

The Effects of Kinship, Reciprocity, and Conscious Deliberation on the Level of Concern for Non-Humans: How Our Psychology Affects Levels of Concern for Non-Humans

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As hunter-gatherers, it is unlikely that humans evolved psychological tendencies to extend high levels of concern for predator or prey species. Our coalitional psychology, which evolved to regulate human interactions with other humans, might be the basis for the extension of ethical concerns to non-humans. This research identified three variables (kinship, reciprocity, and conscious deliberation) that affect our altruistic tendencies toward humans and tested them to see if they also affected our concern toward non-humans. Using a sample of 119 respondents from participants at animal auctions, the researchers compared levels of concern to: perceived the animals as family; received benefits from the animals; and/or consciously contemplated appropriate levels of concern. The data supported the hypotheses that concerns rise when animals are re-categorized as kin and/or when individuals have previously considered appropriate levels of concern, but it did not support the hypothesized connection between concern and reciprocity.

keywords: Attitudes, Concern, Non-Human, Kinship, Reciprocity, Evolutionary, Psychology

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Numerous researchers have directly or implicitly acknowledged that humans tend to maintain higher ethical values for humans than for other species (Horta, 2010; Kalof & Fitzgerald, 2007; Kellert & Berry, 1981; Plous, 2003; Riffkin, 2015; Singer, 2009; Weitzenfeld & Joy, 2014). While socialization can affect these attitudes, developments in the field of evolutionary psychology (Buss, 2016; Cosmides & Tooby, 2013) have made it clear that the mind is not a blank slate (Pinker, 2002), and that our intuitive, emotional, and instinctual tendencies, which are based on underlying evolved psychological adaptations (Buss, 2016; Gigerenzer, 2007; Tooby & Cosmides,

2016) play a significant role in our decision-making, attitudes, and perspectives. A basic premise of the evolutionary approach is that humans are not strictly rational decision-makers, but that a significant portion of their thinking arises from unconscious psychological adaptations that evolved to solve problems that we faced in our evolutionary past. With regard to ethical valuations specifically, Haidt (2001) demonstrated that our decisions and perspectives are significantly influenced by our underlying intuitions, which often arise too quickly for them to be based on rational deliberation.

This study utilizes advances in this field to develop and test hypotheses about how our underlying psychological mechanisms, which are shown to produce altruistic expressions through kinship (Hamilton, 1964), reciprocity (Trivers, 1971), and conscious deliberation (Tooby & Cosmides, 2016), can contribute to our anthropocentrism and our ability to overcome it. This approach does not refute the influence of socialization and environmental factors that can have effects on our perceptions of nature and animals (Ingold, 2011), which is produced by and incorporated into our evolved psychology. However, it does add beneficial (Herzog, 2002) additional psychological dimensions from an evolutionary perspective.

Background

The emergence of the *Homo* genus of hominins coincided with our transition to a meat-eating omnivore approximately two to three million years ago (Stanford, 1999; Wrangham, 2009). Animals in the surrounding environment would have made up a key component of our diet, and it is likely that our ancestors would have developed psychological mechanisms to view them as agents, which were categorized as non-human prey, predators, or competitors (Barrett, 2016). From a theoretical perspective, it is unlikely that our hominin ancestors would have evolved tendencies to extend significant ethical concern to animals which fell into these categories because it would have impeded their ability to successfully hunt, defend, and compete with

these animals (Randler, Hummel, & Prokop, 2012).

To develop our understanding of the degree of concern that hunter-gatherers express for animals, we conducted a preliminary assessment of twenty hunter-gatherer groups around the world using the eHRAF data files (<http://ehrafworldcultures.yale.edu>) with the search codes: Ethnozoology (OCM 825), Hunting and Trapping (OCM224), Fauna (OCM 136), Mortality (OCM 165), Diet (OCM 262), and Production and Supply (OCM 433). Frequently, hunter-gatherers need to spear or beat an animal to death with a stick that they may have trapped or cornered. Ethnographers did not indicate that hunter-gatherers hesitate to kill most prey species that they rely on for their subsistence needs due to morally based concerns unless they were perceived as being spiritually connected to them (or if they envisioned them as having human motivational systems.) On the other hand, there are indications of a degree of callousness from the few ethnographers (Diamond, 1993; Tonkinson, 1978; Turnbull, 1961) who commented on this issue one way or another. Colin Turnbull, a renowned expert of hunter-gatherers, had the following to say about the reactions of the Mbuti Pygmy to the agony of their hunted prey in the throes of death.

It was times like this that I found myself furthest removed from the Pygmies. They stood around in an excited group, pointing at the dying animal and laughing.... At other times I have seen Pygmies singeing feathers

off birds that were still alive, explaining that the meat is more tender if death comes slowly. And the hunting dogs, valuable as they are, get kicked around mercilessly from the day they are born to the day they die. ...When I talked to the Pygmies about their treatment of animals, they laughed at me and said, 'The forest has given us animals for food – should we refuse this gift and starve?' (Turnbull, 1961, pp. 101-102).

Similar patterns of abusive actions toward animals were found in a cross-cultural study by Gray & Young (2011), where they found a relatively high rate of physical abuse of dogs and other animals.

Although concern for pain and suffering was not mentioned directly, some ethnographers noted other types of concern. For instance, Marshall (1957) noted that among the bushmen of the southern Africa, there was a sense of loss that followed their killing of a large animal, because it had created a hollow in the world which might allow for misfortune to follow. Another form of concern was evident in the guise of respect that hunter-gatherers often expressed toward predators. Spiritual connections with certain animals could raise levels of concern to the extent that they invoke taboos against killing them (Martin, 1978; Nelson, 1983; Tanner, 1979). A number of Native American groups have explained that they have to appease the spirits of the animals so that they would "come" to the hunters and give themselves both in the present and future. Ingold (2011) has described this as a reciprocal relationship

between hunter-gatherers and the animals they kill. Savishinsky (1974) noted the increased levels of concern that the Hare had for their sled dogs; however, cross-cultural evidence does not indicate this rise is consistent (Tonkinson, 1978; Turnbull, 1961). When hunter-gatherers adopt animals as pets, increased levels of concern are evident, but they are focused on individuals as opposed to entire species and these relationships are often temporary in duration.

One final form of relationship that relates to level of concern in a more indirect fashion is the degree of harmony that hunter-gatherers were engaged in with their environment and the animals that inhabited it. While hunter-gatherers do have a very well developed and intimate understanding of the ecological dynamics (Blurton-Jones & Konner, 1976), this does not imply that they engage in high levels of concern for the surrounding species. Some researchers have found that their attitudes reflected those of optimal hunting as opposed to conservation (Alvard, 2007; Hames, 1987) and that taboos and prohibitions on killing certain species did not usually work to improve conservation (Low, 1996).

In summary, the degree of concern that hunter-gatherers feel/felt toward non-human species is multi-dimensional. First and foremost, as hunters, they can and do exhibit the propensity to kill most animal species in their environment that provide them with subsistence needs. Furthermore, there is some evidence that they exhibit some levels of callousness in this process. Simultaneously, they sometimes exhibit concern about the loss of larger animals,

spiritually connected animals, and pets, while maintaining respect for some of surrounding predator species.

The question at this point becomes what conditions foster higher levels of concern for non-humans (Kellert, 1993; Rowan, 1988). We believe the solution might be found in our social psychology, which evolved to regulate altruistic interactions between humans (Archer, 1997). In humans and other social species, altruistic tendencies appear to have initially arisen to enhance their reproductive fitness by engaging in regulated altruistic interactions with related individuals (Hamilton, 1964). A second path for the evolution of altruism arose from the advantages obtained through interactions with potential reciprocators (Trivers, 1971). Although reciprocity is common among humans, it is rare in other species (Clutton-Brock, 2009). Both types of altruism appear to have been utilized in the development of human coalitional psychology which governs our group interactions (Harcourt, 1992; Tooby & Cosmides, 2010). Internal regulatory variables (Tooby & Cosmides, 2008, 2010) develop to gauge the value and corresponding concern that one develops for another, based on the degree to which the other is perceived to exhibit: sexual benefits, fighting potential, kinship, reciprocal potential, competition, and hostile intentions.

