal is difficult to explain. The Biopsychosocial model allows for a more complimentary understanding of how biological (e.g., an evolved history of positive social bonding through oxytocin), psychological (e.g., motivation related to the emotions of love and attachment), and social (e.g., perceptions of social bonding with pets as family) factors interact to produce seemingly paradoxical behaviors.

The final component of the Biopsychosocial model includes social factors related to human health, such as societal, communal, and familial relationships (Sarafino, 2006). The role of the human-animal bond in human perception of social support has been detailed; however, research shows that animals may also play an unconscious role in human social behavior. Chartrand, Fitzsimons, and Fitzsimons (2008) conducted a study on how social perception was influenced by anthropomorphized objects, specifically dogs and cats. Participants were primed with supraliminal images of dogs and cats, and then assessed for their loyalty to a friend's hypothetical transgressions. The authors proposed that images of dogs would unconsciously evoke more feelings of loyalty than that of cats, as loyalty is a characteristic that has classically been applied to dogs. The results showed that people who were exposed to images of dogs responded more loyally to a perceived slight by a friend than those participants who viewed cats or neutral images. Using the Biopsychosocial perspective to assess this study provides a better understanding of the role that non-conscious social processes play in the development of the human-animal bond. By incorporating historical and evolutionary evidence of predator-prey relationships, as well as the archeological records indicating that dogs were among the first animals to be domesticated by humans, we may further advance our understanding

of where the association between dogs and the concept of loyalty originated, as well as the importance of how such unconscious social associations influence every day human perception and behavior.

Current Research

The relationship between humans and animals is complex. Further definition of the human-animal bond and how it may be related to issues of human health and wellness requires rigorous research into the underlying mechanisms of how humans and animals relate to one another at every level. Therefore, the current research was designed to examine the role of attention, attitude, culture, and social expectation towards humans and animals during different levels of social interaction. Additionally, this research sought to further assess the appropriateness of the Biopsychosocial model as a possible theoretical approach for current and future human-animal bond research.

Using eye-tracker technology, the current study mapped human eye movements across a series of four counterbalanced photographs. Each photograph included a different level of social interaction between a human and an animal (background only-control, human presence with no animal present, human and animal present with no interaction, and human-animal present with interaction). The photographs were analyzed to compare attention toward the human and the animal at difference interaction levels. A free-recall memory task and impression formation task were paired with each image to assess whether the presence of an animal influenced attention and social perception towards the human in the photograph. Finally, participants were assessed on a series of interpersonal and social measures to evaluate whether individual culture, attitudes, and

social expectancies played a role how people perceived and evaluated another human in a social situation with an animal.

Scale selection.

Several scales were used to evaluate how humans perceive social interactions between humans and animals. These scales included the Modified Pet Attitude Scale, the Attachment Style Measure, the Auckland Individualism-Collectivism Scale, the Future Events Scale, the Interpersonal Expectancy Scale, and the Need to Belong Scale. The Modified Pet Attitude Scale (Munsell, Canfield, Templer, Tangan, & Arikawa, 2004) is a modified version of the original Pet Attitude Scale (Templer, Salter, Dickey, Baldwin, & Veleber, 1981) that was developed to assess human attitudes towards animals and pet ownership. This scale has been used in several studies to examine attitudes towards human-animal bonding and is one of the few scales that has acceptable reliability information (Cronbach alpha of .93 and a two week test-retest stability of .92) (Anderson, 2007).

Another key element that may play a role in the human-animal bond is attachment style (Parish-Plass, 2008; Hanselman, 2001). Human attachment styles are related to intimacy and avoidance during communication and social interaction (Mazer, 2009). Several attachment style scales have been developed to assess how individuals process and respond to social relationships; however, a primary focal point for many of these scales is the relationship between attachment and romantic social relationships. The Attachment Style Measure developed by Guerrero (1996) was selected for this experiment because it addressed attachment related to more generalized communication in social and intimate relationships. Reliability testing showed the scale was consistent

and reliable (Cronbach alpha greater than .80 for the four underlying scale factors). Additional comparisons demonstrated that the Attachment Style Measure was a valid tool for assessing human attachment style (see Mazer, 2009).

Cultural association may be an important factor in how humans perceive and relate to other people and animals. The primary assessment factors in cross-cultural research are individualism and collectivism. While individualists display independence and ambition towards personal goals, people with a collectivistic orientation are driven by their relationships with others and social group obligations (Komarraju and Cokley, 2008). Research into cultural individualism and collectivism initially supported that attitudes related to these constructs were mutually exclusive and one-dimensional (e.g., Hofstede, 1980). Current research shows that individualism and collectivism consist of multiple orthogonal dimensions that coexist within individuals and cultures (Freeman & Bordia, 2001; Komarraju & Cokley, 2008). Several scales have been developed to evaluate cultural individualism and collectivism; however, a recurring problem with these measures is creating a straightforward method of evaluating the multiple components of cultural identity. Initially, two scales were reviewed for their ability to assess individualism and collectivism: the Self-Construal Scale (Singelis, 1994) and the Horizontal-Vertical Individualism-Collectivism scale (Singelis, Triandis, Bhawuk, & Gelfand, 1995). While research showed these scales to be fairly robust and reliable measures of collectivism and individualism, there has been considerable criticism related to each scale's validity (see Noguchi, 2007; Oyserman, Coon, & Kemmelmeier; 2002; Robert, Lee, & Chan, 2006).

Based on the criticisms of existing cultural assessment scales, Shulruf, Hattie, and Dixon (2007) developed a new individualism-collectivism scale called the Auckland Individualism and Collectivism Scale. Unlike previous individualism-collectivism scales, the Auckland Individualism Collectivism Scale was designed to evaluate behavioral frequencies rather than degree of agreement with specific behaviors. Shulruf et al. proposed that assessing of the number of times a behavior occurred in a given situation rather than degree of agreement with a particular behavior would eliminate miscommunication regarding scale anchors and reduce context effects. The Auckland Individualism Collectivism Scale evaluates cultural orientation by assessing six underlying dimensions of behavior, five of which reliably correlate with two higher order factors reflective of individualism and collectivism. Analysis of the scale has shown it to be a highly accessible and reliable measure of collectivism and individualism (Cronbach alpha greater than .70 for the five underlying scale factors). Comparisons have demonstrated the scales' validity; however, the scale is recently developed and has yet to undergo rigorous use.

The next several surveys are designed to evaluate interpersonal optimism and social expectations about individuals and groups. Examining people's interpersonal expectancies about themselves and others will assist in determining whether perceptions of human-animal interactions are influenced by internal or external motivations. The Future Events Scale uses generalized future event expectancies to measure optimism and pessimism about the self by asking people to rate the likelihood that certain positive and negative events are likely to occur to them in the future (Andersen, 1990). The Interpersonal Expectancy Scale measures optimism and pessimism towards other people

by asking questions about a person's general expectancies about other people's interpersonal behaviors, intentions, characteristics, capabilities, and outcomes (Mather, Casa de Calvo, & Reich, 2005). The Need to Belong Scale evaluates a person's need to identify and belong to a social group (Leary, Kelly, Cottrell, & Schreindorfer, 2005). Each of these scales have demonstrated consistent reliability (Cronbach alpha greater than .80 for all underlying scale factors), and have been tested as significant predictors of human behavior and social expectancies in various social situations (Mather et al., 2005; Gill, Mather, & Jobe, 2009; Shoemake, Gill, Rose, McMillan, & Mather, 2010).

Hypotheses.

Several outcomes are anticipated from this study. Based on the biophilia hypothesis (Wilson, 1984, 1993) and research that humans attend to the presence of living organisms in their environment more than inanimate objects (Barrett 2005; Tipples et al., 2002; Öhman et al., 2001), the results from the eyetracking and memory tasks are hypothesized to show that humans attend to living objects in a scene earlier and more frequently than nonliving objects. Additionally, humans are hypothesized to be sensitive to the presence of animals depending on the level of human-animal interaction observed. Attention and memory for the mere presence of a human and an animal may be less salient than a direct human-animal interaction situation. Therefore, visual attention and memory recall are hypothesized to occur earlier and more frequently for a human and an animal in an interaction situation. Finally, research has shown that people's attitudes towards animals and pets influences how they respond to the presence of animals (Friedmann et al, 1983, 1990). Therefore, participants who have a more positive attitude

towards animals are hypothesized to show increased visual attention and earlier recall for the presence of an animal.

Previous research has shown that people rate other humans as more positive and socially approachable when they are observed in the presence of animals (Lockwood, 1983; Rossbach & Wilson, 1992). Therefore, the results from the impression formation task are hypothesized to show that participants rate the human in the photographs with an animal as significantly more positive than the photograph of the human alone. One result of particular interest is whether there are significant differences in social ratings for the human in the photograph at different human-animal interaction levels. If the social ratings for the human are significantly more positive when the human is observed interacting with an animal (as opposed to the mere presence of an animal), this may indicate that positive perception of animals is related to how the animal is interacting with the human and not mere presence alone. Therefore, the impression ratings for the human in the human-animal presence condition are hypothesized to be more positive than in the human-animal presence condition.

Anticipated scale relationships included positive correlations between the Future Events Scale and Interpersonal Expectancy Scale (Mather et al., 2005; Shoemake at al., 2010), and between the Attachment Style Measure and Need to Belong Scale. In addition to scale correlations, this research predicts that there will be a relationship between participants' scores on the various scales and participant's scores on the impression formation task. Specifically, this research is intended to address the possibility that the impressions formed by participants about the human in the experimental photographs may be influenced by participant attitudes, culture, and social expectancies.

Method

Participants

Participants included 66 undergraduate psychology students from the University of Central Oklahoma (21 males, 45 females). All participants had active student status, a minimum age of 18 years, and active registration with SONA research participation system. The study was divided into two segments on SONA and each section included additional screening criteria. The first section required all participants to be native-born to the USA and have English as a first language. The second section required participants to meet one of the following two criteria: A native-born country that was not the USA, and/or a first language that was not English. The purpose of setting up two separate sections on SONA was to facilitate data collection from a cross-cultural sample; all participants took part in the same study. Participants who completed the study were awarded two research credit hours towards the fulfillment of a research requirement for an introductory psychology course.

Materials

Photographs.

The experimental stimuli consisted of five realistic indoor background settings combined with image components for three possible outcomes of a human-animal interaction. The five background scenes, obtained from Art Visualization (2008), were selected based on their similarities in layout, as well as type and number of background objects. The human-animal image components, purchased from iStockphoto.com, consisted of a young adult Caucasian female and a mature Golden/Labrador retriever-mix dog. A female was chosen as the human image component because research into human

mate selection processes has shown that male and female perceptions of female attractiveness are fairly accurate with minimal gender differences. According to mate selection theory, women perceive attractiveness in other females as it relates to their own relative value as a prospective mate, which allows them to judge female attractiveness at a level comparable to men (Tovee & Cornelissen, 2001). The use of a female target in the current experiment was intended to reduce extraneous effects that might be due to gender differences in social judgments. The human female was also selected based on a casual body orientation (clothing and body posture), as well as full forward frontal body position and a positive smiling facial expression. The dog was selected for by breed based on the American Kennel Club's (2008) ranking of the most popular dog breeds in America; the Labrador retriever was ranked number one and the Golden retriever was ranked number four. Additionally, the dog was posed facing full-front and with a perceived positive facial expression.

The image components of the human and the dog served as the target stimuli and were superimposed onto four of the five background scenes to create four experimental conditions. The first condition was the *control* and contained a background scene only; no human or animal image components were present. The next condition was the *human-only* condition, and included the background scene and human female image component. The third condition was the *human-animal presence* condition. In this image, the human female and dog image components were present within a background scene; however, they were spatially separated and did not appear to be interacting. The final condition was the *human-animal interaction* condition, which displayed the human female and dog

image components on a background scene in close proximity to simulate an interaction between the human and animal.

Participants viewed a total of five photographs. The first photograph was a background scene only, which served to orient the participant to the experiment procedure and tasks. This photograph remained constant for all participants and is shown in Figure 1.

Figure 1. Sample Photograph for Experimental Task Orientation

The subsequent four photographs consisted of a counterbalanced combination of the four possible experimental conditions. Combining each of the four background scenes with each possible experimental condition produced sixteen possible images. The four experiment photographs were arranged so that each background scene and each experimental condition appeared only once. A logic statement in an Excel spreadsheet was used to determine all appropriate photograph combinations, resulting in a total of twenty-four possible counterbalanced combinations of experimental conditions (see Appendix A). The four background images were randomly applied to each counterbalanced photograph combination. A sample photograph combination is shown in Figure 2.

Figure 2. Sample Experimental Photograph Combination

Eyetracking.

Applied Sciences Laboratory Eyetracker 5000 Series system measured participants' visual response times and eye movements. Eye movements were sampled at a rate of 60 Hz, and near-infrared technology tracked gaze position by means of pupillary and corneal reflection. The eye tracker monitored participants' gaze directions and durations while the participants examined a visual display. The eyetracker interpolated gaze position by monitoring the light reflected off of the pupil and cornea from the near-infrared light source, which allowed researchers to collect data on participants' pupil dilations and eye movement patterns. The eyetracker system was operated using Gazetracker ™ software (Eye Response Technologies, Version 8.0.2), which recorded and analyzed gaze trajectories by tracking changes in pupil and corneal reflections. The Gazetracker software was also used for the presentation of all visual stimuli

Stimuli appeared on a 32'' Elo Touchsystems LCD touch-screen monitor (refresh rate = 60 Hz, resolution = 1024×768), accompanied by a Dell Optiplex 755 computer with 4 GB of RAM and an Intel CORE 2 DUO processer. The touch-screen monitor was viewed from a distance of approximately 104 cm— subtending a vertical visual angle of 16.31° and a horizontal visual angle of 21.32°, left and right of center. The laboratory where all data collection took place was windowless and dark, except for ambient light produced by the monitors and the eye-tracking system—no more than .10 lux. The researcher's computer, a Dell Optiplex GX620 computer with an Intel Pentium 4 CPU and two GB of RAM, was connected to a 26'' Dell flat screen.

Scales.

Participants completed a demographics survey, as well as a series of randomly ordered surveys on a computer using MediaLab™ software (Empirisoft, Version 2008). The demographics survey included questions regarding each participant's gender, age, ethnicity, education, birth place, languages spoken, marital status, and cultural orientation (see Appendix B). The remaining questionnaires included the Modified Pet Attitude Scale (see Appendix C), the Attachment Style Measure (see Appendix D), the Auckland Individualism-Collectivism Scale (see Appendix E), the Future Events Scale (see Appendix F), the Interpersonal Expectancy Scale (see Appendix G), and the Need to Belong Scale (see Appendix H). .

Design

A one-way Analysis of Variance (ANOVA) for repeated measures and linear regression were used in the analysis of eyetracking, memory recall, and impression formation results. A 3 x 6 mixed factorial Multivariate Analysis of Variance (MANOVA) (photograph condition by impression rating) for profile analysis was performed to examine possible trends in participant's impression ratings. Canonical correlation was used to examine possible relationships between experiment surveys results and participant impression ratings.

Eyetracking dependent measures.

The dependent variables were the number of total fixations and the total duration of all fixations for each experimental photograph. Due to the short length of time that experimental photographs were presented, a fixation was defined as .10 seconds. Additional dependent variables included the number of times and total length of time the

human in each photograph was observed, and the number of times and total length of time the animal in each photograph was observed. Gazetracker™ was used to create areas of interest called *look zones* around the target stimuli of the human and the animal. The number of times a person looked at the target stimuli was assessed as the 'number of times the look zone was observed'. This number is defined as the number of times a person's gaze entered the target stimuli look zone. The length of time a person looked at the target stimuli was assessed as the 'length of time the look zone was observed'. This number is defined as the total length of time a person's gaze was within the target stimuli look zone

Memory recall dependent measures.

The dependent variables were the total number of objects recalled and the order of recall for the target stimuli. Participant's responses were tallied based on the total number of objects stated; accuracy of object recall was not assessed. Participant's responses were assessed specifically for quantity of objects recalled. For example, if a participant recalled seeing a 'hanging lamp', this object would count as one point towards the total tally of objects recalled. If a participant recalled seeing a 'green hanging lamp', this object would still only count as one point towards the final tally of objects. However, if a participant recalled seeing 'two hanging lamps', this would count as two points towards the final tally of objects. The order of recall for target stimuli is defined as the order in which participants recalled the human or the animal in the list of objects recalled.

Impression formation dependent measures.

The dependent variables were participants' ratings of the human in each photograph condition for six impression characteristics (aggressiveness, attractiveness,

friendliness, happiness, health, and wealth). Impression ratings were defined on a 9-point Likert scale with the anchors 1 = “not at all” and 9 = “extremely”.

Procedure

A script of the experiment protocol has been provided in Appendix I. Participants were given two copies of the experiment informed consent form (see Appendix J). One copy of the informed consent was signed by the participant and returned to the researcher; the second copy was retained by the participant for their records. Using a running sheet and a predetermined randomized order of conditions, participants were assigned to one of twenty-four possible photograph groups that contain one standard orientation photograph and four counterbalanced experimental condition photographs.

Participants viewed five photographs; one sample photograph to orient the participant to the experimental tasks and four experimental photographs where data was recorded. Participants viewed each experimental photograph for three seconds, and then the image was removed. The time length of image presentation was selected based on a review of previous studies of memory and attention to natural scenes (Calvo & Lang, 2004; DiMase, Olivia, & Wolfe, 2002; Wolfe et al., 2006). Three seconds was determined to be an acceptable time frame for adequately engaging short term visual memory while minimizing mere exposure effects.

