THESIS

MESSAGE FRAMES AND WILDLIFE VALUES INFLUENCE PUBLIC ACCEPTANCE OF WILD HORSE MANAGEMENT STRATEGIES

Submitted by

Jeffrey Rodriguez

Department of Human Dimensions of Natural Resources

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Master’s Committee:

Advisors: Alan Bright
Co-Advisor: Rebecca Niemiec

Sarah King
ABSTRACT

MESSAGE FRAMES AND WILDLIFE VALUES INFLUENCE PUBLIC ACCEPTANCE OF WILD HORSE MANAGEMENT STRATEGIES

Wild horses are a symbol of the American West that evoke emotional responses from people, and the management of these populations has become a contentious issue. We examined the influence of messaging and wildlife value orientations on public acceptance of potential wild horse management actions in the Western United States. We used an online questionnaire that began with one of three randomly assigned messages about wild horse management: the control message provided information about wild horse populations and management options, the rational appeal added on information about the negative impacts of growing wild horse populations and the limitations of current management approaches, and the emotional appeal added a photograph of emaciated wild horses to the rational appeal. The questionnaire then asked participants about their acceptance of wild horse management options and their values of and experiences with domestic horses. Our survey experiment showed that messaging can influence overall acceptance of wild horse management techniques. Participants who received the emotional or rational appeal were more accepting of the use of contraception, sterilization, euthanasia, and the sale of horses to be used for consumption compared to those who received the control. Adding an emotional component to the rational appeal increased acceptance of wild horses living out their lives in government holding pens over all other message conditions. We also found that participants in general were more accepting of contraception and sterilization than any of the other management techniques. Participants with traditionalist values were more likely to accept euthanasia. Overall, we suggest that messaging may influence public acceptance of many of the proposed management actions for wild horses in the Western United States.
TABLE OF CONTENTS

ABSTRACT...............................................................................................................................ii
LIST OF TABLES.......................................................................................................................iv
LIST OF FIGURES.........................................................................................................................v
Introduction.................................................................................................................................1
Methods........................................................................................................................................5
Results.......................................................................................................................................9
Discussion.................................................................................................................................21
Conclusion.................................................................................................................................25
References.................................................................................................................................26
Appendix....................................................................................................................................37
LIST OF TABLES

TABLE 1- Messages used in our experiment ................................................................. 6
TABLE 2- Variables used in analysis .............................................................................. 7
TABLE 3- Description of the sample .............................................................................. 9
TABLE 4- ANOVA table for contraception..................................................................... 11
TABLE 5- Post-hoc test for message condition (contraception) .................................. 11
TABLE 6- Regression analysis for contraception .......................................................... 12
TABLE 7- ANOVA table for sterilization ..................................................................... 12
TABLE 8- ANOVA for wildlife value orientations (sterilization) ............................... 13
TABLE 9- Post-hoc test for message condition (sterilization) ..................................... 13
TABLE 10- Regression analysis for sterilization ............................................................ 14
TABLE 11- ANOVA table for horses living out their lives in holding pens ................... 14
TABLE 12- ANOVA table (message condition*wildlife value orientation) .................. 15
TABLE 13- Regression analysis for horses living out their lives in holding pens .......... 15
TABLE 14- ANOVA table for horses being killed humanely in holding pens ............... 16
TABLE 15- ANOVA for wildlife value orientations (horses being killed humanely) ...... 16
TABLE 16- Regression analysis for horses being killed humanely in holding pens ...... 17
TABLE 17- ANOVA table for horses being killed humanely and sold for consumption .... 17
TABLE 18- ANOVA for wildlife value orientations ....................................................... 18
TABLE 19- Regression analysis for horses being killed humanely ............................. 19
LIST OF FIGURES

FIGURE 1- Percent acceptable for each management options........................................................10
FIGURE 2-Percent acceptable for Wildlife Value Orientations.........................................................20
INTRODUCTION

Wild horses (Equus ferus) are an iconic symbol of the American West, and for many people just the word “horse” conjures up a multitude of emotions (Scasta, Hennig, & Beck, 2018). The native horse species that originally existed in North America went extinct about 10,000 years ago, and the wild horses in the American West today are descendants of horses introduced by European settlers in the late 15th century (Beever, 2003; Garrott & Oli, 2013; Kirkpatrick, Lyda, & Frank, 2011; Scasta et al., 2018; Scasta, 2019). Wild horse populations are currently growing at a rate of 15-20 percent per year (Michaels, 2018; National Research Council, 2013) in the American West. Scientists suggest that population increases has led to increased pressure on rangelands creating less available forage for horses resulting in increased competition with native wildlife and livestock (Garrott & Oli, 2013; Michaels, 2018; Norris, 2018; Scasta, 2019). These negative ecological and economic impacts have led agencies and organizations to begin considering various management options to control populations of wild horses.

Currently, wild horses are being managed primarily by the Bureau of Land Management in compliance with the Wild and Free Roaming Horses and Burros Act (WFRHBA) (1971), which prompts the agency to protect and manage wild horse and burro populations in their jurisdictions (Garrott & Oli, 2013; Michaels, 2018; Perryman, McCuin, & Schultz, 2018; Wild and Free Roaming Horses and Burros Act (1971)). The BLM and other federal agencies manage wild horse populations primarily by removing horses from public rangeland and placing them into private off range holding facilities. Managing agencies seek to promote adoption of these horses removed from the range. The horses that are not adopted live out their lives in these
enclosures or pastures (Garrott & Oli, 2013; Perryman et al., 2018). For the fiscal year 2018, the BLM used 61 percent of the total budget for the wild horse and burro program on off-range holding costs (about $50 million) (Bureau of Land Management, 2019). In addition to removing horses from the range and placing them in pastures, the BLM currently practices contraception on range to manage population growth rates.

Contraception has been used to manage wild horse populations since the late 1970’s and researchers continually seek a safer, more practical, and highly effective method to apply to the overpopulated wild horse herds across the Western US (Kane, 2018). Current contraception approaches include the use of Porcine Zona Pellucida (PZP) immunocontraception vaccines (PZP-22 and Zona-Stat-H) and the GonaConTM vaccine (National Research Council, 2013). These vaccines have been shown to reduce fertility in wild horses but are difficult and costly to implement, because inoculations need to be given frequently and are most effective when hand-injected (Kane, 2018; Kirkpatrick et al., 2011; National Research Council, 2013). Implementing novel management strategies such as sterilization and furthering research for contraception drugs will require building public acceptance of such techniques (Kane, 2018; Kirkpatrick et al., 2011; Scasta, 2019).

Management of free roaming horses on public lands in the western United States creates legal, social, and political challenges for federal agencies (Michaels, 2018; Scasta et al., 2018; Scasta, 2019). Appropriations bills have limited the options that managers can use to curb population growth (Danvir, 2018; Norris, 2018). For example, the Consolidated Appropriations Act (2005) which required the BLM to sell horses older than ten years and the Rahall Amendment (2006) which prevented the sale and slaughter of protected wild horses and burros limit the scope of management possibilities (Danvir, 2018; Norris, 2018). Wild horse
management plans are often plagued by litigation, and during public comment periods, many stakeholders voice concern for horse well-being. Such litigation and stakeholder opposition has often prevented the BLM from implementing alternative management options, such as sterilization or lethal control (Danvir, 2018; Michaels, 2018; Norris, 2018; Perryman et al., 2018; Scasta et al., 2018). Although there is controversy around the use of sterilization and the efficacy of contraception techniques to stabilize population growth rates, studies have shown that these techniques may be promising management options for reducing wild horse populations (Kane, 2018; Kirkpatrick et al., 2011).

Given the social challenges associated with wild horse management, research is needed on whether communication strategies can influence public support for diverse wild horse management options. Previous studies from conservation psychology suggest that carefully crafted and framed messaging to the public has the potential to change attitudes and build support for controversial wildlife management issues (Goldstein, Cialdini, & Griskevicius, 2008; Kidd et al., 2019; Perryman et al., 2018; Steinhorst, Klöckner, & Matthies, 2015; Wolsko, Ariceaga, & Seiden, 2016). Echeverri and colleagues (2017), for example, showed that messages could shape student attitudes toward sea otters and their management as an endangered species. Studies suggest that rational and emotional appeals in particular may be able to change attitudes towards conservation issues (Miller, Freimund, Metcalf, & Nickerson, 2018; Skurka, Niederdeppe, Romero-Canyas, & Acup, 2018; Zinn & Manfredo, 2000). Rational appeals are objective statements of information that can be verified independently (Zinn & Manfredo, 2000). Emotional appeals provide subjective information open to interpretation, such as a photograph that elicits an emotional response (Zinn & Manfredo, 2000). In advertising campaigns, both rational and emotional appeals have been shown to be persuasive (Batra & Ray, 1986), but the
role of these appeals in conservation is still not clearly understood (Zinn & Manfredo, 2000). Research suggests that emotional appeals are more memorable than rational appeals but may not be effective if subjects do not believe the emotional content to be relevant (Zinn & Manfredo, 2000).

In this study, we sought to understand whether, and how, rational and emotional appeals influence public acceptance of various wild horse management options. We also sought to understand how such messaging may influence individuals with different value orientations.

Preliminary evidence from Miller et al. (2018) suggests that when messaging is consistent with wildlife value orientation (i.e. pro hunting messaging directed to traditionalists), it is perceived as more relevant. A large body of research suggests that wildlife value orientations - the ideological shaped beliefs that orient and provide meaning to one’s values in relation to wildlife (Teel & Manfredo, 2010) - are strong predictors of attitudes towards and support of wildlife management strategies (Bright, Manfredo, & Fulton, 2000; Manfredo, Teel, Sullivan, & Dietsch, 2017; Miller et al., 2018; Teel, Dayer, Manfredo, & Bright, 2005). However, little is known about how messaging and wildlife value orientations interact to influence support for controversial management options. Preliminary evidence from Miller et al. (2018) suggests that when messaging is consistent with wildlife value orientation (i.e. pro hunting messaging directed to traditionalists), it is perceived as more relevant. Furthermore, few studies have examined more broadly how diverse messages influence individuals with different values, attitudes, and demographics (Kidd et al., 2019). Such investigations are crucial to inform the development of targeted outreach campaigns, which could be more effective by targeting certain messages to certain audience segments (Kidd et al., 2019). We sought to address these gaps by examining
how rational and emotional appeals influence support for wild horse management options, and if these influences differ among individuals with different value orientations.
METHODS

Respondents from the sample of individuals who completed a survey for the America’s Wildlife Values study (Manfredo et al., 2018) were recruited for this study. A total of 11,343 people participated in the Manfredo et al. (2018) study from the ten western states that have wild horse populations, and 3,207 of those participants included email addresses in their response indicating they would be willing to participate in future studies about wildlife related issues. Recruiting participants from this list allowed the targeting of residents who live in states with wild horse populations. It also allowed survey responses of participants in this study to be matched with their previously reported wildlife value orientation results from the study of America’s Wildlife Values (Manfredo et al. 2018).