A second significant aspect of our evolved social psychology is the flexible manner in which it was designed to categorize other humans as agents (Pietraszewski, Cosmides, & Tooby, 2014). Our sense of agency had to be labile enough to include a wide range of potential kin,

allies, etc., as well as competitors, manipulators, etc., and Ashby and Maddox (2005) have documented the existence of broad categorization capabilities in humans. An example of this flexibility can be seen in the capability to re-categorize non-kin as kin (pseudo-kin) with the result that they intuitively raise their level of care and expectations for such individuals. The universal appropriation of the label, “blood brother,” re-categorizes a non-kin individual as kin and thereby ascribes the level of concern that would usually only be assigned to actual brothers. Other more modern terms like “brothers-in-arms,” the “motherland,” or “fatherland,” which are utilized in political discourse, as well as the designations of family members in religious orders (“father,” “mother,” “sister,” “brother,”) also illustrate the ability of humans to re-categorize others in ways that will cue their underlying mechanisms to extend more concern than normal. This flexibility even extends to non-humans when totem animals become spiritual kin as they have for many traditional coalitions (Levi-Strauss, 1963).

This potential to extend human agency to non-humans has been recognized as anthropomorphizing, which appears to be a common human trait in modern as well as traditional cultures (Blurton-Jones & Konner, 1976; Daston & Mitman, 2005; Epley, Schroeder, & Waytz, 2013; Mithen, 1999; Serpell, 2003). Plous (2003) pointed out that pets are often perceived as family members. Gray and Young (2011) noted that pets often appear to act as surrogates for children. Anthropomorphizing goes beyond the boundary of animals to plants (Hill, 2000)

and even inanimate objects (Daston & Mitman, 2005). We believe this is indicative of the ease with which humans can re-categorize non-humans as human agents, who are then assessed by human-to-human internal regulatory variables (Tooby & Cosmides, 2010) that evolved to direct our decisions including the level of concern that is appropriate.

Although Barrett (2004) has argued that humans have evolved to distinguish prey species from humans as agents, he acknowledges that anthropomorphizing is still a widespread cross-cultural occurrence, which can happen on a partial basis so that some inferences are maintained but others are not (Barrett, 2016). The ethnographic record indicates that when individuals in traditional societies re-categorize animals as something other than prey, predators, or competitors, they significantly change their level of concern. For instance, in contrast to the generally harsh treatment that the Mardujara exhibited towards most non-human animals, both young and old “fondled, petted and kissed” (Tonkinson, 1978, p. 38) their pets. Missionaries provided the Yanomamo with chickens in hopes that they would use them for food, but they refused to eat them because they said that they had become part of their community, and therefore they had developed higher levels of concern, such that eating them would have been perceived as acts of cannibalism (Chagnon, 2013). Likewise, when the Yolngu (Australian Aborigines), raised wild Australian dogs, their perceptions of them were likened to their own children with an accompanying

increase in their degree of concern (Swanson, Lien, & Ween, 2018).

It was frequently difficult to distinguish between the variables of kinship extension and reciprocity as a source of increased concern among traditional cultures. Among the Hare Native Americans, Savishinsky (1974) found extremely high levels of concern for their sled dogs. They depended on them for their livelihoods, and they perceived them as members of their families. Smith and Litchfield (2009) found evidence of concern being extended by Aborigines to dingoes, which may have derived from spiritual beliefs but also could have emanated from perceived family connections and/or services that they provided. The Nuer and most other East African pastoralists (Evans-Pritchard, 1969) perceive of their cattle as both members of their family coalitions and as necessary to their survival; accordingly, they have developed very high ethical concerns for them. Studies in industrial societies have also shown hints of this same process occurring (Beierl, 2008; Dhont, Hodson, Costello, & MacInnis, 2014). Military service dogs gain high levels of concern from their handlers (Rogak, 2011); however, again it is unclear if it derives from their reciprocal benefits or the close relationship they develop. In both traditional and industrial societies, the extension of concern for animals may be tied to connecting them to our coalitional group through pseudo-kin connections and/or reciprocity.

A third variable is based on the understanding that our conscious reasoning can influence our internal regulatory

variables by inputting important data about a particular issue. Although the degree to which conscious deliberation affects inferential perspectives is not clearly defined (Tooby & Cosmides, 2016), it is apparent that there are definitive effects. For instance, a sexually attractive individual might initially induce feelings of lust in others, which can be muted subsequently by the knowledge that the individual is a long-lost sibling. In like manner, abstract reasoning about the inconsistency of the argument that humans are intrinsically more valuable than non-humans could cue our concern-governing mechanisms to override the default position and extend moral concerns. The ability to develop this abstract and objective reasoning may be difficult for the majority of humans to understand (Kohlberg, 1969) and perhaps is a reflection of the fact that only a minority of the population maintains rights-based ideals about animals (Kellert & Berry, 1981).

This theoretical development has led us to develop the following three hypotheses about levels of concern that humans have for non-human animals.

Hypothesis #1: Concern for non-human animals develops when non-humans are recategorized as pseudo-kin, which cues higher levels of altruistic feelings for them. The prediction is that independent variables associated with kinship will be positively correlated with the dependent variables associated with levels of concern.

Hypothesis #2: Concern for non-human animals develops when non-humans are recognized as reciprocators, which cues higher levels of altruistic feelings for them. The prediction is that independent variables

associated with reciprocity will be positively correlated with the dependent variables associated with levels of concern.

Hypothesis #3: Concern for non-human animals develops when the ethical worth of non-humans is rationally deliberated. This process acts to alter the underlying intuitive mechanisms that normally regulate interactions between humans and non-humans. The prediction is that in most cases rational deliberation will lead to the conclusion that non-humans have partial or equal ethical value as humans and that variables related to deliberation will be positively correlated with the dependent variables associated with levels of concern.

Methods

Sample Population

Because one of the objectives is to explore the underlying evolved psychology that governs concern for animals, it made sense to utilize a sample which included a relatively high number of respondents who actually worked with animals in ways that somewhat mimicked the relationships of our hominin ancestors, relying on and working with animals on a far more intimate level than most humans in industrial society do. One of the key aspects of this relationship is that the animals represented a significant source of their subsistence needs. Other groups who worked with animals in a different manner and focused on saving the lives of the animals, did not seem to maintain this element of the relationship. Most of the attendees at the animal auctions that we

attended were there to either sell animals that they had raised or purchase others to raise or slaughter for profit. Based on one of the underlying principles of evolutionary psychology, it is likely that the human-animal interactions in this venue will reflect some aspect of the universal human cognitive architecture (Buss, 2016). We also felt that this sample population enabled us to test all three independent variables (kinship, reciprocity, deliberation) simultaneously. Working with animals intimately opened the door to exploration of the kinship and deliberation variables, with the added benefit that this sample also included individuals who depended on animals for at least some portion of their subsistence needs and thereby also maintained the potential to test for the effects of reciprocity.

Three different animal auction sites in central Pennsylvania (New Holland, Green Dragon, and Leesport) were visited on multiple occasions. Livestock (cattle, pigs, goats, sheep, horses, etc.) were the predominant type of animal that were auctioned although one venue (Green Dragon) targeted smaller and some exotic animals. At each of these sites the researchers walked to different sections and then targeted every tenth person. Less than 5% of the solicited participants declined the interview. The New Holland Animal auction, where the majority of the respondents for this study were obtained, represents one of the largest animal auctions on the east coast. Attendees represent a wide range of individuals regarding: what sort of animals they work with, the type of work from training to livestock production, and the geographic area

they came from. For this reason, it provided a suitable venue to seek respondents for this particular study with its focus on a sample population of people who worked closely with animals generally.