Immediately following the presentation of each photograph, participants were asked to complete two tasks: a free-recall memory task and an impression formation task (see Appendix K). During the free recall task, participants stated every object, living or nonliving, that they remembered seeing in the previous photograph. If there was a human present in the photograph, participants rated their impression of the person on a series of

six randomly ordered characteristics: aggressiveness, attractiveness, friendliness, happiness, health, and wealth. For the free recall and impression formation tasks, participants made their responses verbally to the researcher so they would not have to look away from the computer monitor. This allowed the eye tracker to remain calibrated and reinforced the reliability of eye tracking data being collected across subsequent images. The researcher recorded participants' responses on a prepared data collection form (see Appendix L).

Following the eye tracking portion of the study, participants were taken to a computer lab where they completed a series of surveys in private. The first survey for all participants was the demographic survey. The remaining surveys were presented in random order. After completing all experiment surveys, participants returned to the eyetracker lab and were debriefed regarding the underlying nature of the experiment and the study's interest in evaluating the human-animal bond (see Appendix M).

Several measures were taken to control for the possible effects of mere exposure and anchoring in the memory recall and impression formation tasks. All images were fully counterbalanced by target stimulus and background scenes were applied randomly. Participant exposure to experimental photographs was limited to three seconds per image. This time frame was selected to maximally engage visual short term memory and capitalize on the attentional bottleneck effect of visual memory processes. Research has shown that people are somewhat limited in their capacity to detect visible changes in relatively stable visual displays, especially when additional tasks are introduced as attentional distractions (Wolfe, Reinecke, & Brawn, 2006). The two tasks immediately following experimental photograph presentation doubly served as attentional distracters.

For the image recall task, participants were given the cognitive task of recalling as many objects as possible, thus limiting the amount of time a participant was likely to focus on a single image component. The impression formation task served as a secondary distraction task and time break between each photographic presentation, allowing participant visual memory for previously viewed photographs time to deteriorate.

.

Results

Eyetracking

Due to individual differences in participants, researcher error, and complications with the eyetracking apparatus, a certain degree of data loss occurred during the collection of eye movement data. A criterion was established to determine the level of eye movement data loss that would be acceptable for final data analysis. One data point extracted from the eyetracker was the length of time eye movement tracking was lost during the presentation of each experimental photograph. This value was averaged across the presentation of all four experimental images and converted to a percentage. The exclusion criteria was set to remove any experimental trial that experienced a loss of greater than 25% of total eye movements tracked. With this exclusion level, the final sample size for eyetracking data analysis was $N = 38$. A mean summary table for all eyetracking data has been provided in Table 1.

N = 38

	Control		Human Only		Human-Animal Presence		Human-Animal Interaction	
Variable	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
Number of Fixations	1.18 (1.69)	[.63, 1.74]	1.24 (1.74)	[.66, 1.81]	1.21 (1.61)	[.68, 1.74]	1.18 (1.50)	[.69, 1.68]
Duration of Total Fixations	.23 (.33)	[.12, .34]	.26 (.38)	[.13, .38]	.24 (.35)	[.12, .35]	.25 (.32)	[.14, .35]
Number of Human LZ Observations	~	~	7.79 (5.01)	[6.14, 9.44]	5.66 (4.24)	[4.26, 7.06]	9.34 (5.08)	[7.67, 11.01]
Number of Animal LZ Observations	~	~	~	~	3.24 (3.26)	[1.88, 5.11]	3.82 (3.52)	[2.41, 5.74]
Total Time Human LZ Observed	~	~	.33 (.28)	[.24, .43]	.20 (.23)	[.12, .27]	.26 (.21)	[.19, .33]
Total Time Animal LZ Observed	~	~	~	~	.06 (.09)	[.03, .10]	.10 (.17)	[.05, .18]

Note: CI = confidence interval

Table 1. Summary Table of Eyetracking Results

Fixation data.

The number of total fixations and total fixation duration for the four experimental photographs were assessed using a one-way ANOVA for repeated measures. In the analysis for number of fixations in each scene, Mauchly's test was not significant; therefore the assumption of sphericity was upheld. A test of within-subject effects showed no significant differences in the number of fixations for each photograph. For the total duration of fixations in each scene, Mauchly's test indicated that that the assumption of sphericity had been violated (chi-square = 13.70, $p = .018$). Degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (epsilon = 0.84). The test of within-subject effects showed no significant differences in the duration of fixations for each photograph. Overall, there were no differences in the number of participant fixations or the total duration of fixations between the four experimental photographs.

Human and animal look zone data.

For the three experimental photographs where a human was present, the number of times the human look zone was observed and the total time participants spent looking at the human look zone were assessed using a one-way ANOVA for repeated measures. For the number of times the human look zone was observed, Mauchly's test was not significant; therefore the assumption of sphericity was upheld. A test of within-subject effects showed a significant difference in the number of times participants observed the human look zone, $F(2, 74) = 7.16$, $p = .001$, $\eta_p^2 = .162$, observed power = .923. Post hoc tests revealed that participants observed the human look zone in the human-animal interaction condition significantly more than the human-animal presence condition ($p = .004$). There were no other significant differences between individual conditions. For the

total time participants spent looking at the human look zone, Mauchly's test was not significant; therefore the assumption of sphericity was upheld. A test of within-subject effects showed significant differences in the total time participants observed the human look zone, $F(2, 74) = 3.58$, $p = .033$, $\eta_p^2 = .088$, observed power = .647. Post hoc tests revealed that participants spent significantly more time looking at the human look zone in the human-only condition than in the human-animal presence condition ($p = .023$). There were no significant differences between the human-animal interaction condition and the other two conditions. See Figures 3 and 4.

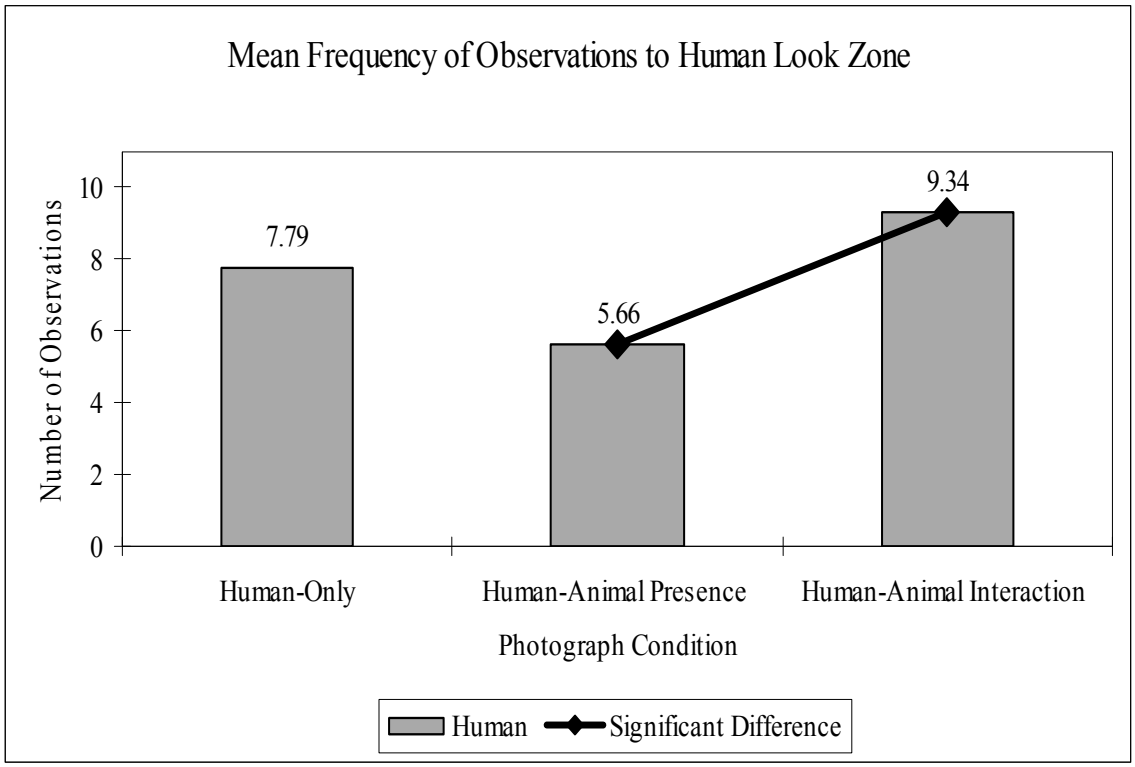

Figure 3. Mean Frequency of Observation to Human Look Zone

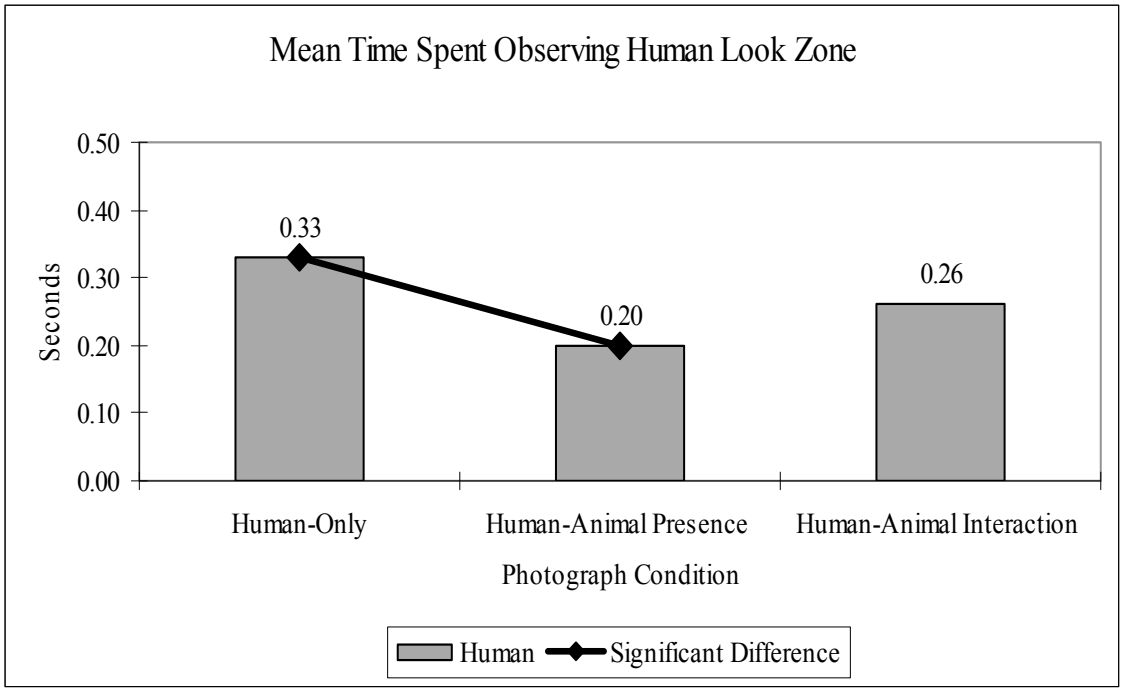

Figure 4. Mean Time Spent Observing Human Look Zone

The number of observations and total gaze duration for the animal look zone were assessed using linear regression. In the human-animal presence condition and the human-animal interaction condition, there were no significant differences between either the number of times the animal look zone was observed or the total time participants gazed at the look zone.

The following comparisons were made within the human-animal presence condition and the human-animal interaction condition using linear regression: number of observations in the human look zone compared to the animal look zone, and total time spent in the human look zone compared to the animal look zone. In the human-animal presence condition, the there were no significant differences between the human look zone and the animal look zone for number of observations or total length of observations. In the human-animal interaction condition, participants observed the human look zone significantly more than the animal look zone ($r = .36$, $p = .024$, power = .647). There was no significant difference in the length of time participants looked at the human look zone compared to the animal look zone in the human-animal interaction condition.

Finally, a regression analysis was performed to see if participant scores on the Pet Attitude Scale could predict a higher number of observations and length of time that participants observed the animal in the human-animal presence and human-animal interaction conditions. The results showed that there was no significant relationship between participant's scores on the Pet Attitude Scale and the eyetracking results for number and duration of observations of the animal look zone in either condition.

Memory Recall

A mean summary table for all memory recall data has been provided in Table 2.

N = 66

	Control		Human Only		Human-Animal Presence		Human-Animal Interaction	
Variable	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
Total Number of Objects Recalled	5.62 (.20)	[5.17, 6.08]	5.32 (.30)	[4.82, 5.82]	6.20 (.20)	[5.71, 6.69]	5.97 (.20)	[5.53, 6.41]
Order of Human in Object Recall List	~	~	2.56 (.20)	[1.60, 2.37]	1.99 (.20)	[1.60, 3.37]	2.64 (.20)	[2.16, 3.12]
Order of Animal in Object Recall List	~	~	~	~	2.29 (1.19)	[1.15, 2.23]	2.88 (1.77)	[.91, 2.73]

Note: CI = confidence interval

Table 2. Summary Table of Memory Recall Results

The total number of objects recalled for each of the four experimental photographs was assessed using a one-way ANOVA for repeated measures. Mauchly's test was not significant; therefore the assumption of sphericity was upheld. A test of within-subject effects showed significant differences in the number of objects participants recalled in each experimental photograph, $F(3, 195) = 5.45$, $p = .001$, $\eta_p^2 = .077$, observed power = .934. Post hoc tests revealed that participants recalled significantly more objects from the human-animal presence condition than the human-only condition ($p = .002$). There were no significant differences between the number of objects recalled for any of the other groups.

The order of recall for the human in the list of recalled objects was assessed using a one way ANOVA for repeated measures. Mauchly's test was not significant; therefore the assumption of sphericity was upheld. The test of within-subject effects showed significant differences in the order that participants recalled seeing a human in the experimental photograph, $F(2, 130) = 3.82$, $p = .024$, $\eta_p^2 = .055$, observed power = .685. Post hoc tests revealed that participants recalled the presence of the human significantly sooner in the human-animal presence condition than in the human-animal interaction condition ($p = .034$). There were no significant differences in the order of human recall between the human-only condition and the other two conditions when an animal was present.

The order of recall for the animal in the list of recalled objects was assessed using linear regression. The analysis showed that there was a significant difference between the order of recall for the dog in the human-animal presence condition compared to the human-animal interaction condition ($r = .310$, $p = .011$, power = .752). Participants

recalled the dog sooner in the human animal-presence condition compared to the human-animal interaction condition.

Using linear regression, a comparison was made within the human-animal presence condition and the human-animal interaction condition between the order of recall for the human and the animal in the same photograph. In the human-animal presence condition, there was a significant difference between the order of recall for the human and the animal ($r = .346$, $p = .004$, power = .844). Additionally, there was a significant difference in the order of recall between the human and the dog in the human-animal interaction condition ($r = .685$, $p < .001$, power = 1.00). In both conditions, participants recalled the human sooner than the dog. See Figure 5 for a summary of memory recall results.

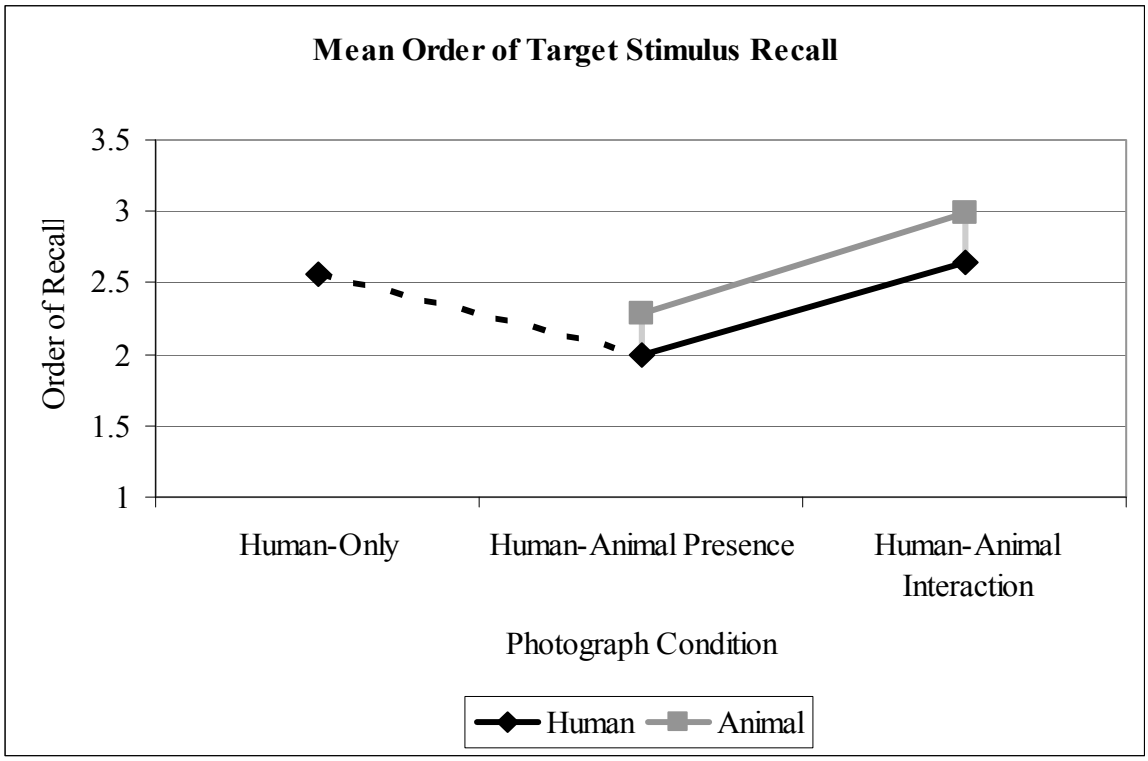

Figure 5. Mean Order of Target Stimulus Recall

Note: A solid line indicates a significant relationship at the $p < .05$ level. A dotted line indicates no significant relationship.

Finally, a regression analysis was performed to see if participants' attitudes towards animals and pet ownership were related to the order of recall for the animal in the list of recalled objects. The results showed that there was no significant relationship between participants Pet Attitude Scale scores and the eyetracking results for number or duration of observations of the animal look zone in either condition.

Impression Formation

A mean summary table for all impression data has been provided in Table 3.