A messaging experiment was conducted in which participants were randomly assigned to read one of three messages (a control message, a rational appeal, or an emotional appeal) discussing wild horse management. The control message provided information about wild horse populations and the debate surrounding management of these species. It did not have any information intended to persuade the audience (Table 1). The rational appeal included the information about wild horse populations from the control and added information about the negative effects of overpopulation on horse well-being, ecosystems, and native fauna and the challenges and limitations to current management approaches (Table 1). The emotional appeal included the same information as the rational appeal and added a picture of an emaciated mare and a foal at the Wheeler Pass HMA in Nevada with a caption that read: “Managers and scientists have reported that in some places, overpopulation is leading to starvation due to the lack of available forage” (Table 1).
Table 1. Messages used in our experiment. Participants were randomly assigned to receive one of these three messages at the beginning of the survey.

<table>
<thead>
<tr>
<th>Control</th>
<th>Rational Appeal (RA)</th>
<th>Emotional Appeal (EA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you know that there are over 80,000 wild horses and burros in the western United States? These are horses not kept by an owner that live off of available forage on public lands. Wild horses and burros are not native to the United States, but rather, were brought to America by the Spanish. Since then the population of wild horses has increased and is currently growing 15-20% annually.</td>
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</tr>
<tr>
<td>Some people believe that wild horses should not be managed, and nature should take its course, while others believe that the wild horse population should be managed to prevent overgrazing on public lands. Various management options could exist for managing wild horses, including rounding up horses to government holding pen until they are adopted, sterilization, and birth control.</td>
<td>Managers and scientists have reported that in some places, overpopulation is leading to starvation due to lack of available forage. In some areas, wildlife like antelope and deer are diminishing, and the land is so overused it is being made unproductive.</td>
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</tr>
<tr>
<td>To reduce the ecological impacts of wild horses where the horses are overpopulated, a federal agency, the Bureau of Land Management, has rounded up 50,000 wild horses into government holding pens and pastures, which are costing the agency nearly $50 million annually. Fewer than 5,000 horses are adopted annually while more than 10,000 are being born each year. Lawsuits have often prevented the BLM from taking actions to further manage the wild horse population using tools such as sterilization, birth control or humane lethal control.</td>
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</tr>
</tbody>
</table>
After receiving the message, study participants responded to a questionnaire asking about their acceptance of five wild horse management options using a 7-point Acceptability scale, ranging from Very Unacceptable to Very Acceptable (i.e. contraception, sterilization, keeping them in holding pens, and two additional methods that involve euthanasia, techniques are not allowable options for the BLM; summarized in Table 2). Participants were then asked questions about their experience with horses and their attitudes and beliefs towards horses using a 7-point Likert scale (Table 2). Demographic information and wildlife value orientations were taken from their original responses to the original study of wildlife values (Manfredo et al. 2018) and therefore not collected in the wild horse survey. We used the Qualtrics platform for survey design and data collection and gave a unique response ID to each participant. We combined the responses from our survey with the responses from the original wildlife values study (Manfredo et al. 2018) using the unique response ID.
One-way analysis of variance (ANOVA) was performed to compare the mean acceptance for each of the five different management options among participants in each of the three different message conditions. A Bonferroni correction was applied to adjust for multiple comparisons. This same approach was used to understand differences in acceptance for the five management options based on message condition and wildlife value orientation.

Linear regression analysis was conducted to examine the extent to which emotional and rational appeals and wildlife value orientations predicted the acceptance of the five wild horse management options in our survey when adjusting for other potential predictors of acceptance. In our regressions, we coded the emotional and rational appeals as 0/1 binary variables. We used
linear regression given Rhemtulla et al., (2012)’s suggestion that ordinal dependent variables with five or more response choices can be treated as continuous variables; however, we also conducted an ordinal logistic regression as a sensitivity analysis (contraception S3-5; sterilization S8-10; live out their lives in holding pens S13-15; killed humanely S18-20; killed humanely and sold for consumption S23-25). The following variables were included as co-variates: sex, income, education, community size, age, horse ownership, value of horses as symbol of American freedom, value of horses as an important part of life, value of horses as important to civilization, traditionalism (domination), and mutualism. Moderation analysis (Baron & Kenny, 1986) was used to explore any significant interaction between message type and wildlife value orientation when predicting acceptability of management options.
RESULTS

Of 2,789 emails sent to past participants of America’s Wildlife Values study, 328 completed surveys were received (11.8% response rate). Relatively equal amounts of participants received the control message (n=105), the emotional appeal (n=107), and the rational appeal (n=108). To compare the sample to the general population, demographic information from the 2017 American Community Survey (ACS) was collected for the states where respondents lived (Table 3). Compared to the ACS data, the sample population was wealthier, more educated, and older than the general population (Table 3). Demographics were similar among respondents who received the rational appeal, emotional appeal, and control message suggesting that randomization achieved a relative balance across all groups (Table 3).
For all three message conditions, the percentage of respondents who indicated the management option was slightly, moderately, or extremely acceptable was highest for contraception and sterilization and lowest for keeping horses in a holding pen for the duration of their lives (Figure 1). Acceptance for the two management options involving euthanasia were similar; among these management options, acceptance was highest for euthanasia and use in consumption among the individuals who received the rational appeal.

Table 3. Description of the sample. Percentages are reported as the percent of the total number of respondents. Data from the 2017 American Community Survey reported is the average across all the states in our sample (AZ, CO, CA, ID, MT, NM, NV, OR, UT, WY).

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Emotional Appeal</th>
<th>Rational Appeal</th>
<th>Control Message</th>
<th>ACS (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Household Income (100,000 and higher)</td>
<td>35.5%</td>
<td>30.8%</td>
<td>32.7%</td>
<td>42.8%</td>
<td>24%</td>
</tr>
<tr>
<td>Age Group (55 years and older)</td>
<td>54.4%</td>
<td>58.1%</td>
<td>52.3%</td>
<td>54.4%</td>
<td>27%</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>42.2%</td>
<td>50.5%</td>
<td>37%</td>
<td>39.3%</td>
<td>50%</td>
</tr>
<tr>
<td>Education (4-year college degree or higher)</td>
<td>68.7%</td>
<td>68.5%</td>
<td>70.1%</td>
<td>67.6%</td>
<td>30%</td>
</tr>
<tr>
<td>Community (a farm or rural area)</td>
<td>20.6%</td>
<td>23.8%</td>
<td>15%</td>
<td>23.1%</td>
<td>Not available</td>
</tr>
<tr>
<td>Horse Ownership (Yes)</td>
<td>51.8%</td>
<td>50%</td>
<td>45.7%</td>
<td>59.6%</td>
<td>Not available</td>
</tr>
<tr>
<td>Mutualist*</td>
<td>34.6%</td>
<td>33.3%</td>
<td>35.2%</td>
<td>35.2%</td>
<td>Not available</td>
</tr>
<tr>
<td>Traditionalist*</td>
<td>36.4%</td>
<td>38.1%</td>
<td>30.6%</td>
<td>40.7%</td>
<td>Not available</td>
</tr>
</tbody>
</table>

*These terms are based on measurements of domination and mutualism views of wildlife (Teel & Manfredo 2009; Manfredo et al. 2018).

**Domination (traditionalist)** - a view of wildlife that prioritizes human well over wildlife and treats wildlife in utilitarian terms

**Mutualism (mutualist)** - view of wildlife as capable relationships of trust with humans and defined by a desire for companionship with wildlife.
Figure 1. Percent acceptable for each management option. The percentage of respondents who indicated the management option was slightly, moderately, or extremely acceptable for participants in the full sample and all three message conditions (control, rational appeal, and emotional appeal).

The effect of message type and wildlife value orientation on management strategy acceptance

Analysis of variance and regression analyses are reported for each of the five management strategies for wild horses used in this study (contraception, sterilization, living in holding pens, killed humanely in holding pens, and killed and sold for consumption) separately below.

**Contraception**

A one-way analysis of variance with a Bonferroni multiple comparison test revealed a significant difference in mean acceptance for contraceptive use among respondents who received different messages ($F = 9.75, p < .001$) (Table 4). However, there was no significant main effects of wildlife value orientations ($F = 1.91, p = 0.168$), and no significant interaction effect between wildlife value orientation and message condition ($F = 0.04, p = 0.958$) (Table 4).
Table 4. ANOVA table for contraception

<table>
<thead>
<tr>
<th>Contraception</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>86.36*</td>
<td>5</td>
<td>17.28</td>
<td>4.38</td>
<td>0.001</td>
<td>0.090</td>
</tr>
<tr>
<td>Intercept</td>
<td>6025.96</td>
<td>1</td>
<td>6025.96</td>
<td>1526.42</td>
<td>&lt; 0.001</td>
<td>0.874</td>
</tr>
<tr>
<td>Message Condition</td>
<td>77.00</td>
<td>2</td>
<td>38.50</td>
<td>9.75</td>
<td>&lt; 0.001</td>
<td>0.081</td>
</tr>
<tr>
<td>Wildlife Value Orientation</td>
<td>7.54</td>
<td>1</td>
<td>7.54</td>
<td>1.91</td>
<td>0.168</td>
<td>0.009</td>
</tr>
<tr>
<td>Message Condition* Wildlife Value Orientation</td>
<td>0.34</td>
<td>2</td>
<td>0.17</td>
<td>0.04</td>
<td>0.958</td>
<td>0.000</td>
</tr>
<tr>
<td>Error</td>
<td>868.51</td>
<td>220</td>
<td>3.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6950</td>
<td>226</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>954.89</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*R Squared =0.09 (Adjusted R Squared = 0.07)

Post hoc comparisons using the Bonferroni test for multiple comparisons (Table 5) indicated that the mean level of acceptance for contraception for participants who received the emotional appeal (m = 5.70 out of 7.00) was significantly greater than for those who received the control message (m = 4.41). Mean acceptance of contraception for those who received the rational appeal (m = 5.62) was also significantly greater than for the control message yet not significantly different from the emotional appeal.