Interview/Questionnaire

The questionnaire (See Appendix) included standard demographic data, such as sex, age, and income. It also included some general qualitative and quantitative data about their relationships and attitudes about animals. Immediately following the interview, additional notes were added to the subject's questionnaire sheet based on answers to the open-ended questions as well as overall impressions. Although we interviewed a total of 119 respondents, some did not answer all the questions clearly. Unanswered and/or unclear responses were not included.

Hypotheses, Independent and Dependent Variables

For each hypothesis, we tested two independent variables against three dependent variables. The reason for the multiplicity of both independent and dependent variables was to add to the robustness of the assessment and to cover a broader range of potential issues that related to both the independent and dependent variables. While the independent variables differed for each hypothesis, the dependent variables remained constant. Table 1 provides an outline of the independent and

dependent variables that were utilized to test each of the three hypotheses.

Determination of Independent Variables

For Hypothesis #1 regarding the effects of kinship on levels of concern, two independent variables were developed to measure the degree to which the respondent had re-categorized animals as pseudo-kin.

They were whether the subject perceived an animal specifically as part of their family and whether they developed a kinship-like relationship with an animal. We separated these two variables because we realized that it was possible that although some respondents did not consciously view animals as part of their family, their relationship with these animals might indicate that in fact respondents were relating

Table 1: Variables

<i>Hypothesis</i>	Variable	Type	How Determined	Rating Range	Rating Division for Independent Variables
<i>Hypothesis #1 (Kinship)</i>	Animal as Family	Independent	Assessed By Researcher	1-9	6-9 vs. 1-4
	Relationship with animal	Independent	Assessed By Researcher	1-9	6-9 vs. 1-4
<i>Hypothesis #2 (Reciprocity)</i>	Livestock	Independent	Designated Directly by Respondent	Yes or No	Yes vs. No
	Reciprocity	Independent	Assessed By Researcher	1-9	6-9 vs. 1-4
<i>Hypothesis #3 (Deliberation)</i>	Education	Independent	Designated Directly by Respondent	1-18+	1-11 vs. 13-18+
	Prior Thought	Independent	Designated Directly by Respondent	Yes or No	Yes vs. No
<i>Hypothesis #1-3</i>	Overall	Dependent	Assessed By Researcher	1-9	
	Pain & Suffering	Dependent	Designated Directly by Respondent	1-9	
	Intrinsic	Dependent	Designated Directly by Respondent	1-9	

to the animals in that manner. (One of the underlying principles of psychology in general and evolutionary psychology in particular is that subconscious thinking plays a significant role in our attitudes and ultimately our behaviors. (Buss, 2016).)

Data from question IVA - (see Appendix), which asked about whether or not they were concerned because the animal was a part of their family (Independent Variable “Animal as Family” from Table 1), was utilized to rate the respondents on a 9-point scale in terms of the degree to which they perceived animals as a member of the family. If they indicated clearly that a particular animal was perceived a member of their family, they would be assigned a 7, 8, or 9 indicating high levels of kinship perception. The determination of which number depended on how informants responded to other questions, which helped to confirm and clarify the degree to which they perceived animals as members of their family. If they were hesitant or unsure about whether some animals were perceived as members of their family, they were assigned a 4, 5, or 6 on the scale, and the precise number again was determined by assessing their other responses. Finally, if they indicated that animals were not considered members of their family, they were assigned a 1,2, or 3 rating, and the specific number was again determined by other responses.

To assess the relationship variable (Independent Variable “Relationship with Animal” from Table 1), a more comprehensive assessment of the entire set of responses was utilized because, as noted above, we were attempting to determine if

they were treating animals as members of their family without being consciously aware of it. Some of our benchmarks were whether the respondents let the animals into their houses or allowed them to sleep in their bedrooms. Another benchmark was the degree to which their animals and children interacted. A third was how much time they spent with the animals. A fourth was the type of activities they engaged in. Overall, we were attempting to determine if their animals fulfilled the categories that were usually applied to close kin. Indications of these types of activities arose in the context of answers to different questions. Sometimes the respondent would expand on one issue or another and reveal something about their relationship with the animal. If there was clear evidence that their relationship did mimic that which would be found for kin, then the subject was rated as a 7, 8, or 9 for this variable with the distinction being based on how clearly and strongly the relationship seemed. A 4, 5, or 6 rating was given if the respondent indicated some potential for kinship-like relationship although it was not strongly demonstrated; distinctions were once again based on the degree to which there were indications of the potential behaviors. Finally, a rating of 1, 2, or 3 was given if the relationship seemed clearly devoid of the usual elements of kinship relationships with the distinctions being based upon and the degree to which non-kinship was indicated.

For Hypothesis #2, two indicators were used to measure degree of reciprocity. The first independent variable (Independent Variable “Livestock” from Table 1) was whether they were livestock owners, which

we determined produced a high potential for a sense of reciprocity. For the second independent variable (Independent Variable “Reciprocity” from Table 1) for Hypothesis #2, we rated respondents on a 9-point scale in terms of reciprocity based on a combination of the open-ended responses and their responses to question IVC - (see Appendix), which asked about whether they cared for animals due to the services they provided. Through the variations in their responses to question IVC, the researchers were able to gain a good sense about the degree to which the respondent recognized and valued the animals due to what return benefits the animals provided.. Relatively high levels of recognition for their help resulted in a 7-9 rating. Lower levels of recognition resulted in a 4-6 rating, and the lack of recognition resulted in a 1-3 rating. In addition, other comments to other questions that related to the recognized level of gratitude for the benefits were utilized to complete the rating of reciprocity. (For this rating, ownership of livestock was not included.) It should be noted that although they may not have recognized the value from the animals initially, other responses may have indicated some level of gratitude that could be used to elevate the respondent from the 1-3 to the 4-6 category.

Finally, for Hypothesis #3 we utilized two variables. The first independent variable for Hypothesis #3 (“Education” from Table 1) was based on the level of education as an indication of the likelihood for prior deliberation about the level concern. Level of education was reasoned to be an indicator of potential for prior deliberation because

formal education is focused in part on developing one’s ability to expand one’s rational and critical thinking skills (Brinch & Galloway, 2012; Ceci, 1991), and these in turn increase the potential for one to make independent deliberations about any issues - including those related to intrinsic values of organisms. The second independent variable (“Prior Thought” from Table 1) for Hypothesis #3 was a direct measurement based on whether the respondent answered “yes” or “no” to question IIA - (see Appendix) - about whether or not they had ever thought about the issue or not.

Determination of Dependent Variables

Three dependent variables (labeled “Pain and Suffering,” “Intrinsic,” and “Overall”) based on assessments of concern were measured. We felt it would be beneficial to specifically target two particular types of concern that had been discussed in the literature (Kellert & Berry, 1981): concerns over pain and suffering and concerns based on a sense of intrinsic rights of non-humans. Initially we to use four questions in which the respondents indicated a rating of 1-9 on a Likert scale, (Appendix: IIC-F). However, during a pilot study, questions “C” and “E” proved less effective at accurately measuring their levels of concern for both pain and suffering and intrinsic variables because it was relatively easy for most respondents to rate themselves highly since there were no qualifying conditions. (Although Questions C & E were no longer utilized to measure these dependent variables directly, they were maintained on the questionnaire to help

characterize the respondents in terms of other aspects of their relations to animals.) Question “IID” on the other hand, asked about their level of concern for pain and suffering if actions to alleviate it would cost more than the animal was worth. This required the respondents to weigh the financial costs against their concern. Their answers to this question became the score for the "Pain and Suffering" dependent variable. Question “IIF” successfully measured the degree to which respondents developed a sense of intrinsic worth for the animals because respondents were required to rate their concern for the animals relative to their concern for humans.