N = 66

	Human Only		Human-Animal Presence		Human-Animal Interaction	
Impression	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
Aggressive	2.11 (.18)	[1.75, 2.47]	2.14 (.18)	[1.77, 2.51]	2.03 (.17)	[1.69, 2.38]
Attractive	6.70 (.15)	[6.41, 6.99]	6.27 (.19)	[5.89, 6.66]	6.86 (.16)	[6.54, 7.19]
Friendly	7.32 (.18)	[6.97, 7.67]	7.53 (.16)	[7.20, 7.86]	7.97 (.11)	[7.75, 8.19]
Happy	7.56 (.16)	[7.24, 7.89]	7.36 (.21)	[6.95, 7.77]	8.33 (.09)	[8.14, 8.52]
Healthy	7.50 (.15)	[7.21, 7.79]	7.24 (.17)	[6.9, 7.59]	7.65 (.17)	[7.41, 7.90]
Wealthy	6.94 (.14)	[6.66, 7.22]	6.65 (.15)	[6.36, 6.94]	6.96 (.16)	[6.65, 7.26]

Note: CI = confidence interval

Table 3. Summary Table of Impression Formation Results

All six impression characteristics were individually assessed using a one-way ANOVA for repeated measures. For the characteristic judgments of aggressiveness and wealth, Mauchly's test was not significant; therefore the assumption of sphericity was upheld. The test of within-subject effects was not significant; therefore there were no significant differences in participants' ratings of how aggressive or wealthy the human in any of the photographs appeared.

For friendliness ratings, Mauchly's test was not significant; therefore the assumption of sphericity was upheld. A test of within-subject effects showed significant differences in participants' ratings of friendliness for the human in the photograph, $F(2, 130) = 6.99$, $p = .001$, $\eta_p^2 = .097$, observed power = .922. Post hoc tests revealed that participants rated the human in the human-animal interaction condition as significantly more friendly than the human in the human-only condition ($p = .003$) and the human-animal presence condition ($p = .029$). There was no significant difference for ratings of friendliness between the human-only condition and the human-animal presence condition.

For ratings of attractiveness and happiness, Mauchly's test indicated that that the assumption of sphericity had been violated (chi-square = 13.98, $p = .001$ and chi-square = 6.15, $p = .046$). Degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (epsilon = 0.86 and epsilon = 0.94). Tests of within-subject effects showed significant differences in participants' ratings of attractiveness for the human in the photograph, $F(1.71, 111.21) = 8.74$, $p = .001$, $\eta_p^2 = .119$, observed power = .947. Participant's ratings of happiness for the human in the photograph also showed significant differences, $F(1.88, 122.36) = 13.69$, $p < .001$, $\eta_p^2 = .174$, observed power =

.997. Post hoc tests for attractiveness revealed that participants rated the human in the human-only condition ($p = .037$) and the human-animal interaction condition ($p = .001$) as significantly more attractive than the human-animal presence condition. There was no significant difference between the human-only and human-animal interaction condition. For happiness, participants rated the human in the human-animal interaction condition as significantly more happy than the human in the human-only condition ($p < .001$) and the human-animal presence condition ($p < .001$). There was no significant difference between ratings of happiness for the human-only condition and the human-animal presence condition.

For the health impression, Mauchly's test indicated that that the assumption of sphericity had been violated (chi-square = 16.62, $p < .001$). Degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (epsilon = 0.83). The test of within-subject effects showed a significant main effect for differences in participants' ratings of healthiness for the human in the photograph, $F(1.66, 108.14) = 3.56$, $p = .040$, $\eta_p^2 = .052$, observed power = .596. Post hoc tests revealed that there were no significant differences between individual ratings of health in each condition; however; the difference between participant ratings for the human-animal presence condition were borderline significant to the human-animal interaction condition ($p = .051$), with participant's rating the human as more healthy in the interaction condition. See Figure 6.

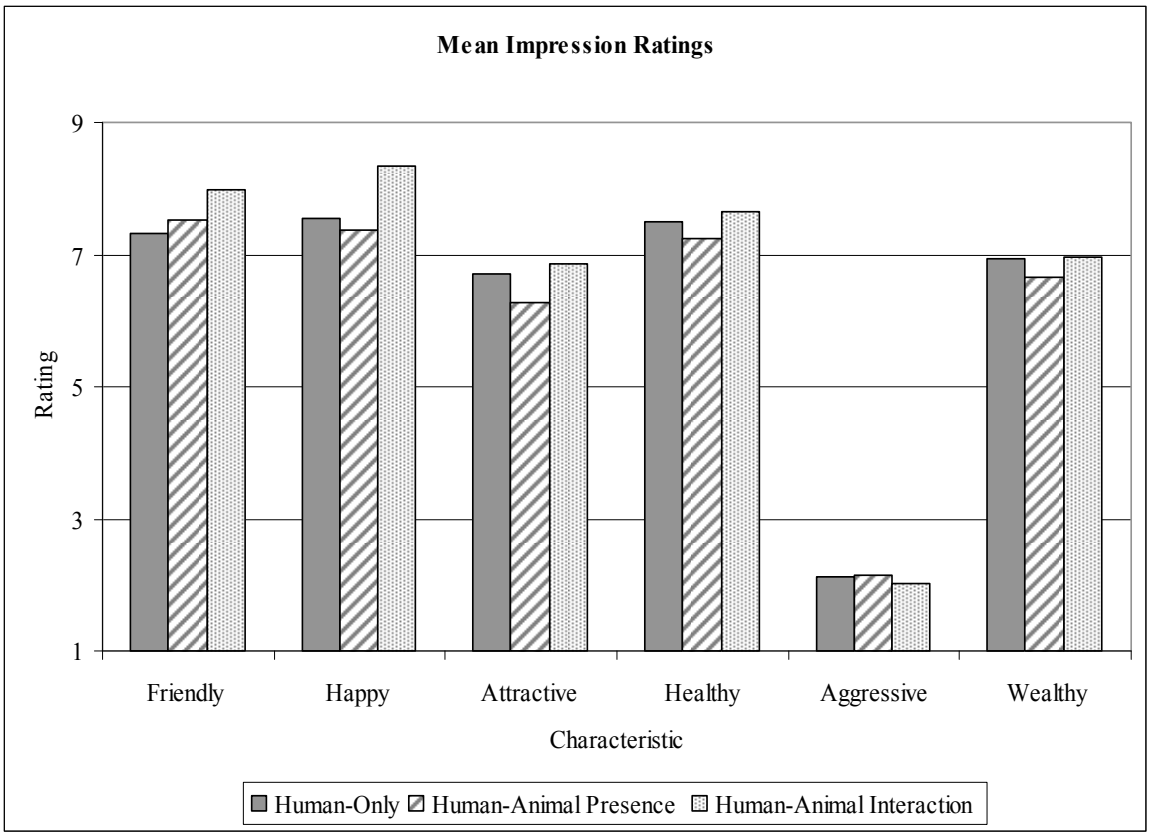

Figure 6: Mean Impression Ratings

The individual repeated measures analysis of all six impression characteristics showed significant differences in how participants rated the human in the experimental photographs. Based on similarities observed in the changes of participant's impression scores, a profile analysis was performed on all six impressions to determine if there was a similar trend in participant's ratings of the human in each of the photographic conditions. Specifically, profile analysis was used to determine if there was a significant degree of parallelism between the six impression characteristics and each experimental condition (human-only, human-animal presence, and human-animal interaction). Participant scores for aggressiveness were reverse scored so all impression characteristics would be unidirectional and represent positive impression characteristics. A 3 x 6 mixed factorial MANOVA was used to compare photograph conditions to all six impression ratings. The results of the analysis showed a significant main effect of parallelism between participant's impression ratings and the experimental photograph conditions, $F(10, 380) = 2.41$, $p = .009$, $\eta_p^2 = .06$, observed power = .942. The null hypothesis for overall profile flatness was rejected, $F(5, 191) = 327.28$, $p < .001$. See Figure 7.

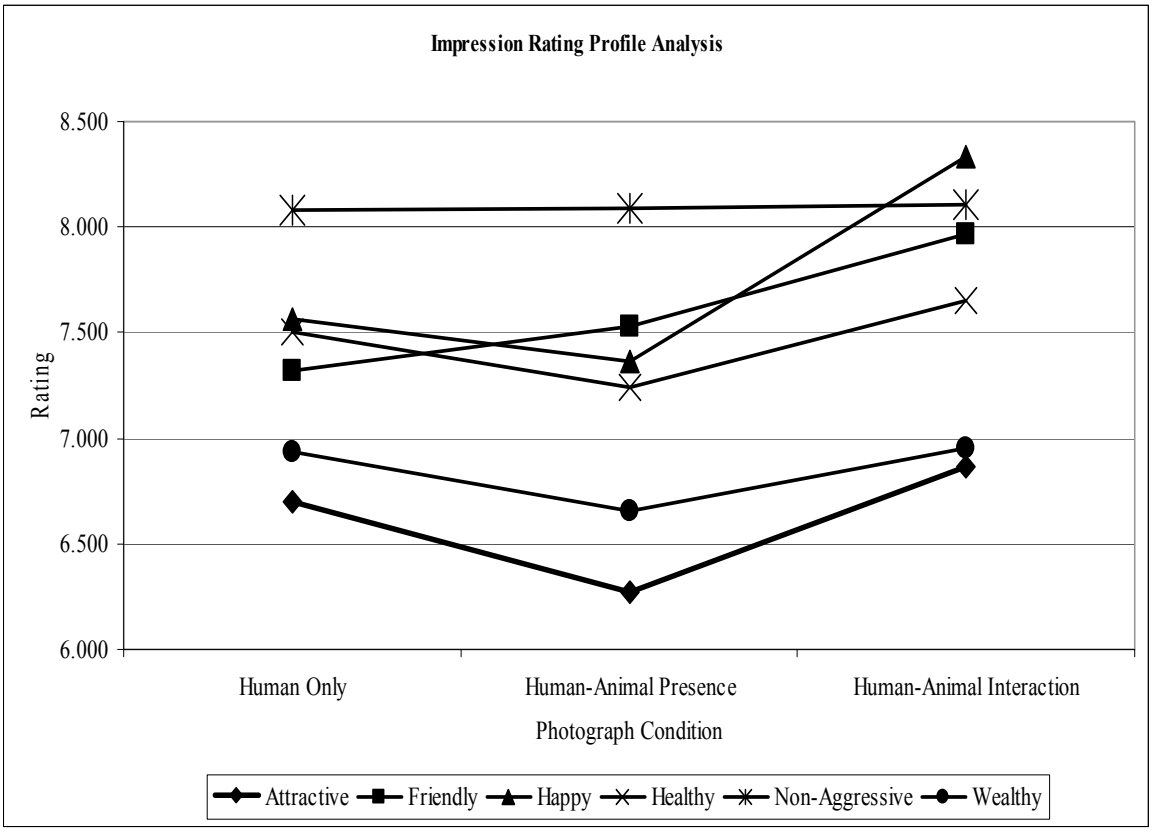

Figure 7: Impression Rating Profile Analysis

Note: Ratings for aggressiveness were reverse coded to represent a unidirectional scale that assessed positive impression characteristics.

Scales

The following scales correlated: the FES correlated positively with the IES (p = .005, r = .339); the AICS for collectivism correlated positively with the IES (p = .001, r = .393) and the FES (p = .005, r = .343); the ASM correlated positively with the IES (p = .001, r = .391) and the FES ($p < .001$, r = .479), and negatively with the NBS ($p < .001$, r = -.451). The PAS-M correlated negatively with the AICS for individualism (p = .016, r = -.295). A summary table of scale correlations has been provided in Table 4.

N = 66

Variables	1	2	3	4	5	6	7
1. Interpersonal Expectancy	~						
2. Future Expectancy	.339**	~					
3. Need to Belong	-0.061	-0.239	~				
4. AICS - Collectivism	.393**	.343**	0.191	~			
5. AICS - Individualism	-0.108	0.045	-0.189	0.001	~		
6. Pet Attitude	-0.009	-0.114	0.196	0.014	-.295*	~	
7. Attachment Style	.391**	.479**	-.451**	0.054	-0.013	-0.212	~

** Correlation is significant at the .01 level (two-tailed)

* Correlation is significant at the .05 level (two-tailed)

Table 4. Summary of Scale Correlations

Possible relationships between participant's impression ratings and research scales were examined through canonical correlation. Three canonical relationships were analyzed using all research scales on one side of the relationship and the impression ratings for the three photographic conditions where a human was present. In the human-only condition and human-animal interaction condition, no canonical relationships emerged from the dimension reduction analysis. In the human-animal interaction condition, one canonical variate emerged from six possible interactions, Rc = .657, $F(42, 252.04) = 1.50$, $p = .031$. For the research scale variables, the canonical variate was most strongly influenced by the AICS for collectivism (-.70), the IES (.55), the NBS (-.46). For the impression variables, the canonical variate was dominated by health (-.94), aggressiveness (-.60) and wealth (-.50). See Table 5 for a full list of the standardized canonical coefficients for both sets of variables.

N = 66

Scale Variable	Standardized Coefficient	Scale Variable	Standardized Coefficient
1. Interpersonal Expectancy	0.55	Aggressive	-0.60
2. Future Expectancy	0.03	Attractive	-0.03
3. Need to Belong	-0.46	Friendly	0.18
4. AICS - Collectivism	-0.72	Happy	0.33
5. AICS - Individualism	0.03	Healthy	-0.94
6. Pet Attitude	0.11	Wealthy	-0.50
7. Attachment Style	0.02		

Table 5. Standardized Coefficients for the First Dimension Canonical Correlation in the Human-Animal Presence Condition

Discussion

The role of the human-animal bond in the modern medical community depends on researchers and practitioners demonstrating a clear and practical role for this relationship in established medical methodology. The relationship between humans and animals may have various physiological, psychological, and social benefits; however, comprehension of the mechanisms that make the human-animal bond successful has been not been reliable. The current experiment represented an attempt to further indentify some of the fundamental aspects of the human-animal bond. By examining the role of attention, attitude, culture, and social expectancies in how people perceive and relate to social interactions between humans and animals, research will move closer to the overall goal of understanding of how the relationship between humans and animals works, and how it may positively impact human health and wellness.

Eyetracking and Memory Recall

According to Wilson's (1984, 1993) biophilia hypothesis, human's evolutionary heritage predispose them to attend to living objects in an environment. Part of the human ability to quickly detect the presence of animals in an environment may be rooted in the history of mankind's relationships with animals, including that of predator and prey (Barrett, 2005). Several studies have shown that humans visually attend to living objects in a scene earlier than non-living objects, and are able to distinguish intentional living agents (e.g., friendly and aggressive animals) before non-intentional living agents (e.g., plants and mushrooms) (Tipples et al., 2002; Öhman et al., 2001). Initially, this research proposed that participants would fixate more frequently and for longer durations on photographs where a human or an animal was present. However, the results from

analyzing fixation data showed no significant differences between the four photographs used in the experiment.

The lack of fixation differentiation between the photographs may have been a result of two factors: a short viewing duration and the nature of the cognitive recall task assigned to participants. Each photograph was only on screen for three seconds; therefore participants were limited in the amount of time available for scene observation. Requiring participants to perform a free recall task after viewing a scene for such a short duration of time may have influenced participant eye movements to display widespread search patterns with a reduced number of fixations. This outcome is consistent with research on the effects of cognitive task instruction on eye movements (Castelhano, Mack, & Henderson, 2009). A future test of the hypothesis that people visually fixate more frequently and for longer durations in a scene with a human and/or animal could increase the length of time the scene was visible, or remove the response task.

A significant effect appeared between the human-only photograph and the human-animal presence photograph. Overall, participants recalled the highest number of objects from the human-animal presence photograph, and the fewest from the human-only photograph. This result is interesting when taken in context with the results from the human and animal recall order. The order of recall for the human and the animal in the human-animal presence condition occurred significantly earlier than in the human-animal interaction condition. Participants remembered more objects from the human-animal presence condition and recalled the presence of the human and the dog sooner as well.

These results suggests that something about the scenario with a human and dog present, but not interacting, may have served as a catalyst for enhancing attention to the

presence of the human and the dog, as well as to overall photographic content. From an evolutionary perspective, an increase in sensitivity to the human-animal presence photograph may reflect an attempt to cognitively assess the immediate fitness impact to a human in a situation where a second intentional agent is present. Since the order of recall for the human in the human-only condition and the human-animal interaction condition were not significantly different, participants may have assessed these conditions as having a fairly equivalent situational impact for the human in the photograph. In the human-only photograph, there were no other intentional agents affecting or threatening the status of the human. In the human-animal interaction condition, the human and the dog were oriented in close proximity and appeared to be engaged in a positive social interaction. The status of the human in the photograph was unthreatened by the presence of the second intentional agent. Perception of the nature of the interaction between the human and the dog may have moderated attention levels to appear similarly to that of the human-only photograph.

In the human-animal presence photograph, the relationship between the human and the dog was more ambiguous; there was a spatial distance between the human and the dog and they did not appear to be interacting. Therefore, attention to the potential impact of an intentional agent on the status of the human in the photograph may have resulted in an increase in attentiveness to this scenario. This outcome is further supported by results that showed recall for the human occurred significantly sooner than recall for the dog within the presence and interaction conditions. This suggests that the human in each scenario was the most salient focal point, whereas the presence and interaction level of the animal acted to mediate the degree of attentional focus.

Eyetracking data was assessed for the number of times and length of total time that participants gazed at the human and the dog in each photograph. Although changes were observed in how frequently and how long participants gazed at the human in the different photographs, there were no overall gaze differences related to the dog in the either the presence or the interaction conditions. Again, this finding suggests that the human in each photograph is the primary target of attentional interest, and the presence or degree of interaction with an animal served as an attentional moderator. Regarding the differences observed in gaze towards the human, participants observed the human in the interaction condition significantly more often than the presence condition, and spent significantly more time looking at the human in the human-only condition than the presence condition. Overall, the human in the human-animal presence condition was observed the least often and for the least amount of time, while there were no overall differences between the human-only and human-animal interaction conditions.