Table 5. Post-hoc test for message condition. Bonferroni test for multiple comparisons was performed for the different message conditions.

<table>
<thead>
<tr>
<th>Contraception</th>
<th>Control</th>
<th>Emotional Appeal</th>
<th>Rational Appeal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.41a</td>
<td>5.70b</td>
<td>5.62b</td>
</tr>
</tbody>
</table>

Superscripts indicate statistical significance at p < 0.05. Means that share a superscript do not have statistically significant differences.

The regression analysis found that the emotional (β=0.286, p < 0.001) and rational (β=0.251, p < 0.001) appeals predicted a positive and significant effect on acceptance for contraception compared to the control when adjusting for key co-variates (Table 6). Regression analysis indicated that the emotional appeal did not have a significant effect on acceptance for contraception beyond the rational appeal (Table S-2). The interaction terms and wildlife value orientations were not significant for contraception (Table S-1). This confirmed the findings from the ANOVA analysis when adjusting for key covariates.
Sterilization

Analysis of variance revealed a significant difference in mean acceptance for sterilization among respondents who received different messages (F = 5.50, p = 0.005) (Table 7). The analysis of variance also revealed significant differences in mean acceptance between wildlife value orientations (F = 4.47, p = 0.036), but no significant interaction between wildlife value orientation and message condition (F = 0.26, p = 0.769).

Table 7. ANOVA table for sterilization

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>Type III Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>72.65*</td>
<td>14.53</td>
<td>3.21</td>
<td>0.008</td>
<td>0.068</td>
</tr>
<tr>
<td>Intercept</td>
<td>5970.59</td>
<td>5970.59</td>
<td>1318.49</td>
<td>&lt;0.001</td>
<td>0.857</td>
</tr>
<tr>
<td>Message Condition</td>
<td>49.78</td>
<td>24.89</td>
<td>5.50</td>
<td>0.005</td>
<td>0.048</td>
</tr>
<tr>
<td>Wildlife Value Orientation</td>
<td>20.25</td>
<td>20.25</td>
<td>4.47</td>
<td>0.036</td>
<td>0.020</td>
</tr>
<tr>
<td>Message Condition* Wildlife Value Orientation</td>
<td>2.39</td>
<td>1.19</td>
<td>0.26</td>
<td>0.769</td>
<td>0.002</td>
</tr>
<tr>
<td>Error</td>
<td>996.24</td>
<td>4.53</td>
<td>1068.89</td>
<td>225</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7064.00</td>
<td>226</td>
<td>1068.89</td>
<td>225</td>
<td></td>
</tr>
</tbody>
</table>

* R Squared = 0.068 (Adjusted R Squared = 0.047)
No post-hoc tests were performed for the wildlife value orientation effect since there were only two groups. Traditionalists showed significantly higher acceptance of sterilization (m = 5.47) than did the mutualists (m = 4.86) (Table 8).

**Table 8. ANOVA for wildlife value orientations**

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>Traditionalist</th>
<th>Mutualist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.47&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.86&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Superscripts indicate statistical significance at p<0.05. Means that share a superscript do not have statistically significant differences.

*Post hoc* comparisons using the Bonferroni test for multiple comparisons indicated that the mean level of acceptance for sterilization for respondents who received the emotional appeal (m = 5.75 out of 7.00) was significantly higher than for those who received the control message (m = 4.61) and the rational appeal (m = 5.13) (Table 9). However, the mean score for the rational appeal message condition and the control message were not statistically different from each other.

**Table 9. Post-hoc test for message condition. Bonferroni test for multiple comparisons was performed for message conditions.**

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>Control</th>
<th>Emotional Appeal</th>
<th>Rational Appeal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.61&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.13&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Superscripts indicate statistical significance at p<0.05. Means that share a superscript do not have statistically significant differences.

The regression analysis found that emotional (β=0.281, p < 0.001) and rational (β=0.183, p=0.004) appeals predicted a positive and significant effect on acceptance for sterilization compared to the control when controlling for key co-variates (Table 10). Regression analysis indicated that the emotional appeal did not have a significant effect on acceptance for sterilization beyond the rational appeal (Table S-7). The interaction terms and wildlife value orientations were not significant for sterilization (Table S-6). This confirmed the findings from the ANOVA analysis when adjusting for key covariates.
Table 10. Regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.260</td>
<td>0.281</td>
<td>0.281</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.814</td>
<td>0.183</td>
<td>0.282</td>
<td>0.004</td>
</tr>
<tr>
<td>Sex</td>
<td>0.117</td>
<td>0.038</td>
<td>0.181</td>
<td>0.519</td>
</tr>
<tr>
<td>Income</td>
<td>0.308</td>
<td>0.182</td>
<td>0.098</td>
<td>0.002</td>
</tr>
<tr>
<td>Education</td>
<td>0.139</td>
<td>0.069</td>
<td>0.115</td>
<td>0.230</td>
</tr>
<tr>
<td>Community</td>
<td>0.065</td>
<td>0.076</td>
<td>0.050</td>
<td>0.192</td>
</tr>
<tr>
<td>Age</td>
<td>0.005</td>
<td>0.040</td>
<td>0.008</td>
<td>0.491</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.517</td>
<td>-0.123</td>
<td>0.273</td>
<td>0.059</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.172</td>
<td>-0.154</td>
<td>0.074</td>
<td>0.021</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.022</td>
<td>-0.021</td>
<td>0.072</td>
<td>0.761</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.054</td>
<td>0.035</td>
<td>0.093</td>
<td>0.561</td>
</tr>
<tr>
<td>Domination</td>
<td>0.231</td>
<td>0.149</td>
<td>0.114</td>
<td>0.045</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.060</td>
<td>0.042</td>
<td>0.108</td>
<td>0.576</td>
</tr>
</tbody>
</table>

R Square = 0.155 (R Square adjusted = 0.117)

Live out their lives in holding pens

Analysis of variance for horses living out their lives in holding pens (Table 11) revealed significant main effects for message condition (F = 5.02, p = 0.007) and wildlife value orientation (F = 14.66, p < .001). It also revealed a statistically significant interaction between wildlife value orientation and message condition (F = 7.95, p < 0.001) (Table 11).

Table 11. ANOVA table for horses living out their lives in holding pens

<table>
<thead>
<tr>
<th>Live out their lives in holding pens</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>110.30*</td>
<td>5</td>
<td>22.06</td>
<td>7.81</td>
<td>&lt; 0.001</td>
<td>0.151</td>
</tr>
<tr>
<td>Intercept</td>
<td>1401.72</td>
<td>1</td>
<td>1401.72</td>
<td>495.98</td>
<td>0.000</td>
<td>0.693</td>
</tr>
<tr>
<td>Message Condition</td>
<td>28.35</td>
<td>2</td>
<td>14.17</td>
<td>5.02</td>
<td>0.007</td>
<td>0.044</td>
</tr>
<tr>
<td>Wildlife Value Orientation</td>
<td>41.42</td>
<td>1</td>
<td>41.42</td>
<td>14.66</td>
<td>&lt; 0.001</td>
<td>0.062</td>
</tr>
<tr>
<td>Message Condition* Wildlife Value Orientation</td>
<td>44.94</td>
<td>2</td>
<td>22.47</td>
<td>7.95</td>
<td>&lt; 0.001</td>
<td>0.067</td>
</tr>
<tr>
<td>Error</td>
<td>621.76</td>
<td>220</td>
<td>2.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2095.00</td>
<td>226</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>732.06</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*R Squared =0.151 (Adjusted R Squared = 0.131)

Post hoc comparisons using the Bonferroni test for multiple comparisons (Table 12) indicated that the mean level of acceptance toward allowing horses to live out their lives in holding pens for mutualists who received the emotional appeal (m = 4.00 out of 7.00) was
significantly higher than for all other groups. However, the mean level of acceptance for this
management strategy for the other five groups were not statistically different from each other.

Table 12. ANOVA with Bonferroni correction for multiple comparisons

<table>
<thead>
<tr>
<th>Live out their lives in holding pens</th>
<th>Mutualist Emotional Appeal</th>
<th>Mutualist Rational Appeal</th>
<th>Traditionalist Emotional Appeal</th>
<th>Traditionalist Rational Appeal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.27\textsuperscript{a}</td>
<td>4.00\textsuperscript{b}</td>
<td>2.53\textsuperscript{a}</td>
<td>1.89\textsuperscript{a}</td>
</tr>
</tbody>
</table>

Superscripts indicated statistical significance at p<0.05. Means that share a superscript do not have statistically significant differences. Groups are participants of a certain wildlife value orientation (traditionalist and mutualists) who got the same message condition (e.g. mutualists who got the control message, etc.).

The regression analysis found that the emotional appeal (β=0.146, p=0.021) predicted a positive and significant effect on acceptance of horses living out their lives in holding pens when compared to the control (Table 13). There was also a positive and significant effect on acceptance of horses living out their lives in holding pens for one interaction term (EA*Domination (β=0.259, p=0.011) (Table S-11).