In addition, we added a rating of “overall” concern in an attempt to include a more comprehensive measurement of concern. There were often situations in which various comments were made by respondents during the interview that provided valuable insights about their levels of concern. While we already had two measurements that were based solely on the respondents’ own ratings, we felt it would be beneficial to add this more comprehensive method of measuring concern, which was based on the researchers’ overall assessments of each respondent. Following each interview both researchers independently assessed the “overall” concern level based on any and all of the answers they provided; we purposefully did not focus on a particular question because as noted, various comments which provided insights about their levels of concern were made at different points during the interviews. As we had done in the previous ratings that we made for some of the independent variables (Family,

Relationship, and Reciprocity), we first designated the respondents in one of three general categories: 7-9 for respondents who were judged to be highly concerned, 4-6 for respondents who showed signs of moderate concern, and 1-3 for those who demonstrated little to no concern. Within those categories, we then made judgments about whether their concerns were high or low. We then compared our results and usually found them to be quite consistent (See Reliability section below for greater details of the reliability of our ratings). If different ratings existed, they were averaged to determine the final score for the overall dependent variable. (In this and the other variables, a “9” was seen as highest on the scale and “1” as the lowest.)

Reliability of Data Measurement

We realized that there was a level of subjectivity involved in the development of four out of the nine independent and dependent variables that we utilized. This is true of any rating system where qualitative data needs to be interpreted and operationalized. We felt that the particular rating system we used helped to diminish the subjectivity in two manners. First, we set up criterion to place respondents in one of three initial categories (1-3, 4-6, 7-9). Once they were determined to be in those categories, we then were able to utilize additional data to further distinguish them. From a cognitive perspective, this eased the process considerably of distinguishing the different ratings.

To test the reliability of our method, we had each researcher independently rate

the respondents based on their responses. We found that we were over 90% consistent in terms of the more basic designations of whether the respondent fell into the 1-3, 4-6, or 7-9 categories. We were less consistent on the distinctions within these categories, but still better than 65% consistent. When we were inconsistent, we averaged the ratings. Overall, we felt that our ratings were representative of the three independent and one dependent variables that we were attempting to measure; however, we do acknowledge the possible limitation due to subjectivity. One of our attempts to overcome potential subjective errors (beyond what has been described) was to include two rather than one independent variable for each hypothesis that could be tested independently. For the hypotheses on reciprocity, one of the independent variables was not based on our rating system but rather on an objective measure that was designated directly by the respondent. Both independent variables for the deliberation hypothesis (#3) were determined directly by the respondents. For the dependent variables, two out of three were determined directly by the respondents.

Method of Assessment

Each of the three hypotheses was evaluated using two independent variables. A two-tailed *t*-test was used to assess the statistical significance of their responses for each of these dependent variables. A regression test was also utilized to comprehensively model for the relative significance of all the independent variables simultaneously.

For the *t*-tests, two of the independent variables were tested based on yes or no responses (livestock ownership and prior deliberation). The education variable was split between those who had been educated beyond high school and those who had not completed their high school education. This split was proposed initially for theoretical reasons, but it also corresponded with an appropriate dividing point in the sample. From a theoretical perspective, additional education in college beyond high school represents another step up in the development of potential for critical thinking abilities and the potential to come up with independent conclusions about intrinsic worth of non-human animals. In addition, the average level of education among the respondents was 12.3 years, which meant that splitting them at the level of more than or less than high school which equated to 12 years was just about synonymous with splitting them according to the mean.

For the three independent variables, which were measured on a 9-point scale (perception of animal as a family member, relationship with an animal, and reciprocal interaction with an animal), the responses were initially separated according to whether the subject was rated between 9-6 versus 4-1. These groups were chosen because they represented the simplest and most clear division of these three independent variables - the rating of "5" was left out because it represented the most obvious demarcation between the two groups that we wanted to contrast. To ensure that the results of these tests did not arise due to the way they were divided, an additional "progression"

assessment was carried out to determine if the same trends arose when the groups were divided between 1-3, 4-6, and 7-9.

Results

General Characteristics of the Sample

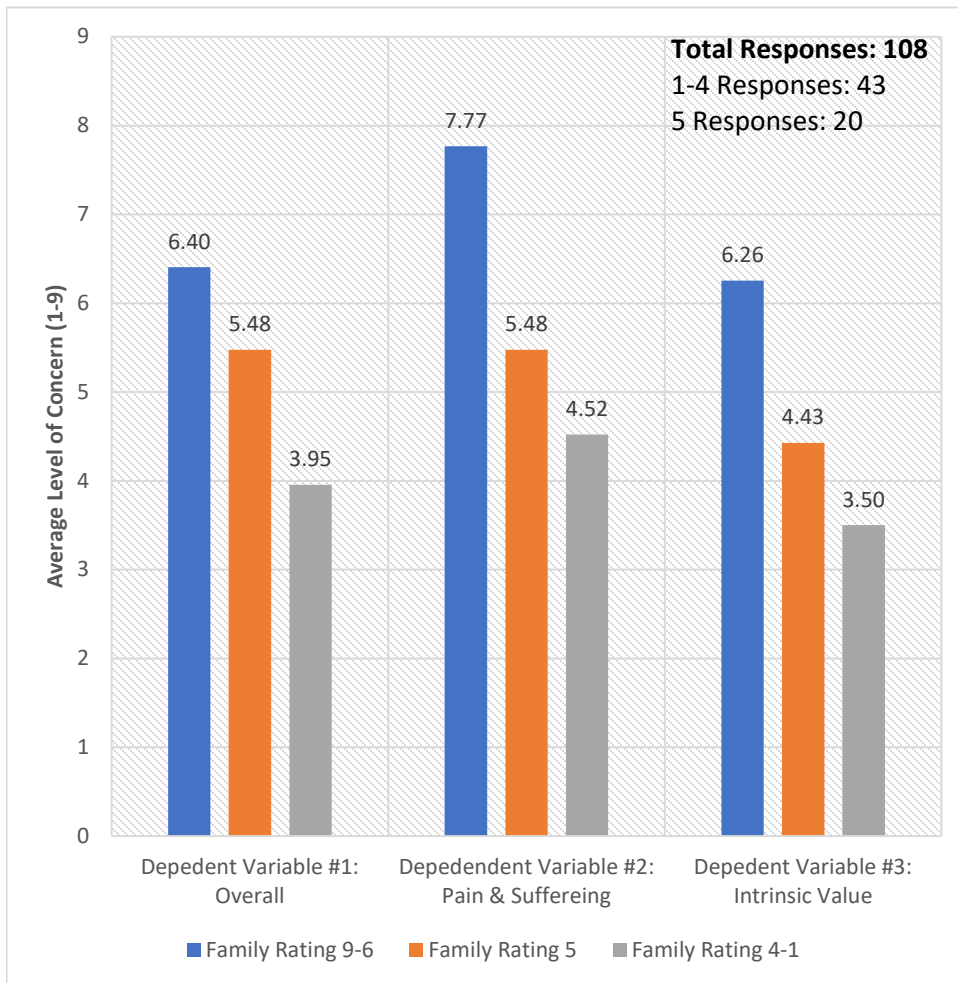
Eighty-one of the 119 respondents were males (68%) and thirty-eight were females (32%). Ages in years ranged from 18-86 with a mean of 46.3 and a median of 46. The average years of education with 12

years representing graduation from high school, was 12.3 years. One-hundred and two out of 119 indicated that they owned pets.

The results are displayed through figures and tables. The six figures provide the responses and illustrate how each of the six independent variables relate to each of the three dependent variables. Table 2 provides statistical data for the *t*-tests, and Table 3 provides statistical data for the regressions.