Although the mere presence of an animal may have sharpened participant focus and attention to the status of the human in the human-animal presence condition, the eyetracking data shows that participants visually observed the human in this condition the least. In context with the interpretation of the memory results, this finding suggests that participants may have required additional or different cognitive resources to assess the human's situation in the human-only and human-animal interaction condition than the human-animal presence condition. If the level of interaction between the human and the dog served to sharpen attentional focus in the human-animal presence condition, then participants may have required less time to make a cognitive assessment about the scenario. Conversely, in the human-only and human-animal interaction conditions,

participants may have required more time and a greater number of observations to assess the scenario using different cues. For example, participants may have used more time to assess the person's facial expressions and body language in the human-only condition, whereas a greater number of gaze observations may have been required to make a judgment about the social interaction occurring between the human and the animal in the human-animal interaction condition.

Another contributing factor to the outcomes observed from the memory recall and eyetracking data involves differences in a human's ability to recognize visual scenes based on central or peripheral vision. Larson and Loschky (2009) conducted a study to examine whether people were able to recognize the gist of a visual scene more quickly based on central attention (central fixation with greater visual acuity), or peripheral vision (lower spatial frequencies). "Scene gist recognition is important because it activates scene schemas which affect later critical cognitive processes, such as directing attention within a scene" (Larson & Loschky, 2009, p. 1). The results from their study showed that peripheral vision was more useful for maximal scene gist comprehension than central vision. These results have implications for the current research, as the spatial distance between the human and the animal in the human-animal presence condition may have placed the target stimuli in a peripheral position; thus, less time and observations were required to make a determination about the scene. Future testing of the differences between how people attend to humans and animals at various levels of interaction should manipulate spatial orientation of the human and animal to include different interactions and varying visual points in a scene.

One final outcome that arose from the analysis of the eyetracking and memory recall data involved the relationship between participants' gaze and memory with their attitudes towards animals and pet ownership. Research has shown that people's physiological and psychological responses to animals and pets may be influenced by their pre-existing attitudes towards animals (Friedmann et al, 1983, 1990). The results from this experiment showed no significant relationship between participants' attitudes towards pets and any of the behavioral or memory measures employed in this experiment. As the current tools available for measuring human attitudes towards animals and pets are somewhat limited, future research would benefit from the development of different assessment scales that may assist in evaluating the human-animal bond's underlying factors.

Impression Formation

Research has shown that people rate other humans as having more positive characteristics and being more socially approachable when they are observed in the presence of animals (Lockwood, 1983; Rossbach & Wilson, 1992; Messent, 1982; McNicholas & Collis, 2000); therefore, the goal for many practitioners who use animal-assisted therapy is to use the presence of an animal as a catalyst to encourage and maintain positive social interactions. One issue that has not been clearly defined is whether the positive perception of people interacting with animals is a function of observing a social interaction between a human and an animal, or if the positive perceptions are based on the mere presence of an animal.

After comparing participants' ratings for the human in each of the photographs, the impression formation task was anticipated to show that the human in the human-

animal interaction condition would be rated the most positive, followed by the human in the human-animal presence condition. The human in the human-only condition was expected to receive the lowest impression ratings. To this effect, the human in the interaction condition received more positive ratings than the human in the presence condition and the human-only condition for the characteristics of happiness and friendliness. The human in the interaction condition was also rated more attractive and healthy than the presence condition; however, there were no significant differences between the human-animal interaction condition and the human-only condition for the characteristic of attractiveness. The impression rating for health was marginal, with the human in the interaction condition being rated slightly healthier than the presence condition. Although the ratings for aggressiveness and wealth were non-significant, an overall comparison of means showed that the human in the human-animal interaction condition received the most positive average rating for all six impression characteristics.

The results from the impression analysis supports that a human observed interacting with an animal may be viewed as more positive and socially approachable; however, a review of the impression scores shows an interesting phenomenon. While the average rating for the human in the interaction condition was consistently the most positive, the rating for the human in the human-animal presence condition was the least positive for five out of six characteristics (excluding friendliness). The profile analysis conducted to determine if this overall trend was significant indicated that there was a significant parallel pattern in impression rating scores. People may form more positive impressions about others when they are seen interacting with an animal, but people who

are perceived to be in the presence of an animal and not interacting with it may be judged in an overall less positive light.

The difference between how people rated the human when they were interacting with an animal compared to when an animal was merely present raises several questions. Foremost is whether the positive impression ratings are directly related to the perception of the interaction with the animal or some other underlying elements. For example, the positive ratings in the interaction condition may be related to a person's perception of the human in the photograph engaging in a positive social interaction, not just an interaction with an animal. If so, an image of two people interacting with one another in a positive fashion may also elicit a similar response. Additionally, the lower impression ratings observed in the human-animal presence condition may be a function of observation time or spatial distance between the human and the animal. The impression formation task from the current research should be replicated to include increased visual exposure to the photographs and controlled variations in the perceived distance between the human and the animal in the photograph. A variety of animal species should also be incorporated into future testing to control for possible underlying anthropomorphic associations (e.g., Chartrand et al., 2008) and species effects.

Scales

The purpose of incorporating the set of research scales used in this experiment was to further determine the possible role of individual differences in attitude, culture, and social expectancy in the relationship between humans and animals. A test of the relationships between all scales showed the expected scale correlations (future expectancies to interpersonal expectancies; attachment style to need to belong), as well as

a few unexpected relationships. Research scale correlations showed that a more secure attachment style was related to a lower need to belong to social groups and positive expectancies about one's self and others. A tendency to demonstrate collectivistic oriented behaviors (e.g. advice seeking and maintaining group harmony) was also related to more positive expectancies about one's self and others. Finally, a more positive attitude towards animals and pet ownership was related to a lower frequency of individualistic behaviors (e.g., responsibility, independence, and competitiveness).

The relationship between the research scales demonstrates the interrelated quality of the factors that may be influencing human behavior in any given situation. Therefore, the effects of these variables were assessed as a whole to see if any particular combination of underlying social behaviors might be related to participant's ratings of the human in each of the photographic conditions. For example, participants who have a more positive social orientation towards other people may have a higher baseline for rating the human in the experimental photographs than participants who have a less optimistic social orientation towards others.

The canonical correlation of experiment scales to impression ratings produced mixed results. For the human-only condition and the human-animal interaction condition, the dimension reduction analysis of all variables showed no significant interactions. In the human-animal presence condition, however, a single canonical variate emerged. In this case, the scale variables that contributed the most to the canonical variate was frequency of collectivistic behaviors, degree of optimism towards others, and the need to belong to a social group. For the impression variables, the canonical variate was most influenced by health, aggressiveness, and wealth. People's underlying attitudes and

experiences may play a role in how humans relate to the presence of animals (particularly the mere presence of animals); however, this relationship appears to be more complex that initially believed and could not be adequately analyzed using the current research design. Further analysis using a different research methodology may provide additional understanding of how human attitudes, culture, and social expectancies are involved in human perception of the human-animal bond.

Conclusion

There may be notable differences between how people attend to and perceive humans and animals when they are engaged in difference levels of social interaction. Specifically, people appear to be sensitive to the degree of social interaction between humans and animals, particularly when an animal is merely present with a human, compared to when a human and an animal are interacting. A multidisciplinary approach was employed to evaluate the underlying reasons for the observed results. Evolutionary influences, differences in visual processing, social judgments, and individual differences may have each combined to affect the outcome of this experiment. Therefore, the Biopsychosocial approach appears to have been appropriate for interpreting research results. The findings from this study have generated several additional research questions that, once explored, will contribute to the scientific community's overall understanding of the human-animal bond.

Currently, the human-animal bond has a tentative foothold in modern medical practice as an alternative therapeutic strategy; however, additional research is necessary before animal-assisted intervention strategies can be safely and effectively integrated into mainstream human health practices. As our understanding of the effects and benefits of the human-animal bond advances, a more diverse acceptance of animal-assisted intervention strategies may emerge. In order for this to occur, science must continue to explore how and why the underlying mechanisms of the human-animal bond influence humans on every level; biological, psychological, and social alike.

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Appendix A

Research Condition Logic Statement

Four Experimental Conditions: 1 (control), 2 (human only), 3 (human-animal presence), 4 (human-animal interaction)

1	1	2	3	4	=IF(A1=B1,"No",IF(A1=C1,"No",IF(A1=D1,"No",IF(B1=C1,"No", IF(B1=D1,"No",IF(C1=D1,"No","Yes"))))))
2	1	2	4	3	=IF(A2=B2,"No",IF(A2=C2,"No",IF(A2=D2,"No",IF(B2=C2,"No", IF(B2=D2,"No",IF(C2=D2,"No","Yes"))))))
3	1	3	2	4	=IF(A3=B3,"No",IF(A3=C3,"No",IF(A3=D3,"No",IF(B3=C3,"No", IF(B3=D3,"No",IF(C3=D3,"No","Yes"))))))
4	1	3	4	2	=IF(A4=B4,"No",IF(A4=C4,"No",IF(A4=D4,"No",IF(B4=C4,"No", IF(B4=D4,"No",IF(C4=D4,"No","Yes"))))))
5	1	4	2	3	=IF(A5=B5,"No",IF(A5=C5,"No",IF(A5=D5,"No",IF(B5=C5,"No", IF(B5=D5,"No",IF(C5=D5,"No","Yes"))))))
6	1	4	3	2	=IF(A6=B6,"No",IF(A6=C6,"No",IF(A6=D6,"No",IF(B6=C6,"No", IF(B6=D6,"No",IF(C6=D6,"No","Yes"))))))
7	2	1	3	4	=IF(A7=B7,"No",IF(A7=C7,"No",IF(A7=D7,"No",IF(B7=C7,"No", IF(B7=D7,"No",IF(C7=D7,"No","Yes"))))))
8	2	1	4	3	=IF(A8=B8,"No",IF(A8=C8,"No",IF(A8=D8,"No",IF(B8=C8,"No", IF(B8=D8,"No",IF(C8=D8,"No","Yes"))))))
9	2	3	1	4	=IF(A9=B9,"No",IF(A9=C9,"No",IF(A9=D9,"No",IF(B9=C9,"No", IF(B9=D9,"No",IF(C9=D9,"No","Yes"))))))
10	2	3	4	1	=IF(A10=B10,"No",IF(A10=C10,"No",IF(A10=D10,"No", IF(B10=C10,"No",IF(B10=D10,"No",IF(C10=D10,"No","Yes"))))))
11	2	4	1	3	=IF(A11=B11,"No",IF(A11=C11,"No",IF(A11=D11,"No" ,IF(B11=C11,"No",IF(B11=D11,"No",IF(C11=D11,"No","Yes"))))))
12	2	4	3	1	=IF(A12=B12,"No",IF(A12=C12,"No",IF(A12=D12,"No" ,IF(B12=C12,"No",IF(B12=D12,"No",IF(C12=D12,"No","Yes"))))))
13	3	1	2	4	=IF(A13=B13,"No",IF(A13=C13,"No",IF(A13=D13,"No" ,IF(B13=C13,"No",IF(B13=D13,"No",IF(C13=D13,"No","Yes"))))))
14	3	1	4	2	=IF(A14=B14,"No",IF(A14=C14,"No",IF(A14=D14,"No" ,IF(B14=C14,"No",IF(B14=D14,"No",IF(C14=D14,"No","Yes"))))))
15	3	2	1	4	=IF(A15=B15,"No",IF(A15=C15,"No",IF(A15=D15,"No" ,IF(B15=C15,"No",IF(B15=D15,"No",IF(C15=D15,"No","Yes"))))))
16	3	2	4	1	=IF(A16=B16,"No",IF(A16=C16,"No",IF(A16=D16,"No" ,IF(B16=C16,"No",IF(B16=D16,"No",IF(C16=D16,"No","Yes"))))))
17	3	4	1	2	=IF(A17=B17,"No",IF(A17=C17,"No",IF(A17=D17,"No" ,IF(B17=C17,"No",IF(B17=D17,"No",IF(C17=D17,"No","Yes"))))))
18	3	4	2	1	=IF(A18=B18,"No",IF(A18=C18,"No",IF(A18=D18,"No" ,IF(B18=C18,"No",IF(B18=D18,"No",IF(C18=D18,"No","Yes"))))))
19	4	1	2	3	=IF(A19=B19,"No",IF(A19=C19,"No",IF(A19=D19,"No" ,IF(B19=C19,"No",IF(B19=D19,"No",IF(C19=D19,"No","Yes"))))))
20	4	1	3	2	=IF(A20=B20,"No",IF(A20=C20,"No",IF(A20=D20,"No" ,IF(B20=C20,"No",IF(B20=D20,"No",IF(C20=D20,"No","Yes"))))))

21	4	2	1	3	=IF(A21=B21,"No",IF(A21=C21,"No",IF(A21=D21,"No" ,IF(B21=C21,"No",IF(B21=D21,"No",IF(C21=D21,"No","Yes"))))))
22	4	2	3	1	=IF(A22=B22,"No",IF(A22=C22,"No",IF(A22=D22,"No" ,IF(B22=C22,"No",IF(B22=D22,"No",IF(C22=D22,"No","Yes"))))))
23	4	3	1	2	=IF(A23=B23,"No",IF(A23=C23,"No",IF(A23=D23,"No" ,IF(B23=C23,"No",IF(B23=D23,"No",IF(C23=D23,"No","Yes"))))))
24	4	3	2	1	=IF(A24=B24,"No",IF(A24=C24,"No",IF(A24=D24,"No" ,IF(B24=C24,"No",IF(B24=D24,"No",IF(C24=D24,"No","Yes"))))))

Appendix B

Demographic Questionnaire

Instructions: Please respond to each of the following questions by either selecting the appropriate answer or typing you answer in the space provided.

1. What is your date of birth? Please enter your response in a month, day, and year format. For example, if your date of birth was January 3rd, 1985, you response would be 01/03/1985.
2. What is your gender?
    a. Male
    b. Female
3. Which of these best describes your ethnic background? If you are multi-racial, please indicate the group with whom you identify the most.
    a. American Indian or Alaskan Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. Native Hawaiian or other Pacific Islander
    f. White or Caucasian
    g. Other
4. Were you born in the United States? (If yes, skip to question #7)
5. What country were you born in?
6. What year did you come to the United States?
7. Is English your first language? (If yes, skip to question #9)
8. What is your first spoken language?
9. What is your most recent marital status?
    a. Single, never been married
    b. Single, living with a significant other
    c. Married
    d. Separated
    e. Divorced
    f. Widowed
10. What is your sexual orientation?
    a. Exclusively heterosexual/straight
    b. Exclusively homosexual/gay/lesbian
    c. Bisexual
    d. None of these options accurately describe my sexual orientation
11. What is the highest degree of education completed by your father?
    a. No high school
    b. Some high school, no degree
    c. High school diploma or GED
    d. Vocational or trade school
    e. Some college, no degree
    f. Two year associates degree, including nursing or teaching certification

g. Four year degree
h. Masters Degree
i. Doctoral Degree
j. Unknown

12. What is the highest degree of education completed by your mother?
    a. No high school
    b. Some high school, no degree
    c. High school diploma or GED
    d. Vocational or trade school
    e. Some college, no degree
    f. Two year associates degree, including nursing or teaching certification
    g. Four year degree
    h. Masters Degree
    i. Doctoral Degree
    j. Unknown
13. What is your current academic classification by credit hour?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate Student
    f. Special
14. What year of college is this for you?
    a. 1st
    b. 2nd
    c. 3rd
    d. 4th
    e. 5th or more

Appendix C

Pet Attitude Scale – Modified, PAS-M (Templer et al., 1981; Munsell et al., 2004)

Instructions: Please answer by selecting one of the following numbers for each question.

1 – Strongly Disagree
2 – Moderately Disagree
3 – Slightly Disagree
4 – Unsure
5 – Slightly Agree
6 – Moderately Agree
7 – Strongly Agree

1. I really like seeing pets enjoy their food.
2. My pet means more to me than any of my friends (or would if I had one).
3. I would like to have a pet in my home.
4. Having pets is a waste of money.
5. House pets add happiness to my life (or would if I had one).
6. I feel that pets should always be kept outside.
7. I spend time every day playing with my pet (or would is I had one).
8. I have occasionally communicated with my pet and understood what it was trying to express (or would if I had one).
9. The world would be a better place if people would stop spending so much time caring for their pets and started caring more for other human beings instead.
10. I like to feed animals out of my hand.
11. I love pets.
12. Animals belong in the wild or in zoos, but not in the home.
13. If you keep pets in the house you can expect a lot of damage to furniture.
14. I like house pets.
15. Pets are fun but it's not worth the trouble of owning one.
16. I frequently talk to my pets (or would if I had one).
17. I hate animals.
18. You should treat your house pet with as much respect as you would a human member of your family.

Appendix D

Attachment Style Measure (Guerrero, 1996)

Please answer the following questions by selecting the number next to the number that best represents your answer.

1- Strongly Disagree
2- Moderately Disagree
3- Somewhat Disagree
4- Neither Agree nor Disagree
5- Somewhat Agree
6- Moderately Agree
7- Strongly Agree

1. I find it easy to trust others.
2. I feel uncomfortable when people get close to me.
3. I feel uneasy getting close to others.
4. I prefer to keep to myself.
5. I worry about people getting close to me.
6. I tend to avoid getting close to others.
7. I find it relatively easy to get close to others.
8. I sometimes worry that I do not really fit in with other people
9. I sometimes worry that I do not measure up to other people.
10. I am confident that other people will like and respect me.
11. I worry that others will reject me.
12. I am confident that others will accept me.
13. Intimate relationships are the most central part of my life.
14. I feel a very strong need to have close relationships.
15. Sometimes others seem reluctant to get as close to me as I would like.
16. I worry a lot about the well-being of my relationships.
17. I worry that others do not care about me as much as I care about them.
18. I wonder how I would cope without someone to love me.
19. I rarely worry about what relational partners think of me.
20. I sometimes worry that relational partners will leave me.
21. I would like to trust others, but I have a hard time doing so.
22. I worry about getting hurt if I allow myself to get too close to others.
23. I would like to depend on others, but it makes me nervous to do so.
24. I would like to have closer relationships, but getting close makes me uneasy.
25. I worry that I might get hurt if I get too close to others.
26. Achieving things is more important to me than building relationships.
27. If something needs to be done, I prefer to rely on myself rather than others.
28. I put more time and energy into my relationships than I put into other activities.
29. Maintaining good relationships is always my top priority.
30. Pleasing myself is more important to me than getting along with others.