Table 13. Regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Live in a holding pen for life</th>
<th>B</th>
<th>(\beta)</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.513</td>
<td>0.135</td>
<td>0.244</td>
<td>0.036</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.133</td>
<td>0.036</td>
<td>0.244</td>
<td>0.586</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.270</td>
<td>-0.104</td>
<td>0.157</td>
<td>0.087</td>
</tr>
<tr>
<td>Income</td>
<td>-0.073</td>
<td>-0.051</td>
<td>0.085</td>
<td>0.387</td>
</tr>
<tr>
<td>Education</td>
<td>0.169</td>
<td>0.100</td>
<td>0.100</td>
<td>0.092</td>
</tr>
<tr>
<td>Community</td>
<td>-0.118</td>
<td>-0.163</td>
<td>0.043</td>
<td>0.007</td>
</tr>
<tr>
<td>Age</td>
<td>-0.009</td>
<td>-0.078</td>
<td>0.007</td>
<td>0.191</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.295</td>
<td>0.083</td>
<td>0.237</td>
<td>0.213</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.065</td>
<td>0.069</td>
<td>0.064</td>
<td>0.311</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.018</td>
<td>0.020</td>
<td>0.063</td>
<td>0.780</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.022</td>
<td>-0.017</td>
<td>0.081</td>
<td>0.782</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.234</td>
<td>-0.179</td>
<td>0.099</td>
<td>0.019</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.042</td>
<td>0.035</td>
<td>0.093</td>
<td>0.652</td>
</tr>
</tbody>
</table>

Killed humanely in holding pens

The analysis of variance for horses being euthanized humanely in holding pens revealed significant main effects between wildlife value orientations in level of acceptance for this
strategy ($F = 73.34, p = < .001$). However, there was no significant main effects among message conditions ($F = 1.27, p = 0.284$), and no significant interaction effect between wildlife value orientation and message condition ($F = 0.07, p = 0.929$) (Table 14).

Table 14. ANOVA table for horses being killed humanely in holding pens

<table>
<thead>
<tr>
<th></th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>343.31*</td>
<td>5</td>
<td>68.66</td>
<td>14.93</td>
<td>&lt; 0.001</td>
<td>0.253</td>
</tr>
<tr>
<td>Intercept</td>
<td>2456.13</td>
<td>1</td>
<td>2456.13</td>
<td>534.06</td>
<td>&lt; 0.001</td>
<td>0.708</td>
</tr>
<tr>
<td>Message Condition</td>
<td>11.65</td>
<td>2</td>
<td>5.83</td>
<td>1.27</td>
<td>0.284</td>
<td>0.011</td>
</tr>
<tr>
<td>Wildlife Value Orientation</td>
<td>337.28</td>
<td>1</td>
<td>337.28</td>
<td>73.34</td>
<td>&lt; 0.001</td>
<td>0.250</td>
</tr>
<tr>
<td>Message Condition* Wildlife Value Orientation</td>
<td>0.68</td>
<td>2</td>
<td>0.34</td>
<td>0.07</td>
<td>0.929</td>
<td>0.001</td>
</tr>
<tr>
<td>Error</td>
<td>1011.77</td>
<td>220</td>
<td>4.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3884.00</td>
<td>226</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>1355.08</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* R Squared =0.253 (Adjusted R Squared = 0.236)

No post-hoc test was conducted because there were only two groups (traditionalists and mutualists). The one-way analysis of variance for horses being killed humanely in holding pens revealed that the mean level of acceptance for this strategy was significantly higher for traditionalists (m = 4.54 out of 7.00) than for mutualists (m = 2.09) (Table 15).

Table 15. ANOVA for wildlife value orientations

<table>
<thead>
<tr>
<th></th>
<th>Traditionalist</th>
<th>Mutualist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.54&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.09&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Superscripts indicate statistical significance at $p<0.05$. Means that share a superscript do not have statistically significant differences.

The regression analysis predicted a positive and significant effect on acceptance of horses living in holding pens for participants who had a traditionalist wildlife value orientation ($\beta=0.300, p < 0.001$) and a negative and significant effect on acceptance for participants who had mutualist value orientations ($\beta= -0.185, p=0.004$) (Table 16). The regression also predicted a positive and significant effect on acceptance for participants who received the rational appeal
(β=0.144, p=0.008). The interaction terms and wildlife value orientations were not significant for sterilization (Table S-16). This confirmed the findings from the ANOVA analysis when adjusting for key covariates.

### Table 16. Regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killed Humanely in a holding pen</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.469</td>
<td>0.092</td>
<td>0.270</td>
<td>0.083</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.727</td>
<td>0.144</td>
<td>0.271</td>
<td>0.008</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.361</td>
<td>-0.104</td>
<td>0.174</td>
<td>0.039</td>
</tr>
<tr>
<td>Income</td>
<td>0.155</td>
<td>0.081</td>
<td>0.094</td>
<td>0.099</td>
</tr>
<tr>
<td>Education</td>
<td>0.014</td>
<td>0.006</td>
<td>0.111</td>
<td>0.898</td>
</tr>
<tr>
<td>Community</td>
<td>0.140</td>
<td>0.144</td>
<td>0.048</td>
<td>0.004</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>-0.028</td>
<td>0.007</td>
<td>0.569</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.032</td>
<td>-0.007</td>
<td>0.262</td>
<td>0.902</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.329</td>
<td>-0.261</td>
<td>0.071</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.035</td>
<td>-0.030</td>
<td>0.070</td>
<td>0.613</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.024</td>
<td>-0.014</td>
<td>0.090</td>
<td>0.786</td>
</tr>
<tr>
<td>Domination</td>
<td>0.529</td>
<td>0.300</td>
<td>0.110</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.301</td>
<td>-0.185</td>
<td>0.103</td>
<td>0.004</td>
</tr>
</tbody>
</table>

R Square = 0.394 (R Square adjusted = 0.367)

**Killed humanely and sold for consumption**

Analysis of variance for the level of acceptance for horses being euthanized humanely and then sold for consumption revealed significant main effects between wildlife value orientations (F = 109.88, p < .001). However, there was no significant main effects among message conditions, and no significant interaction effect between wildlife value orientation and message condition (Table 17).
Table 17. ANOVA table for horses being killed humanely and sold for consumption

<table>
<thead>
<tr>
<th>Killed humanely and sold for consumption</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>494.59</td>
<td>5</td>
<td>98.92</td>
<td>22.82</td>
<td>&lt; 0.001</td>
<td>0.342</td>
</tr>
<tr>
<td>Intercept</td>
<td>3119.80</td>
<td>1</td>
<td>3119.80</td>
<td>719.87</td>
<td>0.000</td>
<td>0.766</td>
</tr>
<tr>
<td>Message Condition</td>
<td>23.40</td>
<td>2</td>
<td>11.70</td>
<td>2.70</td>
<td>0.069</td>
<td>0.024</td>
</tr>
<tr>
<td>Wildlife Value Orientation</td>
<td>476.20</td>
<td>1</td>
<td>476.20</td>
<td>109.88</td>
<td>&lt; 0.001</td>
<td>0.333</td>
</tr>
<tr>
<td>Message Condition* Wildlife Value Orientation</td>
<td>1.06</td>
<td>2</td>
<td>0.53</td>
<td>0.12</td>
<td>0.885</td>
<td>0.001</td>
</tr>
<tr>
<td>Error</td>
<td>953.45</td>
<td>220</td>
<td>4.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4660.00</td>
<td>226</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>1448.04</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*R Squared = 0.09 (Adjusted R Squared = 0.07)

No post-hoc tests were conducted because there were only two groups (traditionalists and mutualists). The one-way analysis of variance for horses being killed humanely in holding pens revealed that the acceptance level for this strategy was significantly higher for traditionalists (m = 5.19 out of 7.00) than for mutualists (m = 2.27) (Table 18).

Table 18. ANOVA for wildlife value orientations

<table>
<thead>
<tr>
<th>Killed humanely and sold for consumption</th>
<th>Traditionalist</th>
<th>Mutualist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.19&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.27&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Superscripts indicate statistical significance at p<0.05. Means that share a superscript do not have statistically significant differences.

Regression analysis predicted a negative and significant effect on acceptance of horses being euthanized and sold for consumption for participants who had a mutualist wildlife value orientation (β = -0.245, p < 0.001) (Table 19). The regression also predicted a positive and significant effect on acceptance of horses being euthanized and sold for consumption for participants who had a traditionalist wildlife value orientation (β = 0.300, p < 0.001). There is also a positive and significant effect on acceptance for participants who received the emotional (β = 0.144, p = 0.005) and rational (β = 0.160, p = 0.002) appeals (Table 19). Regression analysis indicated that the emotional appeal did not have a significant effect on acceptance for horses.
being killed humanely and sold for consumption beyond the rational appeal (Table S-22). The interaction terms and wildlife value orientations were not significant for sterilization (Table S-21). This confirmed the findings from the ANOVA analysis when adjusting for key covariates.

<table>
<thead>
<tr>
<th>Killed humanely and sold for consumption</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.761</td>
<td>0.144</td>
<td>0.271</td>
<td>0.005</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.840</td>
<td>0.160</td>
<td>0.271</td>
<td>0.002</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.523</td>
<td>-0.145</td>
<td>0.174</td>
<td>0.003</td>
</tr>
<tr>
<td>Income</td>
<td>0.167</td>
<td>0.084</td>
<td>0.094</td>
<td>0.077</td>
</tr>
<tr>
<td>Education</td>
<td>0.019</td>
<td>0.008</td>
<td>0.111</td>
<td>0.867</td>
</tr>
<tr>
<td>Community</td>
<td>0.087</td>
<td>0.086</td>
<td>0.048</td>
<td>0.072</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>-0.024</td>
<td>0.007</td>
<td>0.613</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.148</td>
<td>0.030</td>
<td>0.263</td>
<td>0.573</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.280</td>
<td>-0.213</td>
<td>0.071</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.052</td>
<td>-0.043</td>
<td>0.070</td>
<td>0.452</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.075</td>
<td>0.041</td>
<td>0.090</td>
<td>0.402</td>
</tr>
<tr>
<td>Domination</td>
<td>0.548</td>
<td>0.300</td>
<td>0.110</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.414</td>
<td>-0.245</td>
<td>0.104</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

R Square = 0.437 (R Square adjusted = 0.413)

**Wildlife value orientations and acceptance of management strategies**

After the analysis for each management strategy was conducted, we were interested in the rate of acceptance for each strategy by wildlife life value orientation was examined (Figure 2). The percent acceptance for contraception and sterilization was higher for participants who received the emotional and rational appeals regardless of their wildlife value orientation. Furthermore, the percent acceptance for the two lethal control strategies were highest for participants who had traditionalist wildlife value orientations. Also shown in figure two is the high rates of acceptance for horses living out their lives in holding pens for mutualists who received the emotional appeal.
Figure 2. Percent acceptable for each management option by the full sample and traditionalist and mutualist value orientations. Percent acceptable given for all three message conditions.
DISCUSSION

Few animals in the western United States evoke as much emotion and public concern as wild horses (Scasta, 2019). People’s emotional responses to horses as well as the increasing need for management of wild populations have resulted in controversy about this issue throughout the West (Michaels, 2018; Scasta et al., 2018; Scasta, 2019). Understanding public attitudes is crucial for increasing public support for management techniques (Echeverri, Chan, & Zhao, 2017; Manfredo, 2008; Teel et al., 2005), and many studies show that messaging can have an effect on people’s attitudes toward a given issue such as wildlife management (Echeverri et al., 2017; Kidd et al., 2019; Miller et al., 2018; Wolsko, Ariceaga, & Seiden, 2016). The controversy surrounding wild horses and the emergence of messaging studies led to a messaging experiment about wild horse management. The current study finds that emotional and rational messages about the negative impacts of the growing wild horse populations and the need for management increase the acceptance of certain wild horse management techniques, when compared to a control message.