Exploration of Relationships between Each Independent and Dependent Variable

Figure 1: Hypothesis One - Kinship Independent Variable #1 (Animal as Member of Family)

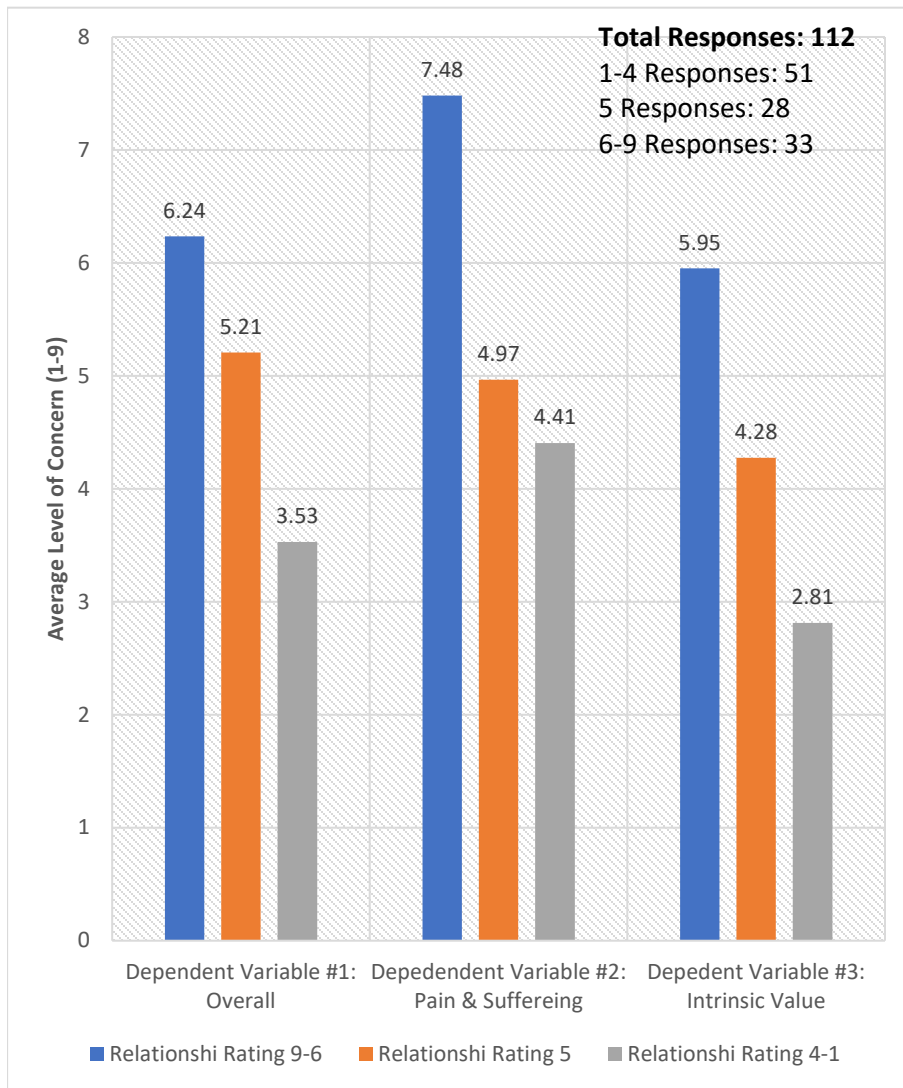


Figures 1 and 2 illustrate the results of the *t*-tests for both independent variables that were related to Hypothesis 1 (“Animal as Family Member” and “Relationship with an Animal”). The responses trended as hypothesized, and the *t*-tests indicated that the differences were significant with *p*-values well below 0.0001. This was true for all three dependent variables. (See Table 2 for results

of the *t*-tests that were carried out on each independent and dependent variable for Hypothesis #1.)

The results of the "progression" assessment mostly mirrored what we had found when we contrasted groups 1-4 against 6-9. For the "Animal as Family Member" independent variable, the averages for all three dependent variables changed in the directions as predicted, and the difference

Figure 2: Hypothesis One - Kinship Independent Variable #2 (Relationship with an Animal)

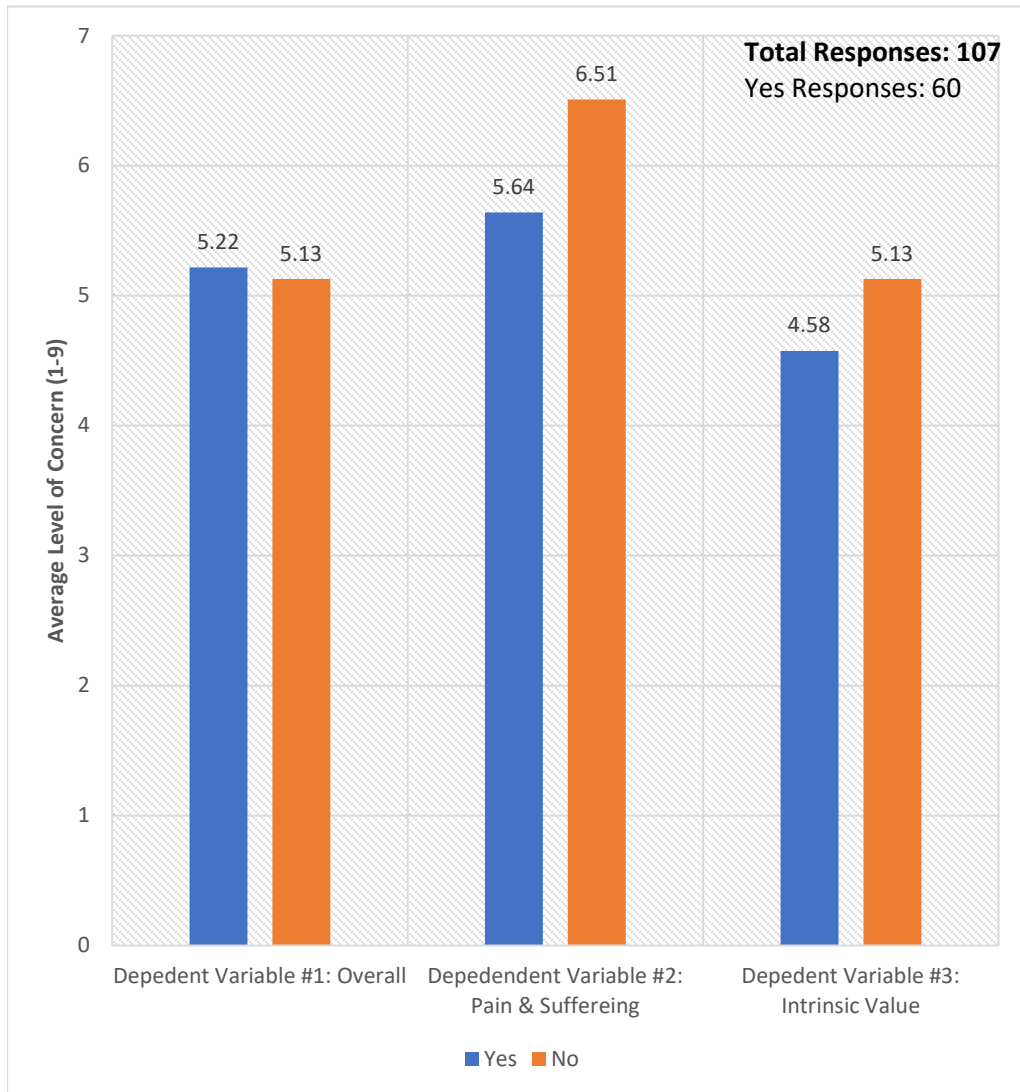


was significant ($p < 0.05$) according to the two-tailed t -test. For the "Relationship" independent variable, the same results were found for two of the dependent variables ("Overall" and "Intrinsic"). For the "Pain and Suffering" dependent variable, the p -value for the contrast between groups 4-6 and 7-9 was just above the significant threshold at .078. Overall, with all averages trending in the expected manner, and eleven out of twelve of differences testing as significant,

we concluded that this method of progression assessment replicates the results found in the simple contrast tests and supports the hypotheses that kinship categorization varies directly with levels of concern.

Figures 3 and 4 illustrate the results for both independent variables ("Livestock Ownership" and "Reciprocity toward Animals") that were related to Hypothesis #2 about the effects of reciprocity on levels of concern. Of the 107 respondents who gave a

Figure 3: Hypothesis Two – Reciprocity: Independent Variable #3 (Livestock Ownership)



clear indication about livestock ownership, 60 owned livestock and 47 did not. Not all the answers trended in the expected direction to support the second hypothesis. For instance, ownership of livestock appeared to result in slightly less rather than more concern for two of the three dependent variables. The *t*-tests only indicated statistically significant differences for one of the six relationships: reciprocity for the pain and suffering dependent variable produced a *p*-value of

0.021. (See Table 2 for results of the *t*-tests that were carried out on each independent and dependent variable for Hypothesis #2).