Appendix E

Auckland Individualism and Collectivism Scale (AICS) (Shulruf et al., 2003)

Instructions: Please answer by selecting one of the following numbers for each question.

Never or almost never 1 2 3 4 5 6 Always

1. I discuss job or study-related problems with my parents.
2. I consult my family before making important decisions.
3. Before taking a major trip, I consult with most members of my family and many friends.
4. It is important to consult close friends and get their ideas before making a decision.
5. Even when I strongly disagree with my group members, I avoid an argument.
6. I hate to disagree with others in my group.
7. It is important to make a good impression on one's manager.
8. In interacting with superiors, I am always polite.
9. It is important to consider the needs of those who work above me.
10. I sacrifice my self-interest for the benefit of my group.
11. I reveal personal things about myself.
12. I have the feeling that my relationships with other are more important than my own accomplishments.
13. I like to live close to my good friends.
14. To me, pleasure is spending time with my superiors.
15. To me, pleasure is spending time with others.
16. I help acquaintances, even if it is inconvenient.
17. I define myself as a competitive person.
18. I enjoy working in situations involving competition with others.
19. Without competition, it is not possible to have a good society.
20. Competition is the law of nature.
21. I consider myself as a unique person separate from others.
22. I enjoy being unique and different from others.
23. I see myself as "my own person".
24. I take responsibility for my own actions.
25. It is important for me to act as an independent person.
26. Being able to take care of myself is a primary concern for me.
27. I consult with my supervisor on work-related matters.
28. I prefer to be self-reliant rather than depend on others.
29. It is my duty to take care of my family even when I have to sacrifice what I want.
30. When faced with a difficult personal problem, it is better to decide for myself, than follow the advice of others.

Appendix F

Future Events Scale (Anderson, 1990)

For each of the following items, please select the number that best represents how likely you think the event will happen to you at some point in your life.

Extremely Unlikely -5 -4 -3 -2 -1 0 1 2 3 4 5 Extremely Likely

1. To be stuck in a boring and unfulfilling job.
2. To have enough money to satisfy all my desires.
3. To be very lonely when I am old.
4. To have the recognition of many of my colleagues.
5. To regret a decision I have made in my life.
6. To live the lifestyle I have always dreamed of.
7. To divorce or experience the death of a mate.
8. To contract a fatal disease.
9. To have what I consider to be the perfect job.
10. To be institutionalized (e.g. prison or asylum) in the next 20 years.
11. To achieve my goals during my life.
12. To live a sexually fulfilled life.
13. To be satisfied with many of the major decisions I have made during my life.
14. To feel that I have made no contribution to others or society within my life time.
15. To lose my mental facilities when I am older.
16. To experience a great financial loss.
17. To be able to live in the home (in the location) I have always dreamed of.
18. To be able to come successfully even when under a great deal of pressure from my job.
19. To work with people that I do not like.
20. To win the lottery.
21. To retire at the age of 40 and do all the things I would like to do.
22. To have a loved one die in the next year.
23. To enjoy doing some of the things I would like to do in the next ten or fifteen years.
24. To be responsible for someone's physical or emotional suffering.
25. To live a healthy and active life until the end of my life.
26. To experience unhappiness with my relationships for several years.

Appendix G

Interpersonal Expectancy Scale (Mather et al., 2005)

Please answer the following questions by selecting the number next to the number that best represents your answer.

1- Strongly Disagree
2- Moderately Disagree
3- Somewhat Disagree
4- Somewhat Agree
5- Moderately Agree
6- Strongly Agree

1. Most people will live a healthy and active life.
2. Few people are capable of true compassion.
3. When I meet people, I usually expect that they will be friendly.
4. People are often insensitive to the needs of others.
5. People will usually treat others with respect.
6. People will generally help others in need.
7. People typically have good intentions towards others.
8. Most people will do whatever they can to avoid hard work.
9. If people can mess things up, they generally will.
10. Most people will cheat to get ahead.
11. People can be trusted.
12. Most people live by the "golden rule" (treat others as you would like to be treated).
13. Most people will live the lifestyle they have always wanted.
14. People will often tell lies if they can get away with it.
15. People cannot be relied on to keep their promises.
16. Most people will strive to be fair.
17. Most people will blame others for things that go wrong.
18. People have trouble being faithful to others.
19. People are generally capable of achieving their goals.
20. I expect most people I meet to be bright, intelligent individuals.
21. Most people will take advantage of others if they get the chance.
22. Most people will deliberately say or do things to hurt you.
23. Most people do not really care what happens to others.
24. Most people are likely to succeed in reaching their goals.

Appendix H

Need to Belong Scale (Leary et al., 2007)

Please answer the following questions by selecting the number next to the statement that best represents your answer.

1- Strongly Disagree
2- Moderately Disagree
3- Neither agree not disagree
4- Moderately Agree
5- Strongly Agree

1. If other people don't seem to accept me, I don't let it bother me.
2. I try hard not to do things that will make other people avoid or reject me.
3. I seldom worry about whether other people care about me.
4. I need to feel that there are people I can turn to in times of need.
5. I want other people to accept me.
6. I do not like being alone.
7. Being apart from my friends for long periods of time does not bother me.
8. I have a strong need to belong.
9. It bothers me a great deal when I am not included in other people's plans.
10. My feelings are easily hurt when I feel that others do not accept me.

Appendix I

Experiment Protocol

1. Introduction
    1.1. Greetings and researcher introductions
    1.2. The study that you will be participating in is designed to evaluate how cross-cultural attention, attitude, and social expectancies influence individual decisions in social situations. There will be two parts to the study: an eye tracking portion and a question-and-answer portion. The whole experiment will take approximately 90 minutes and you will be awarded two SONA research credits for your participation. Please take a moment to review the informed consent forms that have been provided to you. Sign one copy and return it. You may keep the second copy for your records.
    1.3. Allow for time to complete informed consent forms
    1.4. If at any time during the course of the experiment you become uncomfortable and no longer wish to participate, please inform the researcher and the experiment will be stopped immediately. If you choose to withdraw before the study is complete, you will not be penalized and you will be awarded SONA credit based on the length of time you did participate. Do you have any questions before we proceed to the eye-tracking portion of the study?
    1.5. Please silence any cell phones or communication devices for the duration of the experiment.
2. Participant ID number and Condition Assignment

2.1. Open the experiment running book to the Participant Number Assignment Sheet and assign the participant an ID number. Record it on the assignment sheet

2.2. Turn to the Condition Assignment Sheet and assign the participant to a condition based on the criteria outlined on the condition assignment sheet. Record the participant's ID number next to their assigned condition.

2.3. At the Participant Work Station, locate the experiment that corresponds to the condition number assigned to the participant. Double click the experiment to load it, but do not start the experiment yet.

2.4. Prepare the researcher data collection sheet by adding the participants experiment ID number and condition number to the data collection sheet.

3. Experiment Description

3.1. Bring participant into the eye tracker lab and have them sit in the participant chair. Close the door.

3.2. The first portion of the experiment will take approximately 45 minutes. We will be using the GazeTracker eye analysis system to observe and track your eye movements across a series of photographs. This system uses light sensors to lock on to your pupil and cornea and records eye motions as you look at photographs on the computer screen. This is not harmful to you and you will not feel any discomfort from this process. In order to proceed with the experiment, we will first calibrate the eye tracker to your eye. If you require the use of glasses or contacts to view the on-screen photographs, please be sure that they are comfortably in place at this time.

3.3. During the experiment, you will view a series of photographs. Each photograph contains a scene that may have several living or nonliving objects in it. The photographs will only be visible for a few seconds. Please examine each photograph carefully, because you are going to complete two tasks following the presentation of each photograph. The first task is a memory task; the second task is an impression formation task.

3.3.1.1. Memory task: As you look at each photograph, try to remember as many objects from that photo as you can. After each photograph is removed from the screen, you will be asked to remember as many objects as possible from the photograph you just saw. It doesn't matter how many objects you remember or what order you remember them in, just do your best to accurately recall as many objects as possible. You will say each object aloud and I will record your responses. The reason you are responding verbally is so you do not have to look away from the computer screen. It is important that even while you are answering questions about the images you see, you continue to look at the computer screen. This will keep the eye tracker calibrated and make sure that the information we are collecting about your eye movements is accurate.

3.3.1.2.Impression formation task: In some of the photographs you see, there may be a person present. If there is a person present in a photograph, you will be asked a series of questions immediately following the memory task. These questions will ask you to rate your impression of

that person based on a set of characteristics. For example, I might ask you to rate how intelligent the person in the photograph appears. Each question will appear on the monitor with a scale of possible responses (e.g., 1 = not at all intelligent and 9 = very intelligent). You will say the number aloud that best represents your impression of the person you saw, and I will record your response. There are no right or wrong answers, only your impressions, and your responses will be kept confidential. Do you have any questions?

4. Eye Tracker

4.1. Orientation

4.1.1. Seat the participant on the stool in front of the eye tracker. Make sure the stool is all the way back against the wall. Give them the wireless remote.

4.1.2. Please hold on to the mouse, as you will need it later on in the experiment.

4.2. Calibration

4.2.1. Have the participant face the eye tracking system and adjust the height of the stool so that the participant's eye level is just above the top of the eye tracking device.

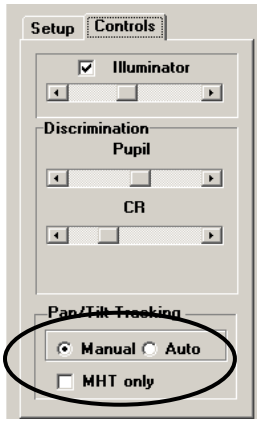
4.2.2. Turn out the lights.

4.2.3. We are going to calibrate the eye tracker now. Please remain seated on the stool and face the eye tracker and computer monitor. Also, please make sure that you are all the way back against the wall and seated in a posture that is comfortable for you to continue to gaze forward at the computer screen. It is very important to remain as still as possible. Once we have calibrated the eye

tracker, any major head and body movements may influence how light is being reflected off of your eye and can influence the eye movement recordings. If your eyes begin to feel tired, you may close and rest your eyes; however, please try to keep your head and body in the same position during this part of the experiment.

4.2.4. Using the system remote, orient the eye tracker until you have a clear view of the participant's left eye on the research work station monitor (eye should be center with the edge of the nose on the left side of the screen).

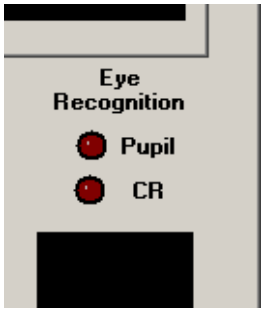
4.2.5. Once you have a clear view of the participant's left eye, switch the eye tracker from **Manual** tracking to **Auto** Tracking



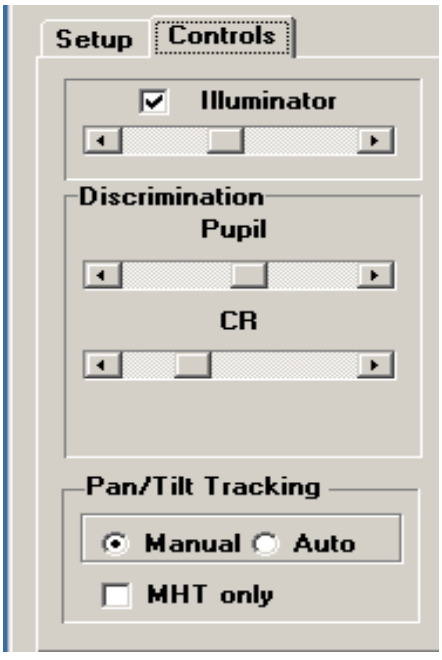
4.2.6. At the Participant work station, click the RECORD button in the upper left corner of the screen. Click START to initiate the trial and pull up the calibration screen. Make sure you move the mouse cursor off the screen using the corded mouse (the participant will be holding the wireless mouse).

4.2.7. The image that you see on screen is going to help me calibrate the eye tracker. Please look at the screen while I adjust the eye tracker settings. This may take a few moments, so please be patient and remain as still as possible.

4.2.8. Lock on to the participants Pupil and Cornea using the eye tracker controls. A good lock is represented by green lights next to the Pupil and CR icons under EYE RECOGNITION and the appearance two cross-hairs on the top white monitor that shows the participants left eye (one will be white and the other black)



4.2.9. In order to lock on to the pupil and cornea, first make adjustments to the Illuminator. If a suitable lock cannot be made with the Illuminator alone, make adjustments to the discrimination of the Pupil and CR. **All adjustments must be manually recorded so that the eye tracker can be returned to baseline at the completion of the experiment.**



4.2.10. If you have trouble locking on even after making several adjustments, try having the participant close their eyes for a moment and then open them. Also, you can try adjusting the height of the stool to get a better angle, or shifting their stool to the left or right.

4.2.11. Once you have a good lock on the participant's eye, begin the calibration. Click on the CALIBRATE tab at the top of the control program and select EYE CALIBRATION. This will pull up a screen that says GET CALIBRATION DATA

4.2.12. Now that the eye tracker is locked on to your eye, we can calibrate the machine to your individual eye movements. On the computer monitor in front of you is a screen with nine numbers. When I call out a number, please look at that number.

4.2.13. Call out the nine numbers in numerical order and click the STORE DATA FOR CURRENT POINT button as soon as you say each number. Once you have calibrated each number, call out the nine numbers again in a random order and reference the top white research monitor to see if the calibration is accurate. A cross-hair should appear on top of each number as the participant looks at it. If any of the numbers did not calibrate, recalibrate them.

5. Experimental Task – Instructions and Sample Photograph

5.1. Once the calibration is complete, use the wireless keyboard to advance to the title screen of the experiment (pressing the space bar).

5.2. On screen, you are going to see several slides with instructions describing the tasks for this experiment. I will go through all of the instructions with you. If you have any questions as we go through the instructions, please feel free to ask them; however, please remember to sit still and continue to gaze at the computer monitor.

5.3. Advance through the slides using the wireless keyboard. Read all instructions aloud and answer any participant questions.

5.4. Perform sample memory and recall tasks

5.5. Make any necessary corrections to participant responses based on orientation task performance.

6. Experimental Task – Experimental Photograph Conditions

6.1.1. What questions do you have before we proceed with the recorded portion of the experiment? (*Answer any questions*).

6.1.2. Remember, please stay as still as possible while you are viewing the images in the experiment. When you are ready to begin, please click the mouse in your hand.

6.1.3. Proceed with experimental conditions recording all participant responses on the researcher data collection sheet.

6.1.4. Once the participant has completed the eye tracking portion of the experiment, save their data. You will be prompted by GazeTracker to enter the participant's social security number and name. ***DO NOT ENTER ANY OF THE PARTICIPANTS PERSONAL INFORMATION.*** When you are prompted to enter the participants SSN, use the participant ID assigned to

them at the beginning of the experiment. For example, for participant #101, you would enter 101-00-0000. Do not enter any name information.

7. Social Questionnaires

7.1. You have successfully completed the eye tracking portion of this experiment. Are you ready to proceed with the second half of the experiment?

7.2. Allow the participant to take a break if they request to rest their eyes of use personal facilities.

7.3. We will go to the computer lab for the second part of the experiment. This part of the experiment will consist of a series of question and answer surveys and will last approximately 30 minutes. Instructions on how to fill out each questionnaire will be provided on screen. Please follow all on-screen directions and answer each question truthfully and to the best of your ability. Once you are finished, please exit the computer lab and return to sit in one the chairs just outside of EDU 307N. At that time, you will be provided with some final instructions about the experiment. If the door to 307N is shut when you return, that means I am working on the eye tracker and I will be with you in a few minutes. Do you have any questions before you begin the second phase of the experiment?

7.4. Once the participant is ready to move on to the next portion of the experiment, take them to the computer lab that will be used for all survey data collection. The computer should already be set up with MediaLab.

7.4.1. Under FILE, choose “Select and run an experiment”. Then select Desktop/My Documents/Mather/shoemakeHAB

7.5. You will be prompted to enter the participants ID number and condition. Enter the participants ID number, however, do not enter the condition number that was previously used for the eye tracking portion of the experiment. All participants will be responding to CONDTION 1 for the MediaLab portion of the study, which is already set as the default. Make sure that the box that says EDIT MODE is not checked.

7.6. Participants will be left in the Cognitive Computer Lab to complete the survey portion of the experiment using MediaLab. Participants will return to the waiting area outside EDU 307N for final debriefing following completion of the second half of the research

8. Between Sessions

8.1. Reset the eye tracker to baseline calibration before the next participant arrives

8.2. Prepare all paperwork for the next scheduled participant

9. Experiment Debriefing

9.1. Once participant returns from computer lab:

9.1.1. Do you have any questions about your participation in this experiment? What do you think the underlying goals of the experiment might be?

9.2. Give the participant a copy of the debriefing sheet

9.2.1. Please read the following debriefing. This will give you some additional information about the underlying goals of the study. If you have any questions after you read it, I will be happy to answer them; otherwise, you are free to leave. Thank you for your participation and your research credits will be awarded within the next 24 hours.