In our survey-based experiment, the rational appeal (which included information about the negative impacts of wild horse overpopulation and the need for management) significantly increased acceptance of four out of five management options, and the emotional appeal (which added a picture of emaciated wild horses to the rational appeal) significantly increased acceptance of all 5 management options when compared to the control message (which included basic information about wild horse populations and their management). There was no significant difference between the emotional and rational appeals when compared to each other in the regression analyses. Although in the ordinal regression for sterilization there was a significant
difference between the emotional and rational appeals. This suggests that the emotional appeal had more of an effect on participants acceptance of sterilization than the rational appeal. The two distinct types of appeals may have had similar and positive effects on public acceptance because they filled a key knowledge gap among the public. Michaels (2018) has suggested that the largest threat to wild horse populations and rangeland is the public’s misconceptions about wild horse populations and the ecosystem damage caused by overpopulation. He explains this threat as the well-meaning public’s rally behind wild horses limiting the acceptable management strategies and creating challenges for managers (Michaels, 2018). Previous research suggests that people have a deep concern for horse well-being but many people are unaware of actual management techniques used by the BLM (Michaels, 2018; Scasta et al., 2018; Scasta, 2019). Our findings suggest that filling these knowledge gaps through rational and emotional appeals that highlight the negative impacts of wild horse overpopulation and the need for further management may help build support for novel management techniques, such as contraception and sterilization.

Our findings are consistent with past studies, which have suggested that rational and emotional appeals have the ability to influence attitudes (Morrison, Greig, Waller, McCulloch, & Read, 2017; Yoon, Jeong, Chon, & Yoon, 2019; Zinn & Manfredo, 2000). Zinn & Manfredo (2000) found that both rational and emotional appeals were equally persuasive, while Morrison et al. (2017) found that rational appeals were more influential to respondents than emotional appeals. We found that both rational appeals and an emotional component within the appeal significantly influenced acceptance of wild horse management techniques when compared to the control message, but rational and emotional appeals were not significantly different from one another in their effectiveness at increasing acceptability for most management techniques in the study. In some situations, and for some people (mutualists) adding an emotional appeal to a
rational argument may enhance acceptance of management techniques. These results suggest a need for future studies examining whether, and the conditions under which, emotional or rational appeals may be most effective.

Our findings suggest that among our sample, there is acceptance for novel management techniques on public land. People in our sample were most accepting of the use of contraception and sterilization and least accepting of removing these animals and keeping them in holding pens. Michaels (2018) argues that the public is opposed to gathering, sterilizing, managing, or euthanizing these animals because of human’s deep connection to horses. Our study suggests that among our sample, this may not be the case. Our study therefore provides promising preliminary evidence suggesting that certain management techniques (i.e. sterilization, contraception) may not be met with level of public opposition that others have assumed (i.e. Michaels, 2018).

Previous research shows that wildlife value orientations are important predictors of public support for various wildlife management strategies (Bright et al., 2000; Miller et al., 2018; Teel & Manfredo, 2010). We found a statistically significant relationship between wildlife value orientation and several of the management options. Traditionalist value orientation was a significant positive predictor and mutualism value orientation was a significant negative predictor of acceptance of the management techniques that included euthanasia. This aligns with previous studies suggesting differences in acceptance levels of management options based on wildlife value orientation (Bright et al., 2000; Manfredo, Teel, & Bright, 2003; Miller et al., 2018; Teel & Manfredo, 2010). Wildlife values have been shown to influence attitudes toward wildlife related management actions, and actions such as killing excess animals are associated with the traditionalist value orientation (Bright et al., 2000; Manfredo et al., 2003; Miller et al., 2018). Our findings provide further support to this link between traditionalist value orientation
and acceptance lethal control measures (or mutualist value orientation and lack of support for killing of animals) as a management option. In the 19 western U.S., Manfredo and colleagues (2018) found on average traditionalism decreased (5.7%) and mutualism increased (4.7%) between 2004 and 2018 and they attribute this shift to modernization. Our findings suggest that if this trend continues and more people become mutualist, acceptance of lethal management options will decline. Therefore, nonlethal management strategies such as contraception and sterilization will be critical for addressing wildlife population concerns in the future.

There are a few key limitations to our study. First, the response rate for our survey was 11 percent and the sample size was relatively small for generalizing. Second, the demographics of our sample when compared to state averages in the ten states sampled; were primarily older (55 years and older), white, rural residents who were highly educated and wealthier (Table 1). Thus, our findings may not be generalizable to the broader population. Furthermore, we only surveyed people that currently reside in the ten states that have wild horse populations in the western United states. Public responses to wild horse management may vary in other states. Future studies are therefore needed to build on ours to examine public attitudes towards wild horse management and the effectiveness of messaging with a larger, representative sample.

Various studies have been conducted to research the effectiveness of contraception (Kirkpatrick et al., 2011; National Research Council, 2013; Norris, 2018) and sterilization (Eagle, Asa, Garrott, Plotka, & Donald, 1993; R. A. Garrott & Siniff, 1992) in wild horse populations, and our results suggest that there is support for the use of these options among our sample if they are available. Management of wild horses is a contentious issue with many layers of social, ecological and legal considerations (Michaels, 2018; Perryman et al., 2018). It has often been assumed that the public has deeply entrenched positions on horse management;
however, our study suggests that messaging could help increase public acceptance of certain management options. Further research could continue to explore the influence of messaging on attitudes and acceptance levels of management options and desired conservation outcomes.

CONCLUSION

We built on previous research suggesting the importance of message framing and wildlife value orientations in understanding people’s attitudes towards wildlife management (Echeverri et al., 2017; Kidd et al., 2019; Pimm, 2000; Wolsko et al., 2016; Zinn & Manfredo, 2000; Miller et al., 2018; Teel & Manfredo, 2010). We found that emotional components and rational messages describing the need for management as well as value orientations influence acceptance of wild horse management techniques. We also found that the main wild horse management strategy being used in the American West was the least acceptable option among our sample. Our research provides promising preliminary evidence that carefully crafted communication campaigns that apply emotional and rational appeals could be an effective way to build public support for new management strategies.
REFERENCES


Contraception

Table S-1. Linear regression analysis with interaction terms for contraception. Analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Contraception with Interaction Terms</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.213</td>
<td>0.283</td>
<td>0.276</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>1.044</td>
<td>0.246</td>
<td>0.277</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.081</td>
<td>-0.028</td>
<td>0.176</td>
<td>0.646</td>
</tr>
<tr>
<td>Income</td>
<td>0.070</td>
<td>0.043</td>
<td>0.095</td>
<td>0.463</td>
</tr>
<tr>
<td>Education</td>
<td>0.244</td>
<td>0.127</td>
<td>0.114</td>
<td>0.032</td>
</tr>
<tr>
<td>Community</td>
<td>-0.004</td>
<td>-0.005</td>
<td>0.049</td>
<td>0.928</td>
</tr>
<tr>
<td>Age</td>
<td>0.009</td>
<td>0.069</td>
<td>0.007</td>
<td>0.240</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.504</td>
<td>-0.125</td>
<td>0.266</td>
<td>0.059</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.035</td>
<td>0.033</td>
<td>0.072</td>
<td>0.626</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.003</td>
<td>-0.003</td>
<td>0.070</td>
<td>0.971</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.088</td>
<td>0.059</td>
<td>0.092</td>
<td>0.340</td>
</tr>
<tr>
<td>Domination</td>
<td>0.138</td>
<td>0.093</td>
<td>0.181</td>
<td>0.447</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.247</td>
<td>0.181</td>
<td>0.182</td>
<td>0.175</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>0.151</td>
<td>0.065</td>
<td>0.250</td>
<td>0.548</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>0.130</td>
<td>0.051</td>
<td>0.266</td>
<td>0.625</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>0.082</td>
<td>0.033</td>
<td>0.240</td>
<td>0.733</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>0.044</td>
<td>0.016</td>
<td>0.255</td>
<td>0.864</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.137 \ (R^2 \text{ adjusted} = 0.086) \]