These results taken together do not support Hypothesis #2 that reciprocal relations lead to increased levels of concern for animals.

Figures 5 and 6 provide results that relate to Hypothesis 3 about the effect of prior consideration of the appropriate concern for non-human animals. Figure 5 indicates that

Figure 4: Hypothesis Two – Reciprocity Independent Variable #4 (Reciprocal Relationship)

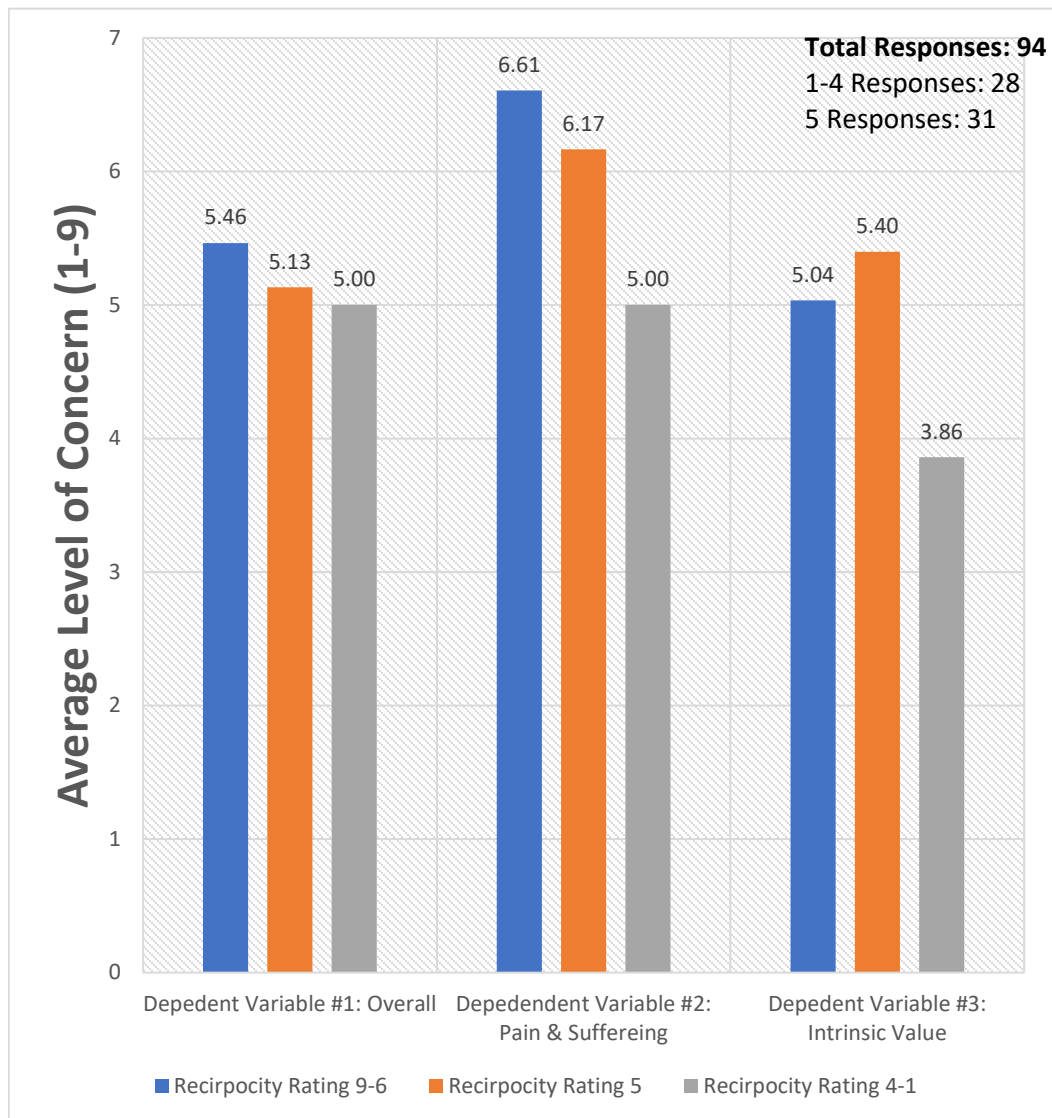
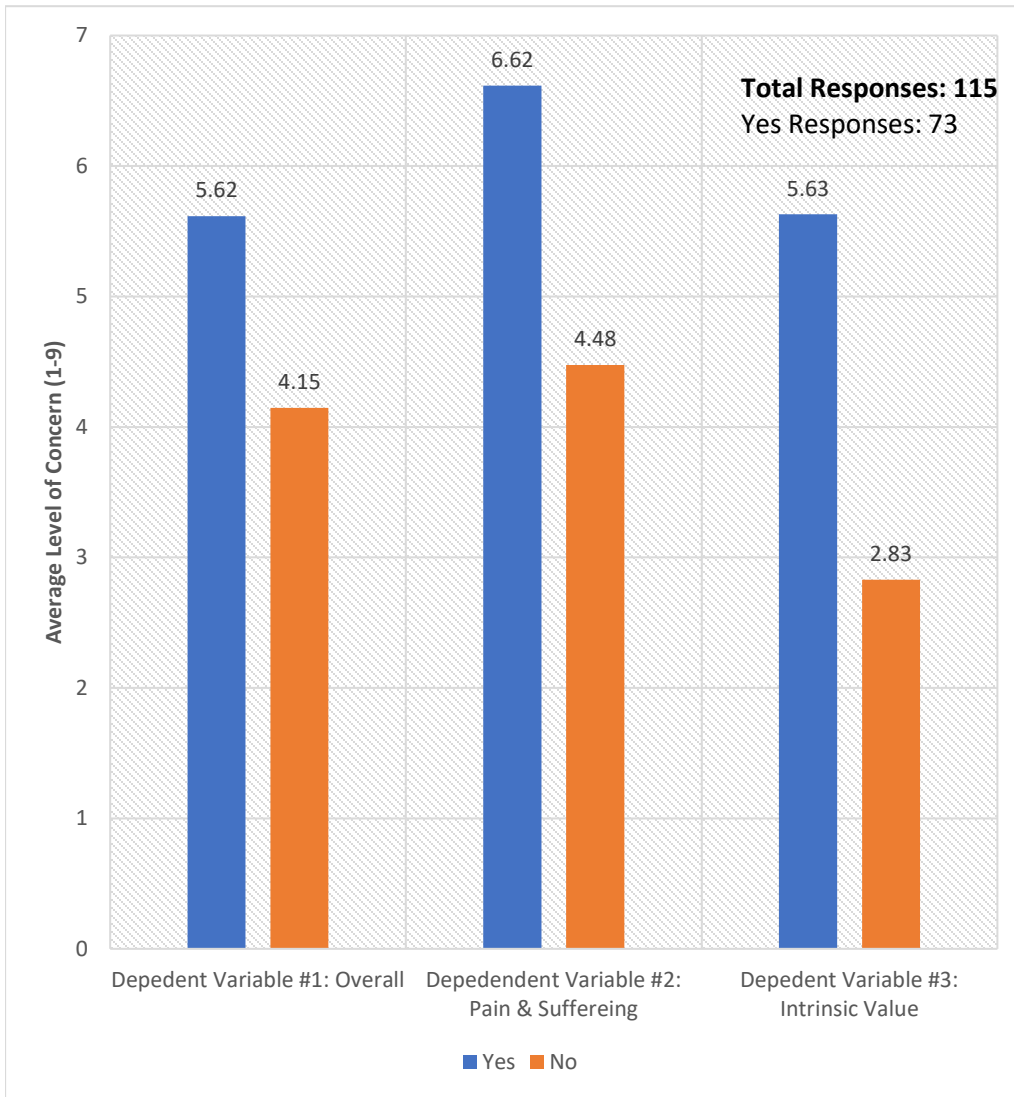