Appendix J

Written Consent Form

UNIVERSITY OF CENTRAL OKLAHOMA
INFORMED CONSENT FORM

Experimental Psychology Research Project Title: The Role of Attention, Attitudes, and Individual Expectancies in Social Decision Making and Impression Formation: A Cross-Cultural Study

Researcher(s) and contact information: Elizabeth Shoemake, (405) 204-0094, eshoemake@uco.edu or Robert Mather, Ph.D., (405) 974-5474, rmather@uco.edu. You may also contact the Research Administrator at (405) 974-5707 or uco-admin@sona-systems.net

A. Purpose of this research: The purpose of the current research is to examine how people from different cultures form impressions and make decisions about people based on their attitudes and individual expectations about themselves and others. This research will also examine the relationship between social attention and how people visually examine photographs of different scenarios.

B. Procedures/treatments involved: If consent is given, participants will be seated in front of a computer and calibrated to an eye-traker, which will track the participants eye movements over a series of photographs. Participants will respond to tasks related to each photograph. Finally, participants will also complete a series of questionairres on a computer.

C. Expected length of participation: No more than 2 hour(s). (2 credits)

D. Potential benefits: There are no direct benefits to the participant. This study will further the knowledge base in predicting how people respond to different scenarios based on individual interpersonal attitudes and expectations.

E. Potential risks or discomforts: There will be no harm or discomfort anticipated in the research greater than what is ordinarily encountered in daily life or during routine physical examinations, psychological examinations or tests. Some experiments expose participants to stimuli of which they are not aware. In such cases, participants will always be fully debriefed at the conclusion of the experiment.

F. Medical/mental health contact information: If you would like to visit with someone regarding sensitive or special concerns about this project or other issues please feel welcome to visit the UCO Student Counseling Center at (405) 974-2215 or http://www.uco.edu/student_counseling (Bruce Lochner, Ph. D., Director).

G. Contact information for researchers appears above. You may contact the Research Administrator at (405) 974-5707 or uco-admin@sona-systems.net

You may contact the Institutional Review Board if you have questions regarding your participation:

Dr. Jill A. Devenport
Chair, UCO Institutional Review Board
ADM 216
Campus Box 159
Edmond, OK 73034

405-974-5479 phone
405-974-2526
405-974-3825 fax
jdevenport@uco.edu – email

You may contact the primary investigator if you have questions regarding your participation:

Elizabeth Shoemake
8808 Aaron Drive
Oklahoma City, OK 73132
405-204-0094 phone
eshoemake@uco.edu e-mail

H. Explanation of confidentiality and privacy: Your name or identity will not be associated in any way with the research findings; information about you remains confidential and will not be kept after the semester ends. Your name or other uniquely identifying information will never be in any record that can be identified with you. We do not request student ID numbers either.

Results are reported only about groups of people or by a number that conceals your identity. All results are reported in summary form, except on occasion when an individual example may be given, at which time no name or other identifiable information will be given. Anonymous data are stored in electronic or hard copy form by individual researchers. Only the student researchers and their instructors have access to the data.

Most psychology journals expect that researchers retain data for five years following publication. Individual researchers destroy anonymous data after the standard retention period (see above) has passed. Records (separate from research data) regarding which students completed their participation assignments are purged from electronic sources or shredded by individual instructors/researchers after final grades are recorded.

The fact that you did or did not participate in a specific experiment or study is part of a record available to your General Psychology instructor. General Psychology instructors have to know which studies you completed in order know how much research participation credits each you earned (in order to determine whether that course requirement was satisfied). They do not need nor do they receive any other information.

I. Assurance of voluntary participation:

AFFIRMATION BY RESEARCH PARTICIPANT

I hereby voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I have read and fully understand this Informed Consent Form. I sign it freely and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Participant's Printed Name: _____

Participant's Signature: _____ Date _____

***** By signing this, I affirm that I am at least 18 years of age.**

J. For more information: If you would like more information about the results of this study, you can get the complete details after we have collected all our data. There are four ways to do this:

1) Come to the Oklahoma Research Day conference.
2) Ask your General Psychology instructor for access to this semester's study summaries.
3) Request that the researcher e-mail or mail you the study results.
4) Make an appointment for a telephone or in person visit with the researcher.

Appendix K

Experiment Task Instructions

Pre-Task Instructions: A photograph is about to be presented on the screen for a brief period of time. Observe the photograph carefully.

Task #1: Memory

Please say aloud the name of every object, living or nonliving, that you remember seeing in the previous photograph.

Task #2: Impressions

In the photograph you just viewed, there was a person present. To the best of your ability, please rate your impression of that person for each characteristic presented. Please use the scale provided and say your answers aloud.

Not at all 1 2 3 4 5 6 7 8 9 Extremely

1. Healthy
2. Attractive
3. Wealthy
4. Friendly
5. Happy
6. Aggressive

Appendix L

Researcher Data Collection Sheet

Participant Number:

Condition:

EXPERIMENTAL PHOTOGRAPH #1

Memory Task: Please write down the participants responses in the order they say them

1.
2.
3.
4.
5.
6.
7.
8.

Impression Formation Task: Please circle the participants response

1. _____ 1 2 3 4 5 6 7 8 9
2. _____ 1 2 3 4 5 6 7 8 9
3. _____ 1 2 3 4 5 6 7 8 9
4. _____ 1 2 3 4 5 6 7 8 9
5. _____ 1 2 3 4 5 6 7 8 9
6. _____ 1 2 3 4 5 6 7 8 9

EXPERIMENTAL PHOTOGRAPH #2

Memory Task: Please write down the participants responses in the order they say them

1.
2.
3.
4.
5.
6.
7.
8.

Impression Formation Task: Please circle the participants response

1. _____ 1 2 3 4 5 6 7 8 9
2. _____ 1 2 3 4 5 6 7 8 9
3. _____ 1 2 3 4 5 6 7 8 9
4. _____ 1 2 3 4 5 6 7 8 9
5. _____ 1 2 3 4 5 6 7 8 9
6. _____ 1 2 3 4 5 6 7 8 9

EXPERIMENTAL PHOTOGRAPH #3

Memory Task: Please write down the participants responses in the order they say them

1.
2.
3.
4.
5.
6.
7.
8.

Impression Formation Task: Please circle the participants response

1. _____ 1 2 3 4 5 6 7 8 9
2. _____ 1 2 3 4 5 6 7 8 9
3. _____ 1 2 3 4 5 6 7 8 9
4. _____ 1 2 3 4 5 6 7 8 9
5. _____ 1 2 3 4 5 6 7 8 9
6. _____ 1 2 3 4 5 6 7 8 9

EXPERIMENTAL PHOTOGRAPH #4

Memory Task: Please write down the participants responses in the order they say them

1.
2.
3.
4.
5.
6.
7.
8.

Impression Formation Task: Please circle the participants response

1. _____ 1 2 3 4 5 6 7 8 9
2. _____ 1 2 3 4 5 6 7 8 9
3. _____ 1 2 3 4 5 6 7 8 9
4. _____ 1 2 3 4 5 6 7 8 9
5. _____ 1 2 3 4 5 6 7 8 9
6. _____ 1 2 3 4 5 6 7 8 9

Appendix M

Written Debriefing Form

The Role of Cross-Cultural Attention, Attitudes, and Social Expectancies in the Human-Animal Bond (HAB)

Due to the sensitive nature of many social measures, it is not always possible for researchers to explain the true nature of an experiment until after all data measures are complete. You have been told that this experiment was designed to evaluate cross-cultural attention and attitudes. While this is true, the larger underlying goal of this study was to evaluate cultural attention and attitudes towards people and situations when an animal, in this case a dog, was present.

Research has shown that humans attend to situations differently and make different social judgments when an animal is present. Research has also shown that there may be potential health benefits associated with relationships that humans form with animals. One popular example of how this type of relationship appears today is through the use of companion animals in therapeutic settings, such as hospitals, nursing homes, and physical therapy. This type of intervention is commonly known as animal-assisted therapy.

In order to assess whether animal-assisted therapy is an appropriate treatment option for the modern medical community, the underlying mechanisms of this relationship must be further evaluated. The true purpose of this study is to compare how people respond to the presence of animals based on individual measures of attention, attitude, social, and cultural orientation. Our hope is that this study will further our understanding of the potential psychological and physiological benefits of the relationship between humans and animals, otherwise known as the human-animal bond (HAB).

Your participation in this study is greatly appreciated. If you are interested in obtaining a copy of the results once the study is complete, you may contact the primary researcher, Elizabeth Shoemake at eshoemake@uco.edu. If you have a more general interest in this area of research, you may also wish to consult the following reference:

Fine, A. H. (Ed.). (2006) *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice.* San Diego, CA: Academic.

If you have any questions or concerns about this research, please feel free to contact:
Dr. Jill A. Devenport
Chair, UCO Institutional Review Board
ADM 216, Office of Research and Grants
Campus Box 159
Edmond, OK 73034
Phone: 405-974-5479 / 405-974-2526
Fax: 405-974-2526

Appendix N

Experiment Data

partID	cond	group	scene1	tot_obj_1	scene2	tot_obj_2	hum_pres	hum_ord_2	agg2	att2	fri2	hap2	hea2	wea2
101	1	A	A1	5	B2	6	1	1	2	5	6	7	8	6
102	2	A	A1	8	B2	10	1	10	1	6	7	8	7	6
103	1	B	A1	2	B2	4	1	1	3	8	8	9	8	8
104	3	A	A1	5	C2	5	1	2	1	6	9	8	6	7
105	2	B	A1	4	B2	3	1	2	3	7	5	5	9	7
106	3	B	A1	5	C2	5	1	4	1	6	7	8	9	9
107	4	B	A1	7	C2	8	1	1	1	9	9	9	9	5
108	4	A	A1	8	C2	6	1	2	1	7	8	6	7	7
109	5	A	A1	4	C2	5	1	4	1	7	9	9	9	9
110	6	A	A1	6	D2	5	1	3	1	5	8	8	6	6
111	7	A	B1	5	A2	6	1	1	2	7	6	6	7	7
112	8	A	B1	5	A2	7	1	6	2	7	7	7	7	7
113	9	A	C1	4	A2	3	1	1	1	6	9	9	8	8
114	10	A	D1	5	A2	7	1	1	2	6	6	7	7	6
116	5	B	A1	5	C2	9	1	3	1	7	8	9	8	7
117	12	A	D1	5	A2	4	1	2	5	5	7	6	4	6
118	13	A	B1	9	C2	5	1	1	2	6	6	6	5	7
119	6	B	A1	5	D2	5	1	5	3	6	7	8	7	5
120	14	A	B1	6	D2	5	1	1	2	8	8	7	8	6
121	15	A	C1	5	B2	7	1	1	1	4	8	7	6	4
122	16	A	D1	3	B2	2	1	1	1	7	9	9	9	7
123	17	A	C1	11	D2	8	1	8	3	5	6	7	6	5
124	18	A	D1	3	C2	3	1	2	1	9	9	9	9	9
125	19	A	B1	7	C2	7	1	5	1	6	6	8	8	6
126	20	A	B1	8	D2	5	1	1	1	8	9	8	8	8
127	21	A	C1	7	B2	7	1	4	2	6	7	7	8	7
128	22	A	D1	7	B2	5	0	0	2	8	8	9	9	9
129	23	A	C1	6	D2	4	1	2	2	7	7	8	8	7
130	7	B	B1	8	A2	6	1	3	2	7	7	5	9	7
131	8	B	B1	5	A2	3	1	3	1	5	8	7	9	5
132	9	B	C1	7	A2	6	1	6	2	7	7	7	7	7
133	10	B	D1	2	A2	5	1	1	7	5	7	8	8	8
134	24	A	D1	8	C2	7	1	4	3	7	7	9	6	8
135	17	A	C1	5	D2	3	1	1	1	6	7	7	6	7
136	20	A	B1	7	D2	4	1	3	4	7	7	7	8	7
137	2	A	A1	4	B2	5	1	1	3	6	7	6	5	8
138	21	A	C1	5	B2	4	1	2	4	6	6	7	7	6
139	5	A	A1	6	C2	5	1	5	1	7	9	9	8	5
140	11	B	C1	7	A2	5	0	0	3	7	5	7	6	5
141	12	B	D1	5	A2	3	1	1	1	8	8	9	8	8
142	1	A	A1	2	B2	2	1	2	7	8	9	9	7	7
143	13	B	B1	7	C2	5	1	1	2	7	9	8	8	7
144	13	A	B1	6	C2	6	1	1	1	7	9	9	9	7
145	14	B	B1	4	D2	6	1	4	7	5	3	9	8	6
146	14	A	B1	5	D2	4	1	1	2	8	8	6	8	7
147	7	A	B1	7	A2	3	1	2	1	7	9	9	7	9
148	22	A	D1	5	B2	6	1	5	2	7	8	9	8	5
149	24	A	D1	5	C2	9	1	9	2	7	8	7	6	6
150	9	A	C1	3	A2	4	1	3	1	8	9	8	7	7
151	6	A	A1	6	D2	3	1	1	5	8	9	9	8	7
153	15	B	C1	6	B2	5	1	1	3	7	5	5	8	8
154	16	B	D1	6	B2	5	1	3	2	5	5	6	5	7
155	17	B	C1	5	D2	4	0	0	1	8	7	9	8	6
156	18	B	D1	4	C2	5	1	4	2	7	7	6	7	7
157	23	A	C1	5	D2	3	1	1	1	8	8	6	8	7
158	19	B	B1	7	C2	8	1	1	1	6	7	8	8	8
159	18	A	D1	3	C2	3	1	1	1	8	7	8	8	8
160	10	A	D1	6	A2	12	1	1	2	3	2	3	6	6
161	20	B	B1	6	D2	6	1	1	2	7	7	8	9	7
162	8	A	B1	7	A2	6	1	1	3	7	7	7	7	8
163	12	A	D1	9	A2	5	1	3	2	8	8	8	9	8
164	15	A	C1	4	B2	4	1	4	1	5	7	6	8	8
165	21	B	C1	6	B2	6	1	6	3	7	8	9	8	8
166	16	A	D1	3	B2	3	1	3	1	7	6	8	7	7
167	19	A	B1	5	C2	5	1	4	1	7	9	8	9	8
168	3	A	A1	10	C2	11	1	1	2	8	8	9	7	7

scene3	tot_obj_3	hum_pres	hum_ord_3	dog_pres	dog_ord_3	agg3	att3	fri3	hap3	hea3	wea3	scene4	tot_obj_4
C3	6	0	0	1	6	1	5	8	8	8	7	D4	6
D3	10	1	3	1	4	1	6	6	7	7	7	C4	8
C3	3	1	1	1	2	6	8	9	9	8	7	D4	3
B3	6	1	2	1	1	1	5	8	8	7	6	D4	5
D3	4	1	3	1	2	2	8	8	7	9	8	C4	6
B3	5	1	1	1	2	1	5	7	8	9	6	D4	4
B3	8	1	1	1	2	1	9	9	9	9	9	D4	6
B3	8	1	1	1	2	1	7	8	8	7	7	D4	6
D3	5	1	4	1	3	1	7	9	9	9	9	B4	6
C3	7	1	3	1	4	1	5	8	8	6	6	B4	5
C3	7	1	1	1	2	1	6	8	6	7	7	D4	6
C3	6	1	1	1	2	2	5	7	7	6	6	D4	4
B3	5	1	1	1	2	1	6	9	9	8	7	D4	6
B3	9	1	1	1	2	2	7	8	8	8	7	C4	7
D3	8	1	1	1	2	1	8	8	9	8	8	B4	8
C3	5	1	2	1	1	3	5	9	7	8	6	B4	4
A3	6	1	2	1	1	6	8	7	8	7	8	D4	6
C3	6	1	5	1	4	3	6	7	8	7	5	B4	6
A3	6	1	1	1	4	2	8	9	9	8	5	C4	9
A3	7	1	7	1	1	1	4	9	8	6	4	D4	7
A3	4	1	1	1	2	1	7	8	8	9	7	C4	5
A3	8	1	8	1	7	2	4	6	7	6	5	B4	8
A3	3	1	1	1	2	1	9	9	9	9	9	B4	6
D3	10	1	2	1	1	1	6	7	8	8	6	A4	9
C3	5	1	3	1	4	1	8	9	8	8	8	A4	5
D3	4	1	1	1	2	1	6	7	7	7	7	A4	3
C3	10	1	2	1	1	2	8	8	8	8	8	A4	6
B3	7	1	1	1	2	1	7	8	8	8	7	A4	6
C3	7	1	1	1	2	1	8	7	3	5	7	D4	6
C3	9	1	1	1	2	1	4	8	7	9	6	D4	6
B3	8	1	2	1	3	3	7	8	8	7	7	D4	6
B3	4	1	1	1	2	3	6	8	9	8	7	C4	4
B3	8	1	2	1	3	2	5	9	8	8	7	A4	8
A3	4	1	2	1	1	1	6	8	7	7	7	D4	6
C3	7	1	3	1	4	4	7	7	7	8	7	A4	5
D3	4	1	1	1	2	3	6	6	7	6	5	C4	4
D3	4	1	2	1	1	3	5	6	6	7	6	A4	5
D3	8	1	6	1	2	1	8	9	8	9	5	B4	10
D3	3	0	0	1	2	4	6	5	6	5	7	B4	7
C3	5	1	4	1	1	2	6	7	8	6	7	B4	6
C3	3	1	2	1	1	6	7	9	9	7	6	D4	2
A3	5	1	1	1	2	6	5	5	1	2	8	D4	4
A3	7	1	1	1	2	1	7	8	9	7	7	D4	5
A3	5	1	2	1	1	6	4	8	6	4	5	C4	6
A3	4	1	1	1	2	1	8	7	7	8	6	C4	4
C3	6	1	1	1	2	4	5	5	3	5	9	D4	6
C3	7	1	1	1	2	3	2	6	6	5	3	A4	8
B3	9	1	2	1	3	3	7	6	7	6	6	A4	7
B3	5	1	4	1	3	1	8	9	9	8	7	D4	4
C3	7	1	3	1	4	4	7	8	7	8	6	B4	7
A3	5	1	2	1	1	5	7	4	5	8	7	D4	2
A3	5	1	2	1	3	2	4	5	7	6	7	C4	7
A3	6	1	1	1	2	1	8	8	9	8	6	B4	7
A3	7	1	3	1	4	1	7	8	8	8	7	B4	8
B3	5	1	1	1	2	3	6	8	7	5	8	A4	5
D3	7	1	1	1	2	1	6	7	8	8	6	A4	5
A3	5	1	1	1	2	2	8	8	8	8	7	B4	6
B3	9	1	6	1	4	2	5	4	2	5	6	C4	9
C3	6	1	1	1	2	2	5	7	7	8	7	A4	7
C3	8	1	2	1	1	2	5	8	8	6	7	D4	8
C3	12	1	1	1	2	1	6	9	9	9	6	B4	10
A3	4	1	1	1	2	1	7	6	5	8	4	D4	4
D3	7	1	1	1	2	3	7	9	8	8	8	A4	8
A3	3	1	3	1	1	1	8	9	9	7	7	C4	3
D3	6	1	1	1	2	1	1	9	9	8	6	A4	8
B3	7	1	1	1	2	2	7	6	6	8	7	D4	5