Table S-2. Linear regression analysis (with Rational Appeal as Constant) both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Contraception</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-1.064</td>
<td>-0.250</td>
<td>0.272</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.164</td>
<td>0.038</td>
<td>0.271</td>
<td>0.547</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.078</td>
<td>-0.027</td>
<td>0.175</td>
<td>0.656</td>
</tr>
<tr>
<td>Income</td>
<td>0.066</td>
<td>0.041</td>
<td>0.094</td>
<td>0.484</td>
</tr>
<tr>
<td>Education</td>
<td>0.242</td>
<td>0.126</td>
<td>0.111</td>
<td>0.031</td>
</tr>
<tr>
<td>Community</td>
<td>-0.002</td>
<td>-0.002</td>
<td>0.048</td>
<td>0.966</td>
</tr>
<tr>
<td>Age</td>
<td>0.009</td>
<td>0.069</td>
<td>0.007</td>
<td>0.243</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.502</td>
<td>-0.125</td>
<td>0.264</td>
<td>0.058</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.039</td>
<td>0.037</td>
<td>0.071</td>
<td>0.583</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.003</td>
<td>-0.003</td>
<td>0.070</td>
<td>0.970</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.084</td>
<td>0.057</td>
<td>0.090</td>
<td>0.354</td>
</tr>
<tr>
<td>Domination</td>
<td>0.080</td>
<td>0.054</td>
<td>0.110</td>
<td>0.467</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.169</td>
<td>0.124</td>
<td>0.104</td>
<td>0.105</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.135 \ (R^2 \text{ adjusted} = 0.097) \]
<table>
<thead>
<tr>
<th>Table S-3. Ordinal regression analysis. Standard error and p-value is provided for the management strategy.</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraception</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.133</td>
<td>0.262</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>1.089</td>
<td>0.265</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>0.055</td>
<td>0.163</td>
<td>0.734</td>
</tr>
<tr>
<td>Income</td>
<td>0.010</td>
<td>0.091</td>
<td>0.909</td>
</tr>
<tr>
<td>Education</td>
<td>0.150</td>
<td>0.107</td>
<td>0.162</td>
</tr>
<tr>
<td>Community</td>
<td>0.008</td>
<td>0.047</td>
<td>0.868</td>
</tr>
<tr>
<td>Age</td>
<td>0.011</td>
<td>0.007</td>
<td>0.118</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.349</td>
<td>0.253</td>
<td>0.169</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.016</td>
<td>0.068</td>
<td>0.807</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.001</td>
<td>0.067</td>
<td>0.988</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.074</td>
<td>0.085</td>
<td>0.384</td>
</tr>
<tr>
<td>Domination</td>
<td>0.054</td>
<td>0.105</td>
<td>0.610</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.106</td>
<td>0.100</td>
<td>0.290</td>
</tr>
<tr>
<td>Cox and Snell Pseudo R Square = 0.116</td>
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<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table S-4. Ordinal regression analysis (Rational Appeal as constant). Standard error and p-value is provided for the management strategy.</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraception</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Message</td>
<td>-1.089</td>
<td>0.265</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.045</td>
<td>0.264</td>
<td>0.866</td>
</tr>
<tr>
<td>Sex</td>
<td>0.055</td>
<td>0.163</td>
<td>0.734</td>
</tr>
<tr>
<td>Income</td>
<td>0.010</td>
<td>0.091</td>
<td>0.909</td>
</tr>
<tr>
<td>Education</td>
<td>0.150</td>
<td>0.107</td>
<td>0.162</td>
</tr>
<tr>
<td>Community</td>
<td>0.008</td>
<td>0.047</td>
<td>0.868</td>
</tr>
<tr>
<td>Age</td>
<td>0.011</td>
<td>0.007</td>
<td>0.118</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.349</td>
<td>0.253</td>
<td>0.169</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.016</td>
<td>0.068</td>
<td>0.807</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.001</td>
<td>0.067</td>
<td>0.988</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.074</td>
<td>0.085</td>
<td>0.384</td>
</tr>
<tr>
<td>Domination</td>
<td>0.054</td>
<td>0.105</td>
<td>0.610</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.106</td>
<td>0.100</td>
<td>0.290</td>
</tr>
<tr>
<td>Cox and Snell Pseudo R Square = 0.116</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table S-5. Ordinal regression analysis (with interaction terms). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Contraception</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.169</td>
<td>0.267</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>1.083</td>
<td>0.269</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>0.057</td>
<td>0.164</td>
<td>0.726</td>
</tr>
<tr>
<td>Income</td>
<td>0.025</td>
<td>0.091</td>
<td>0.787</td>
</tr>
<tr>
<td>Education</td>
<td>0.149</td>
<td>0.109</td>
<td>0.170</td>
</tr>
<tr>
<td>Community</td>
<td>0.010</td>
<td>0.048</td>
<td>0.828</td>
</tr>
<tr>
<td>Age</td>
<td>0.011</td>
<td>0.007</td>
<td>0.109</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.361</td>
<td>0.255</td>
<td>0.158</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.013</td>
<td>0.068</td>
<td>0.853</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.002</td>
<td>0.067</td>
<td>0.981</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.094</td>
<td>0.087</td>
<td>0.281</td>
</tr>
<tr>
<td>Domination</td>
<td>0.153</td>
<td>0.165</td>
<td>0.354</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.196</td>
<td>0.167</td>
<td>0.240</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>0.165</td>
<td>0.233</td>
<td>0.478</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>0.344</td>
<td>0.253</td>
<td>0.174</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>0.140</td>
<td>0.229</td>
<td>0.541</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>0.008</td>
<td>0.242</td>
<td>0.973</td>
</tr>
<tr>
<td>Cox and Snell Pseudo R Square = 0.125</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sterilization

Table S-6. Linear regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Sterilization Interaction</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.286</td>
<td>0.286</td>
<td>0.284</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.863</td>
<td>0.194</td>
<td>0.285</td>
<td>0.003</td>
</tr>
<tr>
<td>Sex</td>
<td>0.115</td>
<td>0.037</td>
<td>0.181</td>
<td>0.528</td>
</tr>
<tr>
<td>Income</td>
<td>0.301</td>
<td>0.178</td>
<td>0.098</td>
<td>0.002</td>
</tr>
<tr>
<td>Education</td>
<td>0.160</td>
<td>0.080</td>
<td>0.117</td>
<td>0.173</td>
</tr>
<tr>
<td>Community</td>
<td>0.071</td>
<td>0.083</td>
<td>0.051</td>
<td>0.160</td>
</tr>
<tr>
<td>Age</td>
<td>0.005</td>
<td>0.035</td>
<td>0.008</td>
<td>0.549</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.525</td>
<td>-0.125</td>
<td>0.274</td>
<td>0.056</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.164</td>
<td>-0.147</td>
<td>0.074</td>
<td>0.028</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.017</td>
<td>-0.016</td>
<td>0.073</td>
<td>0.814</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.041</td>
<td>0.027</td>
<td>0.095</td>
<td>0.662</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.033</td>
<td>-0.021</td>
<td>0.186</td>
<td>0.858</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.119</td>
<td>-0.083</td>
<td>0.187</td>
<td>0.525</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>-0.221</td>
<td>-0.091</td>
<td>0.258</td>
<td>0.393</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>-0.334</td>
<td>-0.124</td>
<td>0.274</td>
<td>0.224</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>-0.285</td>
<td>-0.109</td>
<td>0.247</td>
<td>0.250</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>-0.486</td>
<td>-0.165</td>
<td>0.263</td>
<td>0.066</td>
</tr>
<tr>
<td>R Square = 0.165 (R Square adjusted = 0.116)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table S-7. Linear regression analysis (with Rational Appeal as constant) both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.811</td>
<td>-0.182</td>
<td>0.282</td>
<td>0.004</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.448</td>
<td>0.100</td>
<td>0.281</td>
<td>0.112</td>
</tr>
<tr>
<td>Sex</td>
<td>0.116</td>
<td>0.038</td>
<td>0.181</td>
<td>0.521</td>
</tr>
<tr>
<td>Income</td>
<td>0.308</td>
<td>0.182</td>
<td>0.098</td>
<td>0.002</td>
</tr>
<tr>
<td>Education</td>
<td>0.139</td>
<td>0.069</td>
<td>0.115</td>
<td>0.230</td>
</tr>
<tr>
<td>Community</td>
<td>0.065</td>
<td>0.076</td>
<td>0.050</td>
<td>0.193</td>
</tr>
<tr>
<td>Age</td>
<td>0.005</td>
<td>0.040</td>
<td>0.008</td>
<td>0.491</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.517</td>
<td>-0.123</td>
<td>0.273</td>
<td>0.059</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.172</td>
<td>-0.155</td>
<td>0.074</td>
<td>0.021</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.022</td>
<td>-0.021</td>
<td>0.072</td>
<td>0.761</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.055</td>
<td>0.035</td>
<td>0.093</td>
<td>0.558</td>
</tr>
<tr>
<td>Domination</td>
<td>0.231</td>
<td>0.149</td>
<td>0.114</td>
<td>0.044</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.061</td>
<td>0.042</td>
<td>0.108</td>
<td>0.575</td>
</tr>
</tbody>
</table>

R Square = 0.154 (R Square adjusted = 0.117)

Table S-8. Ordinal regression analysis. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.253</td>
<td>0.272</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.719</td>
<td>0.264</td>
<td>0.006</td>
</tr>
<tr>
<td>Sex</td>
<td>0.089</td>
<td>0.164</td>
<td>0.589</td>
</tr>
<tr>
<td>Income</td>
<td>0.264</td>
<td>0.096</td>
<td>0.006</td>
</tr>
<tr>
<td>Education</td>
<td>0.075</td>
<td>0.110</td>
<td>0.496</td>
</tr>
<tr>
<td>Community</td>
<td>0.087</td>
<td>0.048</td>
<td>0.072</td>
</tr>
<tr>
<td>Age</td>
<td>0.007</td>
<td>0.007</td>
<td>0.359</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.521</td>
<td>0.260</td>
<td>0.045</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.180</td>
<td>0.072</td>
<td>0.012</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.018</td>
<td>0.069</td>
<td>0.791</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.070</td>
<td>0.089</td>
<td>0.432</td>
</tr>
<tr>
<td>Domination</td>
<td>0.180</td>
<td>0.107</td>
<td>0.094</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.032</td>
<td>0.102</td>
<td>0.752</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.151