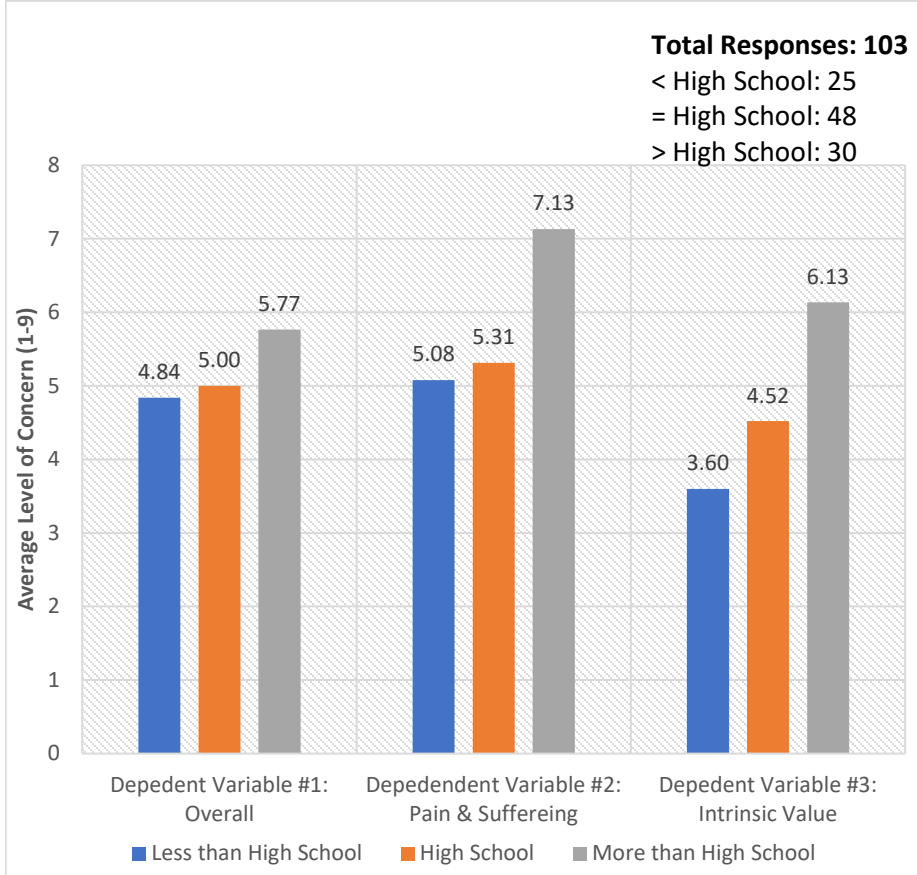
Figure 5: Hypothesis Three – Rationality: Independent Variable #5 (Thought About It)



for all three dependent variables, prior consideration led to significantly more concern for animals. Higher education levels as depicted in Figure 6 also produced significantly more concern for all three dependent variables although the effect was

not quite as strong. Overall, these results support Hypothesis #3 that prior deliberation leads to higher levels of concern. (See Table 2 for results of the *t*-tests that were carried out on each independent and dependent variable for Hypothesis #3.)

Figure 6: Hypothesis Three – Rationality: Independent Variable #6 (Education)



Comprehensive Modeling of All Independent Variables to Each Dependent Variable

To model the combined effects of all six independent variables on each dependent variable simultaneously, multiple regression tests were carried out for each of the three dependent variables ("overall," "pain and suffering," and "intrinsic"). The results of these tests are displayed in Table 3. Because these tests required complete information for each independent variable, the average number of responses was reduced from 106.5 for the *t*-tests to 71 for multiple regression tests. This means that there were 33% fewer respondents for the multiple regression tests than there were for *t*-tests, and it probably explains some of the differences in terms of

statistical significance as calculated between some dependent and independent variables that are noted below.

The regression model was relatively good at predicting overall dependent variable (R Square = 0.72, Adjusted R= 0.70). The regression model proved quite significant with an *F*-value of 27.62 (*p* < 0.001). Most telling, the *p*-values for three of the independent variables were significant (family variable *p*-value < 0.001, relationship variable *p*-value = 0.013, education variable *p*-value = 0.041). Neither of the independent variables associated with reciprocity produced a significant *p*-value, nor did the variable for prior thought.

Table 2: Values for *t*-tests

<i>Hypothesis</i>	Independent Variable	Dependent Variable	Degree of Freedom	<i>t</i>-Stat	<i>p</i> Value for 2-tailed <i>t</i>-test
<i>Kinship</i>	Family	Overall	86	8.44	<0.001
	Family	Pain/Suffering	81	6.38	<0.001
	Family	Intrinsic	86	4.30	<0.001
	Relationship	Overall	69	9.29	<0.001
	Relationship	Pain/Suffering	57	5.38	<0.001
	Relationship	Intrinsic	73	5.29	<0.001
<i>Reciprocity</i>	Livestock	Overall	92	0.27	0.79
	Livestock	Pain/Suffering	100	-1.69	0.094
	Livestock	Intrinsic	93	-0.92	0.36
	Reciprocity	Overall	58	1.05	0.30
	Reciprocity	Pain/Suffering	61	2.37	0.021
	Reciprocity	Intrinsic	58	1.57	0.12
<i>Deliberation</i>	Education	Overall	53	2.31	0.025
	Education	Pain/Suffering	47	2.94	0.0051
	Education	Intrinsic	50	3.07	0.0034
	Thought	Overall	84	4.38	<0.001
	Thought	Pain/Suffering	94	4.53	<0.001
	Thought	Intrinsic	106	5.59	<0.001

Table 3: Regression Analysis

<i>Dependent Variable</i>	R Square	df	<i>F</i>	<i>F</i> Sig	Independent Variable	<i>t</i> Stat	<i>p</i> Value
Overall	0.72	(64,6)	27.62	<i>p</i> <0.001	Family	3.79	<0.001
					Relationship	2.54	0.013
					Reciprocity	1.21	0.23
					Livestock	1.70	0.094
					Education	-2.08	0.041
					Thought	1.38	0.17
	Pain & Suf.	0.35	(67, 3)	9.76	<i>p</i> <0.001	Family	1.46
					Relationship	0.98	0.68
					Reciprocity	0.96	0.34
					Livestock	-1.48	0.14
					Education	-1.25	0.22
					Thought	2.41	0.019
Intrinsic		0.39	(64, 6)	6.76	<i>p</i> <0.001	Family	1.31
					Relationship	1.12	0.27
					Reciprocity	0.71	0.48
					Livestock	0.14	0.89
					Education	-1.31	0.19
					Thought	2.67	0.0096

The "pain and suffering" dependent variable was not as robustly predicted by the independent variables (R Square = 0.35, Adjusted R = 0.28). The F value was 9.76 ($p < 0.001$). The only independent variable with a significant p -value was for prior thought ($p = 0.019$).

The "intrinsic" dependent variable had similar multiple regression test values to the "pain and suffering" dependent variable. The regression model predicted the outcome only moderately well (R Square = 0.39, Adjusted R = 0.33). The F value was 6.76 ($p < 0.001$). Once again, the prior thought independent variable proved significant ($p = 0.0096$).

Covariation Analysis

Covariation was not found to be an issue with most of the variables. Because the independent variables ranged from binary to interval, different tests were necessary to examine how they related to each other. For instance, chi squared tests indicated that owning livestock did not coincide with owning pets, and a t -test was used to establish that the education levels of livestock owners was independent from the education levels for non-livestock owners. The potential for covariation between variables will be a more significant issue in more precise models, which attempt to determine the specific effects of the variables on each other in a defined manner.