hum_pres	hum_ord_4	dog_pres	dog_ord_4	agg4	att4	fri4	hap4	hea4	wea4	1tot_time_track	1tot_time_loss
1	5	1	6	2	4	8	8	7	8	1.60	1.40
1	8	1	1	1	6	6	8	7	7	2.58	0.41
1	1	1	2	5	9	8	9	8	9	0.08	2.91
1	4	1	3	1	6	7	8	7	6	2.55	0.45
1	3	1	2	2	8	9	9	9	7	2.67	0.33
1	1	1	4	1	5	9	9	9	7	2.93	0.07
1	2	1	1	1	9	9	9	7	7	0.50	2.50
1	1	1	2	1	7	9	9	8	7	2.58	0.42
1	3	1	4	1	8	9	8	8	9	2.64	0.36
1	4	1	3	1	5	8	8	6	7	3.00	0.00
1	2	1	1	1	7	6	8	7	8	0.12	2.88
1	1	1	2	2	8	9	9	7	6	2.67	0.32
1	1	1	2	1	6	8	8	8	6	0.73	2.27
1	7	1	6	1	7	8	8	7	7	2.43	0.57
1	4	1	5	1	9	8	8	8	7	3.00	0.00
1	2	1	5	5	7	7	6	7	8	1.00	1.99
1	5	1	6	6	8	7	8	7	9	0.98	2.02
1	2	1	1	3	5	7	8	7	5	2.93	0.07
1	2	1	3	2	8	9	9	8	6	0.12	2.88
1	1	1	2	1	5	8	9	6	4	2.86	0.13
1	4	1	5	1	7	9	9	9	7	2.62	0.38
1	8	1	7	3	5	6	6	6	5	2.33	0.67
1	1	1	2	1	9	9	9	9	9	3.00	0.00
1	4	1	3	1	6	8	8	8	6	3.00	0.00
1	1	1	2	1	8	9	9	9	8	2.02	0.98
1	3	1	2	1	6	7	7	7	7	2.66	0.33
1	3	1	2	2	8	9	9	8	8	2.61	0.39
1	3	1	1	1	8	9	9	8	8	2.38	0.61
1	1	1	2	1	9	9	9	9	9	1.00	2.00
1	1	1	2	1	5	8	9	9	7	2.60	0.39
1	4	1	5	3	7	8	8	7	7	2.60	0.39
1	1	1	2	3	6	8	9	8	7	2.07	0.93
1	2	1	1	4	7	9	9	8	8	1.03	1.96
1	2	1	1	1	5	9	8	8	5	1.10	1.90
1	2	1	3	3	8	8	9	8	7	2.86	0.13
1	1	1	2	4	5	8	7	6	6	2.58	0.41
1	1	1	2	3	7	7	7	6	6	0.02	2.98
1	7	1	6	1	8	8	8	9	5	2.95	0.05
0	0	1	3	3	6	8	8	6	7	1.85	1.15
1	2	1	1	1	8	8	9	8	8	3.00	0.00
1	1	1	2	6	8	9	9	7	8	2.56	0.44
1	1	1	2	1	8	8	8	9	7	3.00	0.00
1	1	1	2	1	7	9	9	9	7	2.73	0.27
1	3	1	4	6	3	8	8	7	6	2.50	0.50
1	1	1	2	1	8	7	9	8	7	0.00	3.00
1	1	0	0	2	7	5	9	7	9	2.93	0.07
1	4	1	3	2	7	8	9	8	5	3.00	0.00
1	6	1	5	3	6	8	8	7	6	1.98	1.02
1	3	1	4	1	8	8	9	9	8	0.50	2.50
1	5	1	6	4	8	9	9	7	7	2.51	0.49
1	1	1	2	1	7	8	9	7	4	3.00	0.00
1	1	1	2	2	5	7	7	5	7	0.20	2.80
1	1	1	2	1	8	8	9	8	5	3.00	0.00
1	4	1	3	2	7	8	7	9	7	1.46	1.54
1	3	1	4	1	8	8	9	7	8	2.40	0.59
1	1	1	2	1	6	7	8	8	8	3.00	0.00
1	1	1	2	1	8	8	9	8	7	2.65	0.35
1	5	1	4	3	6	8	8	8	8	2.44	0.56
1	2	1	1	2	6	8	9	9	7	1.55	1.44
1	1	1	2	4	6	6	7	6	7	1.38	1.62
1	5	1	8	3	7	8	8	9	9	3.00	0.00
1	2	1	1	1	6	9	9	9	4	3.00	0.00
1	6	1	5	3	7	7	8	8	7	0.58	2.42
0	0	0	0	1	7	8	8	7	6	3.00	0.00
1	1	1	2	1	7	8	8	8	8	3.00	0.00
1	4	1	5	2	7	8	8	7	7	2.73	0.27

1%time_track	1%time_loss	1num_fix	1tot_fix_dur	2tot_time_track	2tot_time_loss	2%time_track	2%time_loss
53.45	46.55	0.00	0.00	0.00	3.00	0.00	100.00
86.22	13.78	1.00	0.20	2.34	0.66	77.99	22.02
2.80	97.20	0.00	0.00	0.03	2.96	1.13	98.87
85.12	14.88	1.00	0.22	2.54	0.46	84.62	15.38
88.89	11.11	2.00	0.42	2.30	0.70	76.55	23.45
97.76	2.24	0.00	0.00	2.81	0.18	93.89	6.11
16.52	83.48	1.00	0.27	1.27	1.73	42.46	57.54
86.02	13.98	3.00	0.62	3.00	0.00	100.00	0.00
88.09	11.91	0.00	0.00	2.54	0.46	84.82	15.18
100.00	0.00	0.00	0.00	2.86	0.13	95.56	4.44
3.87	96.13	0.00	0.00	0.52	2.48	17.22	82.78
89.19	10.81	0.00	0.00	2.55	0.45	85.15	14.85
24.26	75.74	0.00	0.00	2.01	0.99	66.95	33.06
81.09	18.91	0.00	0.00	2.53	0.47	84.49	15.51
100.00	0.00	0.00	0.00	3.00	0.00	100.00	0.00
33.47	66.53	0.00	0.00	0.60	2.40	20.09	79.91
32.79	67.21	0.00	0.00	1.12	1.88	37.20	62.80
97.76	2.24	1.00	0.18	2.95	0.05	98.50	1.50
3.94	96.06	0.00	0.00	1.02	1.98	33.93	66.07
95.56	4.44	1.00	0.18	3.00	0.00	100.00	0.00
87.32	12.68	1.00	0.22	2.62	0.38	87.42	12.58
77.71	22.29	0.00	0.00	2.55	0.45	85.02	14.98
100.00	0.00	0.00	0.00	3.00	0.00	100.00	0.00
100.00	0.00	1.00	0.17	3.00	0.00	100.00	0.00
67.40	32.60	0.00	0.00	1.12	1.88	37.29	62.71
88.86	11.14	1.00	0.17	2.88	0.12	96.10	3.90
86.99	13.01	2.00	0.40	1.38	1.62	46.05	53.95
79.52	20.48	1.00	0.17	2.63	0.37	87.75	12.25
33.20	66.80	0.00	0.00	1.54	1.46	51.20	48.80
86.89	13.11	0.00	0.00	1.90	1.10	63.44	36.56
86.89	13.11	0.00	0.00	0.37	2.63	12.18	87.82
68.88	31.12	0.00	0.00	1.69	1.31	56.26	43.74
34.50	65.50	0.00	0.00	0.38	2.62	12.58	87.43
36.74	63.26	1.00	0.15	1.93	1.07	64.30	35.70
95.56	4.44	0.00	0.00	2.88	0.12	96.10	3.90
86.19	13.81	3.00	0.47	2.65	0.35	88.32	11.68
0.53	99.47	0.00	0.00	0.00	3.00	0.00	100.00
98.37	1.63	0.00	0.00	3.00	0.00	100.00	0.00
61.61	38.39	1.00	0.18	0.44	2.56	14.54	85.46
100.00	0.00	0.00	0.00	2.34	0.66	77.99	22.02
85.42	14.58	3.00	0.47	2.90	0.10	96.66	3.34
100.00	0.00	1.00	0.17	2.85	0.15	95.00	5.00
91.12	8.88	3.00	0.60	3.00	0.00	100.00	0.00
83.32	16.68	1.00	0.17	2.54	0.45	84.86	15.14
0.00	100.00	0.00	0.00	0.00	3.00	0.00	100.00
97.76	2.24	3.00	0.67	2.65	0.35	88.29	11.71
100.00	0.00	2.00	0.40	3.00	0.00	100.00	0.00
66.03	33.97	1.00	0.17	1.63	1.37	54.35	45.65
16.68	83.32	0.00	0.00	0.22	2.78	7.24	92.76
83.60	16.40	1.00	0.22	2.60	0.40	86.75	13.25
100.00	0.00	0.00	0.00	2.78	0.22	92.76	7.24
6.71	93.29	0.00	0.00	1.07	1.93	35.54	64.46
100.00	0.00	0.00	0.00	3.00	0.00	100.00	0.00
48.72	51.29	0.00	0.00	0.77	2.23	25.66	74.34
80.18	19.82	1.00	0.18	2.48	0.51	82.85	17.15
100.00	0.00	1.00	0.17	2.88	0.12	96.10	3.90
88.39	11.61	2.00	0.32	2.75	0.25	91.66	8.34
81.22	18.78	0.00	0.00	2.28	0.72	76.01	23.99
51.82	48.18	2.00	0.33	0.62	2.38	20.71	79.29
45.93	54.07	0.00	0.00	1.23	1.77	40.94	59.06
100.00	0.00	0.00	0.00	3.00	0.00	100.00	0.00
100.00	0.00	9.00	1.79	3.00	0.00	100.00	0.00
19.29	80.71	0.00	0.00	1.86	1.14	62.13	37.87
100.00	0.00	0.00	0.00	3.00	0.00	100.00	0.00
100.00	0.00	3.00	0.65	3.00	0.00	100.00	0.00
91.06	8.94	0.00	0.00	2.12	0.88	70.75	29.25

2num_fix	2tot_fix_dur	2hum_#time_lz_obs	2hum_tot_time_lz	3tot_time_track	3tot_time_loss	3%time_track
0.00	0.00	0.00	0.00	0.77	2.23	25.56
2.00	0.35	3.00	0.08	2.63	0.37	87.59
0.00	0.00	0.00	0.00	0.20	2.80	6.67
2.00	0.35	4.00	0.43	2.95	0.05	98.47
0.00	0.00	15.00	1.00	2.57	0.43	85.69
0.00	0.00	0.00	0.00	3.00	0.00	100.00
0.00	0.00	0.00	0.00	1.56	1.44	51.95
7.00	1.68	7.00	0.62	2.59	0.41	86.42
0.00	0.00	0.00	0.00	2.69	0.31	89.59
2.00	0.42	5.00	0.47	2.88	0.12	96.13
0.00	0.00	0.00	0.00	0.27	2.73	8.91
0.00	0.00	5.00	0.28	2.64	0.35	88.19
0.00	0.00	3.00	0.00	1.62	1.38	54.00
0.00	0.00	4.00	0.00	2.56	0.44	85.45
0.00	0.00	19.00	0.43	3.00	0.00	100.00
0.00	0.00	0.00	0.00	0.82	2.18	27.25
0.00	0.00	0.00	0.00	1.33	1.67	44.31
0.00	0.00	12.00	0.98	3.00	0.00	100.00
0.00	0.00	3.00	0.00	1.35	1.65	44.98
0.00	0.00	9.00	0.37	0.98	2.01	32.83
1.00	0.20	8.00	0.02	2.50	0.49	83.55
1.00	0.18	6.00	0.10	2.55	0.45	85.16
1.00	0.15	12.00	0.70	3.00	0.00	100.00
2.00	0.30	7.00	0.23	2.90	0.10	96.66
0.00	0.00	6.00	0.25	1.63	1.36	54.52
1.00	0.22	6.00	0.25	2.71	0.28	90.52
0.00	0.00	9.00	0.15	2.45	0.55	81.65
0.00	0.00	3.00	0.00	2.59	0.41	86.42
0.00	0.00	10.00	0.18	1.49	1.51	49.55
1.00	0.20	0.00	0.00	2.41	0.59	80.45
0.00	0.00	0.00	0.00	0.50	2.50	16.54
0.00	0.00	1.00	0.00	1.94	1.06	64.77
0.00	0.00	0.00	0.00	0.30	2.69	10.11
3.00	0.45	7.00	0.05	2.34	0.66	77.91
0.00	0.00	8.00	0.10	2.45	0.55	81.62
1.00	0.17	9.00	0.35	1.90	1.09	63.51
0.00	0.00	0.00	0.00	1.00	2.00	33.37
0.00	0.00	11.00	0.60	2.93	0.07	97.76
0.00	0.00	0.00	0.00	1.26	1.73	42.14
0.00	0.00	0.00	0.00	3.00	0.00	100.00
0.00	0.00	14.00	0.20	2.77	0.23	92.23
0.00	0.00	8.00	0.00	0.86	2.14	28.63
2.00	0.37	2.00	0.00	2.69	0.31	89.66
0.00	0.00	1.00	0.18	2.66	0.34	88.73
0.00	0.00	0.00	0.00	0.00	3.00	0.00
2.00	0.55	10.00	0.37	3.00	0.00	100.00
3.00	0.78	16.00	0.27	3.00	0.00	100.00
1.00	0.15	10.00	0.05	3.00	0.00	100.00
0.00	0.00	0.00	0.00	0.52	2.48	17.26
0.00	0.00	11.00	0.58	2.76	0.24	92.06
5.00	1.05	5.00	0.43	3.00	0.00	100.00
2.00	0.97	0.00	0.00	0.12	2.88	3.90
0.00	0.00	8.00	0.77	3.00	0.00	100.00
0.00	0.00	0.00	0.00	0.93	2.06	31.15
0.00	0.00	11.00	0.10	1.85	1.15	61.80
1.00	0.17	14.00	0.43	3.00	0.00	100.00
1.00	0.15	18.00	0.52	3.00	0.00	100.00
0.00	0.00	13.00	0.59	2.14	0.86	71.41
0.00	0.00	4.00	0.02	0.61	2.39	20.29
0.00	0.00	0.00	0.00	1.45	1.55	48.42
4.00	0.84	5.00	0.20	3.00	0.00	100.00
6.00	1.08	4.00	0.17	1.36	1.63	45.48
0.00	0.00	12.00	0.70	1.10	1.90	36.54
1.00	0.28	6.00	0.12	3.00	0.00	100.00
2.00	0.45	5.00	0.77	3.00	0.00	100.00
0.00	0.00	2.00	0.52	2.04	0.95	68.25