Table S-9. Ordinal regression analysis (Rational Appeal as constant). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Sterilization</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.719</td>
<td>0.264</td>
<td>0.006</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.534</td>
<td>0.272</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Sex</td>
<td>0.089</td>
<td>0.164</td>
<td>0.589</td>
</tr>
<tr>
<td>Income</td>
<td>0.264</td>
<td>0.096</td>
<td>0.006</td>
</tr>
<tr>
<td>Education</td>
<td>0.075</td>
<td>0.110</td>
<td>0.496</td>
</tr>
<tr>
<td>Community</td>
<td>0.087</td>
<td>0.048</td>
<td>0.072</td>
</tr>
<tr>
<td>Age</td>
<td>0.007</td>
<td>0.007</td>
<td>0.359</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.521</td>
<td>0.260</td>
<td>0.045</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.180</td>
<td>0.072</td>
<td>0.012</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.018</td>
<td>0.069</td>
<td>0.791</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.070</td>
<td>0.089</td>
<td>0.432</td>
</tr>
<tr>
<td>Domination</td>
<td>0.180</td>
<td>0.107</td>
<td>0.094</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.032</td>
<td>0.102</td>
<td>0.752</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.151

**Table S-10.** Ordinal regression analysis (with interaction terms). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.278</td>
<td>0.274</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.754</td>
<td>0.268</td>
<td>0.005</td>
</tr>
<tr>
<td>Sex</td>
<td>0.094</td>
<td>0.165</td>
<td>0.567</td>
</tr>
<tr>
<td>Income</td>
<td>0.257</td>
<td>0.096</td>
<td>0.008</td>
</tr>
<tr>
<td>Education</td>
<td>0.094</td>
<td>0.112</td>
<td>0.399</td>
</tr>
<tr>
<td>Community</td>
<td>0.092</td>
<td>0.049</td>
<td>0.060</td>
</tr>
<tr>
<td>Age</td>
<td>0.006</td>
<td>0.007</td>
<td>0.388</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.527</td>
<td>0.262</td>
<td>0.044</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.179</td>
<td>0.072</td>
<td>0.013</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.015</td>
<td>0.069</td>
<td>0.831</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.070</td>
<td>0.090</td>
<td>0.433</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.019</td>
<td>0.166</td>
<td>0.911</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.113</td>
<td>0.169</td>
<td>0.502</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>-0.148</td>
<td>0.241</td>
<td>0.538</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>-0.174</td>
<td>0.255</td>
<td>0.494</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>-0.243</td>
<td>0.233</td>
<td>0.296</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>-0.439</td>
<td>0.244</td>
<td>0.072</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.159

**Live out their lives in holding pens**

**Table S-11.** Linear regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.555</td>
<td>0.146</td>
<td>0.239</td>
<td>0.021</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.132</td>
<td>0.035</td>
<td>0.240</td>
<td>0.583</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.266</td>
<td>-0.103</td>
<td>0.153</td>
<td>0.082</td>
</tr>
<tr>
<td>Income</td>
<td>-0.057</td>
<td>-0.040</td>
<td>0.083</td>
<td>0.491</td>
</tr>
<tr>
<td>Education</td>
<td>0.122</td>
<td>0.072</td>
<td>0.099</td>
<td>0.216</td>
</tr>
<tr>
<td>Community</td>
<td>-0.099</td>
<td>-0.136</td>
<td>0.043</td>
<td>0.021</td>
</tr>
<tr>
<td>Age</td>
<td>-0.008</td>
<td>-0.073</td>
<td>0.006</td>
<td>0.207</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.239</td>
<td>0.067</td>
<td>0.231</td>
<td>0.301</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.057</td>
<td>0.060</td>
<td>0.063</td>
<td>0.366</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.011</td>
<td>0.012</td>
<td>0.061</td>
<td>0.859</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.030</td>
<td>0.023</td>
<td>0.080</td>
<td>0.707</td>
</tr>
<tr>
<td>Domination</td>
<td>0.013</td>
<td>0.010</td>
<td>0.157</td>
<td>0.933</td>
</tr>
</tbody>
</table>
Table S-12. Linear regression analysis (with Rational Appeal as constant) both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Live in a holding pen for life</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.134</td>
<td>-0.035</td>
<td>0.244</td>
<td>0.585</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.380</td>
<td>0.100</td>
<td>0.243</td>
<td>0.119</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.270</td>
<td>-0.104</td>
<td>0.157</td>
<td>0.087</td>
</tr>
<tr>
<td>Income</td>
<td>-0.073</td>
<td>-0.051</td>
<td>0.085</td>
<td>0.387</td>
</tr>
<tr>
<td>Education</td>
<td>0.169</td>
<td>0.100</td>
<td>0.100</td>
<td>0.092</td>
</tr>
<tr>
<td>Community</td>
<td>-0.118</td>
<td>-0.163</td>
<td>0.043</td>
<td>0.007</td>
</tr>
<tr>
<td>Age</td>
<td>-0.009</td>
<td>-0.078</td>
<td>0.007</td>
<td>0.191</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.295</td>
<td>0.083</td>
<td>0.237</td>
<td>0.213</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.065</td>
<td>0.069</td>
<td>0.064</td>
<td>0.311</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.018</td>
<td>0.020</td>
<td>0.063</td>
<td>0.780</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.022</td>
<td>-0.017</td>
<td>0.081</td>
<td>0.782</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.234</td>
<td>-0.179</td>
<td>0.099</td>
<td>0.019</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.042</td>
<td>0.035</td>
<td>0.093</td>
<td>0.652</td>
</tr>
</tbody>
</table>

R Square = 0.111 (R Square adjusted = 0.072)

Table S-13. Ordinal regression analysis. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Live in a holding pen for life</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.645</td>
<td>0.268</td>
<td>0.016</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.317</td>
<td>0.270</td>
<td>0.241</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.385</td>
<td>0.219</td>
<td>0.079</td>
</tr>
<tr>
<td>Income</td>
<td>-0.103</td>
<td>0.094</td>
<td>0.273</td>
</tr>
<tr>
<td>Education</td>
<td>0.396</td>
<td>0.114</td>
<td>0.001</td>
</tr>
<tr>
<td>Community</td>
<td>-0.088</td>
<td>0.048</td>
<td>0.065</td>
</tr>
<tr>
<td>Age</td>
<td>-0.018</td>
<td>0.007</td>
<td>0.015</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.254</td>
<td>0.258</td>
<td>0.325</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.139</td>
<td>0.072</td>
<td>0.054</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.022</td>
<td>0.070</td>
<td>0.754</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.032</td>
<td>0.089</td>
<td>0.722</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.230</td>
<td>0.109</td>
<td>0.034</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.074</td>
<td>0.104</td>
<td>0.475</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.142
Table S-14. Ordinal regression analysis (Rational Appeal as constant). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Live in a holding pen for life</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.317</td>
<td>0.270</td>
<td>0.241</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.328</td>
<td>0.262</td>
<td>0.210</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.385</td>
<td>0.219</td>
<td>0.079</td>
</tr>
<tr>
<td>Income</td>
<td>-0.103</td>
<td>0.094</td>
<td>0.273</td>
</tr>
<tr>
<td>Education</td>
<td>0.396</td>
<td>0.114</td>
<td>0.001</td>
</tr>
<tr>
<td>Community</td>
<td>-0.088</td>
<td>0.048</td>
<td>0.065</td>
</tr>
<tr>
<td>Age</td>
<td>-0.018</td>
<td>0.007</td>
<td>0.015</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.254</td>
<td>0.258</td>
<td>0.325</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.139</td>
<td>0.072</td>
<td>0.054</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.022</td>
<td>0.070</td>
<td>0.754</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.032</td>
<td>0.089</td>
<td>0.722</td>
</tr>
<tr>
<td>Domination</td>
<td>-0.230</td>
<td>0.109</td>
<td>0.034</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.074</td>
<td>0.104</td>
<td>0.475</td>
</tr>
<tr>
<td>Cox and Snell Pseudo R Square</td>
<td>= 0.142</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table S-15. Ordinal regression analysis (with interaction terms). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Live in a holding pen for life</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.689</td>
<td>0.272</td>
<td>0.011</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.309</td>
<td>0.271</td>
<td>0.254</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.379</td>
<td>0.217</td>
<td>0.081</td>
</tr>
<tr>
<td>Income</td>
<td>-0.075</td>
<td>0.095</td>
<td>0.426</td>
</tr>
<tr>
<td>Education</td>
<td>0.355</td>
<td>0.116</td>
<td>0.002</td>
</tr>
<tr>
<td>Community</td>
<td>-0.063</td>
<td>0.049</td>
<td>0.192</td>
</tr>
<tr>
<td>Age</td>
<td>-0.018</td>
<td>0.007</td>
<td>0.011</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.187</td>
<td>0.258</td>
<td>0.470</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>0.137</td>
<td>0.073</td>
<td>0.059</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.017</td>
<td>0.070</td>
<td>0.805</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.007</td>
<td>0.090</td>
<td>0.936</td>
</tr>
<tr>
<td>Domination</td>
<td>0.038</td>
<td>0.177</td>
<td>0.832</td>
</tr>
<tr>
<td>Mutualism</td>
<td>0.225</td>
<td>0.182</td>
<td>0.218</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>0.042</td>
<td>0.250</td>
<td>0.868</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>0.656</td>
<td>0.259</td>
<td>0.011</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>0.457</td>
<td>0.240</td>
<td>0.057</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>0.250</td>
<td>0.250</td>
<td>0.318</td>
</tr>
<tr>
<td>Cox and Snell Pseudo R Square</td>
<td>= 0.190</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Killed humanely in holding pens