Discussion

Coalitional Kin-Based Concern

These results lead to a number of insights about when and why humans might extend ethical concerns to non-humans. First, the basics are that cues of kinship, pseudo-kinship, or even coalitional inclusion might be enough to raise the level of concern for a particular non-human animal. The existence of a family-like relationship usually raised the level of concern considerably while the view of animals as food or a commodity seemed to lower their concern. Various references to their non-human animals as "surrogate child," a "friend," or "like a spouse," were used to help explain why respondents raised their levels of concern. As a number of researchers (Pietraszewski et al., 2014; Robertson et al., 2014) have pointed out, humans would have had to develop sophisticated and restrictive tendencies for doling out concern to other humans. Categorizing them as kin is one of the basic reasons to extend concern, and these results would appear to support their significance both for humans and non-human animals.

There was evidence that these feelings of concern arose for a particular animal rather than a group of animals in many cases. As an example of this pattern, one pig farmer who raised, sold, and slaughtered pigs for a living had initially entered the business after being given a young injured female pig by a friend, which he nursed back to health and then used to develop his population of sows. While he had relatively low concern for the descendent pigs, which he raised for

sale or slaughter, he unhesitatingly acknowledged that his level of concern was considerably higher for this one pig whom he still had. He stated that she was like family to him, and she came into the house with him frequently. (The fact that he did not raise concerns for any of his other sows, who also provided reciprocal benefits, and the specific label of the pig as "family," makes it appear as though the kinship designation is responsible for the heightened concern.) It is interesting to note that a specific declaration by this farmer that his special sow came into his house with him was expressed by other respondents as explanations for their raised levels of concern. The potential implication is that when one brings a non-human animal into their living abode, it is a cue of kinship and tantamount to categorizing them as a member of your family.

Reciprocity Based Concern

Most of the results do not support the extension of concern based on reciprocity. Respondents who owned livestock and/or who measured highly in terms of perceiving themselves to be in a reciprocal relationship with at least some of their animals, did not significantly raise their levels of concern in five of the six tests. These results are supported by Taylor and Signal's (2009) finding that people who work with animals rate profit animals lower than pets and even pests.

A natural bias was evident among the majority of the subjects who owned livestock, which made it unlikely that they would ever consider raising animals to the

same ethical level as humans. Many respondents simply said that they were not as concerned with these animals because they were not humans but could not explain why that should matter. In fact, many of them did not seem to feel any need to explain why and were incredulous that we should even ask about that issue. A frequent response was, "they're animals!" Their concern for livestock was limited predominantly to providing shelter and limiting pain and suffering at an accepted culturally determined point, which was well below what they would feel was appropriate for humans and their companion animals.

The conclusion that reciprocity is not likely to be as much of a factor in raising concern for animals, could be limited. First, perceiving animals as food sources may trigger a return to a default level of low concern. What is unclear is whether livestock animals used predominantly for food differed in terms of concern from livestock animals used predominantly for drafting or other types of work. Horses seemed to represent an interesting transitional species that would receive higher levels of concern if viewed as companions or lower levels if viewed as livestock. Another possible explanation is that reciprocity-based coalitional psychology operates for humans but is not easily transferred to non-humans for several possible theoretical reasons.

Conscious Deliberation Based Concern

Conscious deliberation was also found to be a significant variable that affected the level of concern for non-human animals.

The logical inconsistencies regarding which non-human animals received higher concern, indicated to us that at least some of the mechanisms that regulate levels of concern arise from other more intuitive processes such as categorization as pseudo-kin as we have suggested. However, when conscious deliberation is applied, it can and does seem to affect concern. The theoretical basis for this connection is that our conscious deliberation can and does have influences on our intuitive psychological mechanisms. There are at least two avenues for conscious thought to affect our intuition-emotions-instincts that arise spontaneously. First, psychological mechanisms can be affected by individual reasoning which produces a logical conclusion. For instance, reasoning that garter snakes cannot harm you significantly may alleviate the potential fear that many humans intuitively feel in the presence of any snake. In similar manner, reasoning about the intrinsic worth of other species may influence the tendency to assign lower levels of concern. The interesting aspect here is that this type of conscious deliberation may enable the transfer from the insular focus of the concern on one animal, which we witnessed among many respondents, to a larger group of animals such as a species. This would represent an area of research that could be assessed in the future.

Conscious knowledge could also develop through the influences of traditions that are passed down from the previous generation in the form of culture. We appear to have psychological mechanisms which promote this type of transition of valuable

knowledge (Tooby & Cosmides, 1992), and it, in turn, also affects not only our conscious understanding of the world but also our underlying psychological operations. Cultural norms that prescribe high or low levels of concern should raise or lower the concern levels; however, they should not be considered to be the only influence because the default mechanism for predators, prey, and competitor categorization as well as the potential effects of kinship categorization also need to be considered. For example, more than one-third of the respondents looked quizzically at the interviewer when asked about levels of concern and said, “I never really thought about that before.” Even for those who had considered it, most did not appear to dwell deeply on the issue.

There were several interesting justifications used to explain why they have different levels of concerns for some non-human animals such as “pigs stink...” or they’re “barnyard animals...” The explanations that subjects provided for why non-human animals should have lower levels of concern may represent unconscious rationalizations (Haidt, 2001) for the attitudes produced by the underlying psychological tendencies that promote less concern for animals categorized as prey. In this situation, it seems to reflect a reverse process in which the underlying mechanisms are influencing the content of conscious deliberation.

Limitations

This study represents a preliminary investigation into the effects that three variables from an evolutionary perspective

would be likely to have on the degree of concern that humans might develop for non-humans. While the results are encouraging in that they provide strong evidence that at least two of the hypotheses are valid, each of the independent variables need to be examined in greater detail in future studies to determine their potential effects with greater precision.

A second limitation relates to the frame of reference that the respondents took when they provided their answers. Some individuals appeared to maintain higher levels of concern for individual non-human animals. It was possible that the different levels of concern might confound our results; for example lower levels of concern for livestock could have been overshadowed by higher levels for pets. The potential danger was that it would depress the correlations that might have existed between the independent and dependent variables. We attempted to override this problem by asking about various types of concern without reference to any particular type of animal. Our assumption was that whatever combinations of concern that respondents felt would be averaged out. The fact that four of our independent variables indicated relatively strong positive correlations appears to support our assumption, but we believe that future research which looks more precisely at the effects of each of these variables can more clearly examine dynamics of concern for different non-human animals.

Conclusion

The results of this research indicate that at least two processes, kinship

categorization and prior conscious deliberation, affect the levels of ethical concern that humans feel for non-humans. Reciprocal relations, on the other hand, did not affect concern levels in the sample we examined. When non-human animals are perceived as pseudo-kin or when prior conscious deliberation takes place, ethical concerns rise. Our interpretation is that associated variables affect the underlying algorithms that influence our levels of concern. More research on these and other variables in the future should lead to a better understanding of when and why humans raise their ethical concerns for non-humans.

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Appendix: QUESTIONNAIRE

Code: Age: Sex: Occupation: Residence: Education: Pets: Family:

I. What do you do that involves the use of animals?

Pets Livestock

Draft animals/working Horses/work Horses/pleasure

Wool Eggs Milk

Other:

II. How concerned are you about animals?

A. Ever thought about it? No Yes How Much:

B. Little to No concern because they are not humans? Y N

C. Concern that they have enough food and shelter?

1 2 3 4 5 6 7 8 9

Not at All A Little Somewhat A Lot Very Much

D. Concern to minimize pain and suffering if it costs more than the animal is worth?

1 2 3 4 5 6 7 8 9

Not at All A Little Somewhat A Lot Very Much

E. Concern for their happiness?

1 2 3 4 5 6 7 8 9

Not at All A Little Somewhat A Lot Very Much

F. Are you concerned about animals to the same extent that you are concerned about other humans?

1 2 3 4 5 6 7 8 9

Not at All A Little Somewhat A Lot Very Much

III. Does your level of concern change depending on the particular or type of animal?

Type of Animal:

Particular Animal:

Change in level of concern?

IV. Why are you concerned with animals in the way you described?

(Open answer first)

- A. Because I feel like they are part of my family
- B. Because they are just as deserving of concern as are humans
- C. Because they provide a service to me/humans
- D. To prevent pain and suffering