3%time_loss	3num_fix	3tot_fix_dur	3hum_#time_lz_obs	3hum_tot_time_lz	3dog_#time_lz_obs	3dog_tot_time_lz
74.44	0.00	0.00	6.00	0.30	0.00	0.00
12.41	1.00	0.18	3.00	0.23	0.00	0.00
93.33	0.00	0.00	0.00	0.00	0.00	0.00
1.54	3.00	0.57	8.00	0.17	8.00	0.00
14.31	3.00	0.83	4.00	0.82	2.00	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.05	0.00	0.00	2.00	0.00	1.00	0.00
13.58	7.00	1.65	6.00	0.28	0.00	0.00
10.41	0.00	0.00	9.00	0.10	0.00	0.00
3.87	2.00	0.35	2.00	0.90	2.00	0.17
91.09	0.00	0.00	0.00	0.00	1.00	0.02
11.81	0.00	0.00	6.00	0.17	6.00	0.08
46.00	1.00	0.17	7.00	0.23	0.00	0.00
14.55	0.00	0.00	2.00	0.02	0.00	0.00
0.00	0.00	0.00	4.00	0.07	1.00	0.00
72.75	0.00	0.00	3.00	0.00	0.00	0.00
55.69	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	14.00	0.25	4.00	0.00
55.02	0.00	0.00	0.00	0.00	0.00	0.00
67.17	0.00	0.00	6.00	0.03	4.00	0.10
16.45	1.00	0.20	0.00	0.00	4.00	0.03
14.84	2.00	0.32	5.00	0.30	7.00	0.10
0.00	0.00	0.00	0.00	0.00	4.00	0.03
3.34	1.00	0.15	14.00	0.43	5.00	0.05
45.48	0.00	0.00	10.00	0.52	0.00	0.00
9.48	1.00	0.15	1.00	0.00	1.00	0.00
18.35	2.00	0.42	3.00	0.23	4.00	0.07
13.58	1.00	0.15	6.00	0.22	9.00	0.03
50.45	0.00	0.00	5.00	0.03	2.00	0.12
19.55	0.00	0.00	5.00	0.02	0.00	0.00
83.46	0.00	0.00	0.00	0.00	0.00	0.00
35.24	0.00	0.00	0.00	0.00	2.00	0.05
89.89	0.00	0.00	0.00	0.00	0.00	0.00
22.09	3.00	0.57	7.00	0.22	0.00	0.00
18.39	0.00	0.00	0.00	0.00	9.00	0.18
36.49	0.00	0.00	2.00	0.10	0.00	0.00
66.63	3.00	0.95	0.00	0.00	0.00	0.00
2.24	1.00	0.15	5.00	0.08	1.00	0.00
57.86	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	7.00	0.03	0.00	0.00
7.77	2.00	0.33	5.00	0.30	3.00	0.00
71.37	0.00	0.00	0.00	0.00	0.00	0.00
10.34	3.00	0.62	1.00	0.00	8.00	0.10
11.27	0.00	0.00	7.00	0.35	12.00	0.10
100.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4.00	0.77	4.00	0.07	6.00	0.48
0.00	2.00	0.35	15.00	0.40	3.00	0.15
0.00	3.00	0.63	2.00	0.03	0.00	0.00
82.74	0.00	0.00	0.00	0.00	0.00	0.00
7.94	0.00	0.00	9.00	0.12	2.00	0.07
0.00	0.00	0.00	7.00	0.05	1.00	0.00
96.10	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1.00	0.18	0.00	0.00	4.00	0.03
68.85	0.00	0.00	0.00	0.00	0.00	0.00
38.21	0.00	0.00	13.00	0.00	0.00	0.00
0.00	1.00	0.18	10.00	0.22	5.00	0.02
0.00	0.00	0.00	12.00	0.02	6.00	0.13
28.60	0.00	0.00	10.00	0.28	0.00	0.00
79.71	0.00	0.00	1.00	0.07	0.00	0.00
51.59	0.00	0.00	5.00	0.15	0.00	0.00
0.00	1.00	0.20	3.00	0.43	6.00	0.23
54.52	5.00	0.94	3.00	0.50	0.00	0.00
63.46	0.00	0.00	1.00	0.10	0.00	0.00
0.00	1.00	0.15	5.00	0.00	0.00	0.00
0.00	3.00	0.62	7.00	0.60	0.00	0.00
31.75	3.00	0.52	5.00	0.17	0.00	0.00

4tot_time_track	4tot_time_loss	4%time_track	4%time_loss	4num_fix	4tot_fix_dur	4hum_#time_lz_obs
1.84	1.16	61.38	38.62	0.00	0.00	1.00
2.53	0.46	84.52	15.48	2.00	0.35	7.00
0.00	3.00	0.00	100.00	0.00	0.00	0.00
3.00	0.00	100.00	0.00	3.00	0.53	11.00
2.06	0.94	68.80	31.20	1.00	0.23	9.00
3.00	0.00	100.00	0.00	1.00	0.23	0.00
0.50	2.50	16.72	83.28	1.00	0.17	1.00
2.65	0.35	88.29	11.71	4.00	0.75	8.00
2.55	0.45	84.96	15.04	1.00	0.22	2.00
2.95	0.05	98.33	1.67	0.00	0.00	11.00
0.35	2.65	11.71	88.29	0.00	0.00	0.00
2.65	0.35	88.36	11.65	3.00	0.63	17.00
2.50	0.50	83.23	16.77	3.00	0.60	10.00
1.89	1.11	63.08	36.93	0.00	0.00	10.00
3.00	0.00	100.00	0.00	0.00	0.00	5.00
0.63	2.36	21.15	78.85	0.00	0.00	1.00
1.19	1.81	39.61	60.39	0.00	0.00	0.00
2.95	0.05	98.33	1.67	1.00	0.18	16.00
0.47	2.53	15.58	84.42	0.00	0.00	0.00
2.50	0.49	83.52	16.48	0.00	0.00	20.00
2.59	0.40	86.52	13.48	0.00	0.00	8.00
1.66	1.34	55.26	44.75	0.00	0.00	8.00
3.00	0.00	100.00	0.00	2.00	0.33	13.00
3.00	0.00	100.00	0.00	0.00	0.00	4.00
2.09	0.91	69.57	30.43	1.00	0.25	12.00
2.58	0.42	85.96	14.04	0.00	0.00	7.00
2.49	0.51	82.96	17.05	1.00	0.18	11.00
2.75	0.25	91.59	8.41	0.00	0.00	11.00
1.20	1.80	40.07	59.93	1.00	0.17	5.00
2.06	0.94	68.77	31.23	1.00	0.17	1.00
0.44	2.55	14.75	85.25	0.00	0.00	0.00
2.05	0.95	68.45	31.55	0.00	0.00	3.00
1.20	1.80	39.96	60.04	0.00	0.00	0.00
1.21	1.78	40.51	59.49	0.00	0.00	0.00
1.83	1.17	61.03	38.97	0.00	0.00	16.00
2.29	0.71	76.28	23.72	1.00	0.15	7.00
2.18	0.82	72.61	27.39	1.00	2.14	0.00
2.87	0.13	95.56	4.44	1.00	0.17	15.00
2.03	0.97	67.63	32.37	0.00	0.00	0.00
3.00	0.00	100.00	0.00	0.00	0.00	9.00
2.96	0.04	98.67	1.34	1.00	0.23	13.00
1.00	2.00	33.20	66.80	0.00	0.00	4.00
2.95	0.05	98.33	1.67	5.00	1.22	4.00
2.05	0.95	68.35	31.65	1.00	0.17	3.00
0.00	3.00	0.00	100.00	0.00	0.00	0.00
2.85	0.15	95.00	5.01	3.00	0.68	13.00
2.86	0.13	95.53	4.47	2.00	0.33	10.00
1.51	1.49	50.25	49.75	1.00	0.15	14.00
0.65	2.35	21.72	78.28	0.00	0.00	0.00
2.64	0.36	87.96	12.05	0.00	0.00	2.00
2.83	0.17	94.46	5.54	0.00	0.00	4.00
0.47	2.53	15.75	84.25	2.00	0.47	0.00
3.00	0.00	100.00	0.00	2.00	0.37	13.00
0.86	2.13	28.80	71.21	0.00	0.00	0.00
2.52	0.48	83.89	16.11	1.00	0.43	13.00
3.00	0.00	100.00	0.00	0.00	0.00	15.00
2.70	0.30	90.03	9.97	2.00	0.42	4.00
3.00	0.00	100.00	0.00	0.00	0.00	14.00
0.48	2.51	16.14	83.86	1.00	0.15	0.00
2.17	0.83	72.34	27.66	1.00	0.15	7.00
2.90	0.10	96.66	3.34	0.00	0.00	14.00
2.68	0.32	89.46	10.54	6.00	1.27	4.00
1.10	1.90	36.54	63.46	0.00	0.00	1.00
3.00	0.00	100.00	0.00	0.00	0.00	14.00
2.73	0.27	91.06	8.94	2.00	0.47	1.00
2.03	0.97	67.77	32.23	3.00	0.62	5.00

4hum_tot_time_lz	4dog_#time_lz_obs	4dog_tot_time_lz	tot_time_track	tot_%_time_track	AICS1	AICS2	AICS3
0.00	3.00	0.07	4.21	35.06	6	5	4
0.38	12.00	0.42	10.08	84.03	6	5	2
0.00	0.00	0.00	0.32	2.65	6	6	6
0.59	7.00	0.59	11.04	91.96	2	5	5
0.32	9.00	0.73	9.60	79.96	1	1	2
0.00	0.00	0.00	11.74	97.83	6	6	6
0.00	0.00	0.00	3.83	31.88	3	5	6
0.13	5.00	0.27	10.82	90.13	1	3	4
0.02	0.00	0.00	10.42	86.80	1	1	1
0.27	12.00	0.13	11.69	97.43	1	1	2
0.00	0.00	0.00	1.25	10.42	4	4	2
0.67	8.00	0.30	10.52	87.63	5	3	1
0.09	0.00	0.00	6.85	57.08	4	4	4
0.13	1.00	0.00	9.41	78.43	4	3	6
0.03	4.00	0.00	11.99	99.91	6	6	4
0.00	0.00	0.00	3.06	25.47	6	6	6
0.00	0.00	0.00	4.61	38.44	6	6	6
0.37	4.00	0.00	11.83	98.56	6	6	5
0.00	0.00	0.00	2.95	24.58	5	4	3
0.50	8.00	0.09	9.35	77.90	5	5	3
0.15	0.00	0.00	10.34	86.13	6	5	6
0.22	6.00	0.05	9.09	75.72	5	4	2
0.33	4.00	0.03	11.99	99.93	2	6	6
0.03	7.00	0.15	11.89	99.09	5	5	4
0.30	2.00	0.35	6.86	57.14	5	5	5
0.57	0.00	0.00	10.83	90.28	6	1	6
0.23	3.00	0.03	8.92	74.35	5	6	5
0.12	1.00	0.00	10.35	86.24	6	4	6
0.00	1.00	0.02	5.22	43.47	6	6	6
0.02	0.00	0.00	8.98	74.83	4	5	3
0.00	0.00	0.00	3.91	32.56	4	4	4
0.23	0.00	0.00	7.74	64.53	5	3	5
0.00	0.00	0.00	2.91	24.27	6	6	6
0.00	0.00	0.00	6.58	54.81	3	4	5
0.02	0.00	0.00	10.02	83.49	5	4	5
0.45	3.00	0.02	9.42	78.51	2	4	4
0.00	0.00	0.00	3.19	26.60	5	6	5
0.28	4.00	0.02	11.74	97.84	5	5	6
0.00	0.00	0.00	5.57	46.44	4	4	4
0.07	0.00	0.00	11.33	94.42	4	5	4
0.63	1.00	0.02	11.18	93.17	5	6	5
0.05	0.00	0.00	7.70	64.15	6	5	5
0.50	0.00	0.00	11.36	94.70	6	6	5
0.18	0.00	0.00	9.75	81.27	1	5	3
0.00	0.00	0.00	0.00	0.00	6	6	6
0.30	4.00	0.00	11.42	95.18	6	6	6
0.12	5.00	0.12	11.86	98.80	5	5	5
0.17	0.00	0.00	8.11	67.60	4	2	3
0.00	0.00	0.00	1.89	15.71	5	5	4
0.08	1.00	0.00	10.50	87.53	5	6	5
0.07	3.00	0.08	11.61	96.71	6	4	4
0.00	0.00	0.00	1.86	15.46	5	3	5
0.07	4.00	0.22	11.99	99.92	2	6	5
0.00	0.00	0.00	4.03	33.55	6	6	3
0.24	4.00	0.08	9.25	77.11	5	6	5
0.40	7.00	0.00	11.87	98.93	6	5	4
0.77	6.00	0.27	11.09	92.43	4	5	4
0.37	8.00	0.13	9.85	82.08	6	6	6
0.00	0.00	0.00	3.27	27.22	3	6	5
0.33	9.00	0.30	6.22	51.86	4	4	5
0.47	0.00	0.00	11.89	99.08	6	6	6
0.15	0.00	0.00	10.04	83.67	2	1	1
0.02	1.00	0.02	4.63	38.58	5	4	6
0.05	7.00	0.12	11.99	99.91	4	4	2
0.00	0.00	0.00	11.72	97.70	5	6	4
0.75	1.00	0.00	8.92	74.36	5	6	6

AICS4	AICS5	AICS6	AICS7	AICS8	AICS9	AICS10	AICS11	AICS12	AICS13	AICS14	AICS15	AICS16	AICS17
4	3	3	6	5	4	3	3	3	4	2	3	4	6
1	4	3	5	1	4	2	4	4	5	2	5	4	5
6	6	6	6	6	6	6	6	6	6	6	6	2	6
3	2	3	6	6	5	5	5	3	5	2	5	5	6
2	1	1	5	4	2	1	1	4	5	2	6	3	1
6	1	1	6	6	6	6	6	6	6	6	6	6	6
6	6	6	5	6	5	5	5	4	3	6	6	2	2
2	1	5	6	5	5	5	6	4	5	2	4	5	6
6	2	2	6	6	4	4	5	5	5	6	5	5	4
1	3	2	4	3	3	4	5	2	5	2	4	4	6
3	4	3	4	3	4	4	2	4	5	3	3	4	2
2	3	4	4	4	5	3	4	4	4	3	5	4	6
3	3	2	6	5	4	5	4	3	4	4	4	4	6
3	3	2	6	6	4	4	3	3	4	2	4	4	6
5	4	1	4	6	4	5	2	6	4	4	4	3	5
4	5	2	6	6	6	5	6	5	6	6	6	6	6
6	6	2	6	6	6	2	2	5	6	1	6	5	5
5	5	5	4	5	4	2	4	2	3	4	6	5	4
3	3	2	4	5	4	3	6	3	5	3	5	5	6
5	4	2	5	4	5	3	2	3	5	3	5	5	6
4	5	5	5	6	4	5	5	4	5	5	5	5	1
4	3	4	3	3	4	2	4	2	5	2	5	3	5
4	6	6	6	6	6	6	2	4	4	3	6	3	5
4	1	2	6	4	4	3	3	1	3	3	3	3	6
5	3	4	6	5	5	4	3	3	6	3	5	5	2
1	1	1	6	6	1	6	6	1	6	6	6	6	6
4	2	3	4	3	4	4	5	2	5	4	5	4	6
6	3	3	6	6	3	3	6	4	5	3	6	3	6
5	3	1	5	6	5	5	2	2	6	2	6	6	5
4	4	3	6	6	4	3	3	3	4	3	5	3	4
2	2	3	4	4	4	3	4	4	5	2	4	2	4
3	2	4	5	4	5	4	5	3	6	5	5	4	2
3	4	4	6	4	5	4	6	5	3	2	5	5	3
4	1	4	6	6	4	3	2	4	6	1	5	3	4
4	4	4	6	4	4	3	4	3	5	3	5	3	4
4	2	2	6	6	6	6	3	6	5	1	5	5	5
5	6	1	5	5	5	5	4	5	6	3	5	3	1
4	4	4	4	5	3	2	3	3	4	2	5	5	4
4	4	3	5	3	3	4	6	3	5	3	5	4	3
4	3	3	4	5	4	3	4	3	5	3	3	3	3
5	4	4	6	6	5	4	6	4	4	5	4	4	4
5	2	2	6	6	6	5	2	2	4	2	5	4	6
4	5	3	5	6	4	3	3	5	5	3	6	4	3
4	2	2	5	2	6	4	4	4	3	2	5	5	3
5	3	5	6	5	5	4	4	6	6	2	6	5	5
6	6	1	6	6	6	3	6	3	6	3	6	6	6
5	2	2	5	5	4	5	5	2	4	2	5	4	5
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AICS18	AICS19	AICS20	AICS21	AICS22	AICS23	AICS24	AICS25	AICS26	AICS27	AICS28	AICS29	AICS30	GA1
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GA2	GA3	GA4	GA5	GA6	GA7	LC8	LC9	LC10	LC11	LC12	PO13	PO14	PO15	PO16	PO17	PO18	PO19
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PO20	FA21	FA22	FA23	FA24	FA25	FA26	FA27	FA28	FA29	FA30	dem1	dem2	dem3	dem4
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South Korea	1992	1	99	1	1	10	10	1	1	11	1
China	2009	2	Chinese	1	1	2	2	1	1	6	9
China	2009	2	Chinese	1	1	6	7	1	1	10	11
99	99	1	99	1	1	3	7	3	4	5	6
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Nepal	2005	2	Nepali	1	1	7	7	4	5	4	10
99	99	1	99	1	1	8	8	6	1	1	11
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indonesia	2009	2	indonesian	1	2	5	6	4	2	4	4
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China	2009	2	Chinese	1	1	6	6	6	4	2	11
mexico	2004	2	Spanish	1	1	1	2	1	1	6	8
the People "s Republic of China	2010	2	Chinese	1	1	3	3	2	2	7	9
Korea	2008	2	Korean	1	1	5	5	2	2	4	1
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SOUTH KOREA	2010	2	KOREAN	1	1	3	8	1	1	5	8
Viet Nam	2009	2	Vietnamese	1	1	7	7	1	1	1	11
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Macedonia	2005	2	Macedonian	1	1	8	7	4	4	3	11
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China	2007	2	Chinese	1	1	3	9	1	1	1	10
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99	99	1	99	1	1	8	5	1	1	1	9
Cameroon	2010	1	99	1	1	3	3	1	1	8	9
Kenya	2010	1	99	1	1	8	8	1	1	5	10
Turkey	2008	2	Turkish	1	1	1	1	1	4	2	9
colombia	2010	2	Spanish	1	1	5	5	1	1	6	10
99	99	1	99	1	1	6	6	1	1	2	9
lebanon	2006	2	arabic	3	1	1	5	2	3	4	5
99	99	1	99	1	1	5	7	1	1	4	5
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Canada	2009	1	99	1	1	7	7	1	1	2	9
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99	99	2	Spanish	1	1	6	2	1	1	1	5
99	99	1	99	1	1	6	6	1	1	4	9
99	99	1	99	1	1	6	7	3	3	1	11
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FES3n	FES4p	FES5n	FES6p	FES7n	FES8n	FES9p	FES10n	FES11p	FES12p	FES13p	FES14n	FES15n	FES16n
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FES17p	FES18p	FES19n	FES20p	FES21p	FES22n	FES23p	FES24n	FES25p	FES26n	IES1	IES2	IES3	IES4	IES5
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IES6	IES7	IES8	IES9	IES10	IES11	IES12	IES13	IES14	IES15	IES16	IES17	IES18	IES19	IES20	IES21	IES22
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IES23	IES24	nbs1	nbs2	nbs3	nbs4	nbs5	nbs6	nbs7	nbs8	nbs9	nbs10	pasm1	pasm2	pasm3	pasm4	pasm5	pasm6
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