Table S-16. Linear regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killed Humanely in holding pen Interaction</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.491</td>
<td>0.096</td>
<td>0.274</td>
<td>0.074</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.768</td>
<td>0.152</td>
<td>0.275</td>
<td>0.006</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.362</td>
<td>-0.104</td>
<td>0.175</td>
<td>0.039</td>
</tr>
<tr>
<td>Income</td>
<td>0.149</td>
<td>0.078</td>
<td>0.094</td>
<td>0.116</td>
</tr>
<tr>
<td>Education</td>
<td>0.035</td>
<td>0.015</td>
<td>0.113</td>
<td>0.756</td>
</tr>
</tbody>
</table>
### Table S-17. Linear regression analysis (with Rational Appeal as constant) both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>KILLED HUMANELY IN A HOLDING PEN</th>
<th>B</th>
<th>( \beta )</th>
<th>SE</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.726</td>
<td>-0.143</td>
<td>0.271</td>
<td>0.008</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>-0.257</td>
<td>-0.050</td>
<td>0.270</td>
<td>0.342</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.361</td>
<td>-0.104</td>
<td>0.174</td>
<td>0.039</td>
</tr>
<tr>
<td>Income</td>
<td>0.155</td>
<td>0.081</td>
<td>0.094</td>
<td>0.099</td>
</tr>
<tr>
<td>Education</td>
<td>0.014</td>
<td>0.006</td>
<td>0.111</td>
<td>0.897</td>
</tr>
<tr>
<td>Community</td>
<td>0.140</td>
<td>0.144</td>
<td>0.048</td>
<td>0.004</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>-0.028</td>
<td>0.007</td>
<td>0.570</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.032</td>
<td>-0.007</td>
<td>0.262</td>
<td>0.902</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.330</td>
<td>-0.261</td>
<td>0.071</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.035</td>
<td>-0.030</td>
<td>0.070</td>
<td>0.613</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.024</td>
<td>-0.014</td>
<td>0.090</td>
<td>0.787</td>
</tr>
<tr>
<td>Domination</td>
<td>0.529</td>
<td>0.300</td>
<td>0.110</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.301</td>
<td>-0.185</td>
<td>0.103</td>
<td>0.004</td>
</tr>
</tbody>
</table>

R Square = 0.400 (R Square adjusted = 0.365)

### Table S-18. Ordinal regression analysis. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>KILLED HUMANELY IN HOLDING PENS</th>
<th>Estimate</th>
<th>SE</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.488</td>
<td>0.285</td>
<td>0.087</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.918</td>
<td>0.287</td>
<td>0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.635</td>
<td>0.263</td>
<td>0.016</td>
</tr>
<tr>
<td>Income</td>
<td>0.151</td>
<td>0.099</td>
<td>0.126</td>
</tr>
<tr>
<td>Education</td>
<td>0.011</td>
<td>0.115</td>
<td>0.926</td>
</tr>
<tr>
<td>Community</td>
<td>0.161</td>
<td>0.051</td>
<td>0.002</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>0.008</td>
<td>0.573</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.055</td>
<td>0.270</td>
<td>0.838</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.358</td>
<td>0.074</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.033</td>
<td>0.073</td>
<td>0.646</td>
</tr>
</tbody>
</table>

R Square = 0.394 (R Square adjusted = 0.367)
Table S-19. Ordinal regression analysis (Rational Appeal as constant). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killer humanely in holding pens</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Message</td>
<td>-0.918</td>
<td>0.287</td>
<td>0.001</td>
</tr>
<tr>
<td>Emotional Appeal (EA)</td>
<td>-0.430</td>
<td>0.277</td>
<td>0.120</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.635</td>
<td>0.263</td>
<td>0.016</td>
</tr>
<tr>
<td>Income</td>
<td>0.151</td>
<td>0.099</td>
<td>0.126</td>
</tr>
<tr>
<td>Education</td>
<td>0.011</td>
<td>0.115</td>
<td>0.926</td>
</tr>
<tr>
<td>Community</td>
<td>0.161</td>
<td>0.051</td>
<td>0.002</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>0.008</td>
<td>0.573</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.055</td>
<td>0.270</td>
<td>0.838</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.358</td>
<td>0.074</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.033</td>
<td>0.073</td>
<td>0.646</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.018</td>
<td>0.089</td>
<td>0.838</td>
</tr>
<tr>
<td>Domination</td>
<td>0.569</td>
<td>0.126</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.276</td>
<td>0.105</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.409

Table S-20. Ordinal regression analysis (with interaction terms). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killer humanely in holding pens</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.516</td>
<td>0.310</td>
<td>0.096</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.965</td>
<td>0.299</td>
<td>0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.652</td>
<td>0.264</td>
<td>0.014</td>
</tr>
<tr>
<td>Income</td>
<td>0.139</td>
<td>0.099</td>
<td>0.159</td>
</tr>
<tr>
<td>Education</td>
<td>0.018</td>
<td>0.117</td>
<td>0.879</td>
</tr>
<tr>
<td>Community</td>
<td>0.164</td>
<td>0.051</td>
<td>0.001</td>
</tr>
<tr>
<td>Age</td>
<td>-0.005</td>
<td>0.008</td>
<td>0.556</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>-0.055</td>
<td>0.271</td>
<td>0.840</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.354</td>
<td>0.075</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.031</td>
<td>0.073</td>
<td>0.673</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>-0.029</td>
<td>0.091</td>
<td>0.747</td>
</tr>
<tr>
<td>Domination</td>
<td>0.390</td>
<td>0.202</td>
<td>0.053</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.466</td>
<td>0.188</td>
<td>0.013</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>-0.262</td>
<td>0.254</td>
<td>0.301</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>-0.313</td>
<td>0.300</td>
<td>0.296</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>-0.277</td>
<td>0.247</td>
<td>0.261</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>-0.231</td>
<td>0.273</td>
<td>0.398</td>
</tr>
</tbody>
</table>

Cox and Snell Pseudo R Square = 0.413

Killed humanely and sold for consumption

Table S-21. Linear regression analysis both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.
### Table S-22. Linear regression analysis (with Rational Appeal as constant) both standardized and unstandardized beta are reported. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killed humanely and sold for consumption Interaction</th>
<th>B</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>0.795</td>
<td>0.150</td>
<td>0.274</td>
<td>0.004</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>0.895</td>
<td>0.171</td>
<td>0.275</td>
<td>0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.519</td>
<td>-0.144</td>
<td>0.175</td>
<td>0.003</td>
</tr>
<tr>
<td>Income</td>
<td>0.158</td>
<td>0.080</td>
<td>0.094</td>
<td>0.095</td>
</tr>
<tr>
<td>Education</td>
<td>0.024</td>
<td>0.010</td>
<td>0.113</td>
<td>0.832</td>
</tr>
<tr>
<td>Community</td>
<td>0.095</td>
<td>0.093</td>
<td>0.049</td>
<td>0.053</td>
</tr>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>-0.027</td>
<td>0.007</td>
<td>0.568</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.144</td>
<td>0.029</td>
<td>0.264</td>
<td>0.586</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.271</td>
<td>-0.206</td>
<td>0.072</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>-0.050</td>
<td>-0.041</td>
<td>0.070</td>
<td>0.475</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.065</td>
<td>0.036</td>
<td>0.091</td>
<td>0.474</td>
</tr>
<tr>
<td>Domination</td>
<td>0.334</td>
<td>0.183</td>
<td>0.180</td>
<td>0.064</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.613</td>
<td>-0.364</td>
<td>0.180</td>
<td>0.001</td>
</tr>
<tr>
<td>EA * Mutual</td>
<td>-0.337</td>
<td>-0.118</td>
<td>0.249</td>
<td>0.176</td>
</tr>
<tr>
<td>EA * Domination</td>
<td>-0.346</td>
<td>-0.109</td>
<td>0.264</td>
<td>0.191</td>
</tr>
<tr>
<td>RA * Mutual</td>
<td>-0.238</td>
<td>-0.077</td>
<td>0.238</td>
<td>0.317</td>
</tr>
<tr>
<td>RA * Domination</td>
<td>-0.316</td>
<td>-0.091</td>
<td>0.254</td>
<td>0.214</td>
</tr>
</tbody>
</table>

R Square = 0.442 (R Square adjusted = 0.410)

### Table S-23. Ordinal regression analysis. Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th>Killed humanely and sold for consumption</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>1.059</td>
<td>0.293</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td>-----</td>
<td>-----------</td>
</tr>
<tr>
<td>Rational Appeal (RA)</td>
<td>1.071</td>
<td>0.293</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sex</td>
<td>-1.113</td>
<td>0.268</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Income</td>
<td>0.185</td>
<td>0.101</td>
<td>0.066</td>
</tr>
<tr>
<td>Education</td>
<td>0.072</td>
<td>0.117</td>
<td>0.536</td>
</tr>
<tr>
<td>Community</td>
<td>0.105</td>
<td>0.051</td>
<td>0.038</td>
</tr>
<tr>
<td>Age</td>
<td>-0.011</td>
<td>0.008</td>
<td>0.164</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.132</td>
<td>0.274</td>
<td>0.631</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.340</td>
<td>0.076</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.017</td>
<td>0.074</td>
<td>0.816</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.051</td>
<td>0.092</td>
<td>0.581</td>
</tr>
<tr>
<td>Domination</td>
<td>0.558</td>
<td>0.126</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.377</td>
<td>0.107</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

**Table S-24.** Ordinal regression analysis (Rational Appeal as constant). Standard error and p-value is provided for the management strategy.

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Appeal (EA)</td>
<td>-0.012</td>
<td>0.277</td>
<td>0.965</td>
</tr>
<tr>
<td>Sex</td>
<td>-1.113</td>
<td>0.268</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Income</td>
<td>0.185</td>
<td>0.101</td>
<td>0.066</td>
</tr>
<tr>
<td>Education</td>
<td>0.072</td>
<td>0.117</td>
<td>0.536</td>
</tr>
<tr>
<td>Community</td>
<td>0.105</td>
<td>0.051</td>
<td>0.038</td>
</tr>
<tr>
<td>Age</td>
<td>-0.011</td>
<td>0.008</td>
<td>0.164</td>
</tr>
<tr>
<td>Horse Owner</td>
<td>0.132</td>
<td>0.274</td>
<td>0.631</td>
</tr>
<tr>
<td>Value horses as a symbol of American freedom</td>
<td>-0.340</td>
<td>0.076</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Value horses as an important part of life</td>
<td>0.017</td>
<td>0.074</td>
<td>0.816</td>
</tr>
<tr>
<td>Value horses as important for civilization</td>
<td>0.051</td>
<td>0.092</td>
<td>0.581</td>
</tr>
<tr>
<td>Domination</td>
<td>0.558</td>
<td>0.126</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mutualism</td>
<td>-0.377</td>
<td>0.107</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

**Table S-25.** Ordinal regression analysis (with interaction terms). Standard error and p-value is provided for the management strategy.
Cox and Snell Pseudo R Square = 0.458