Zoo's Clues: Calling Visitors to Action

By

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Abstract

What makes visitors more likely to want to learn more about helping animals? Using survey data from the Henry Doorly Zoo, I aim to gain insight into potential differences in how visitor behavior differs between individuals. I used an ordered logistic regression model to examine patterns behind individuals' willingness to learn more about helping animals after visiting zoo exhibits. This analysis showed that the amount of signage read in an exhibit significantly predicts zoo visitors' willingness to learn more about helping animals; this behavior is present when someone reads half or more of the exhibit signage. Additionally, being a zoo member and other exhibit characteristics were not significant in determining if one wanted to learn more about helping animals.

1. Introduction and Review of Literature

We would like to determine if survey respondents, after visiting an exhibit, would like to learn more about helping animals. By using survey data provided by the Henry Doorly Zoo, I intend to gain insight into potential differences in how zoo visitor behavior differs between zoo members and non-members. As stated by Caldwell and Andereck (1994), one of the main reasons for becoming a member of an organization is the ability to make an impact on society. Becoming a zoo member is extremely valuable for the zoo; by becoming a member, one can simultaneously support the zoo's conservation efforts and its mission. Therefore, being a zoo member may be an indicator of understanding who will potentially volunteer and support environmental movements. With this research project, the author intends to enable the Henry Doorly Zoo to better understand its visitors; by doing this, the Zoo can tailor its experiences so that visitors are more likely to support the Zoo's mission "to inspire, educate and engage people to serve as lifelong stewards for the conservation of animals and their habitats." This project attempts to understand if any visitor or exhibit characteristics make one more likely to want to learn more about helping animals. By understanding these behaviors, education programs could be improved, and policies could be enacted to promote policies that encourage pro-environmental behaviors. Furthermore, these findings may also have implications for the psychology field. Additionally, the contribution of this paper is to validate past findings related to zoo visitors' attitudes after visiting the zoo.

We found that the amount of signage read in an exhibit significantly predicts zoo visitors' willingness to learn more about helping animals. This behavior occurs when someone reads half or more of the exhibit signage. Furthermore, our econometric model suggests that younger individuals (between the ages of 18-24) are more willing to learn more about helping animals—

after going through a Zoo exhibit. Therefore, the Henry Doorly Zoo may want to market itself to a younger audience and incentivize zoo visitors to read exhibit signage more. Moreover, the Henry Doorly Zoo may also need to conduct a study to understand why older individuals might not want to learn more about helping animals. We also found that being a member of the Henry Doorly Zoo was not a significant predictor of learning more about animals, and all the exhibit characteristics were also not significant in determining this.

Literature review

Hacker and Miller (2016) explore visitors' attitudes towards conservation after visiting African elephants at the San Diego Zoo. They aim to find if there is a correlation between visiting a zoo and willingness to champion animal rights. To explore this topic, the authors collected surveys from random adults who filled out a survey as they exited the Elephant Valley exhibit. This survey was built on previous research papers, which indicates that their survey was valid and robust. In this survey, the authors asked people to recall the behaviors they saw the elephants do, and then they asked questions regarding how much they agreed with conservation statements. By doing this, the authors aimed to see if observing elephant behaviors affected peoples' attitudes regarding conservation. Hacker and Miller collected 284 surveys from September 2013 to January 2014 (2016). In their econometric model, the correlation between being a zoo member and intending to act was not statistically significant; this indicates there is not enough evidence to suggest that being a member influences conservation attitude. Additionally, zoo members had a higher propensity towards attitudes toward preserving nature but did not have a higher propensity to support conservation issues than non-members.

Ross and Gillespie also intended to understand "how visitors use the educational opportunities presented to them" (2009, 462). The authors aim to use this information to create effective strategies for educating visitors about environmental and conservation issues. The authors tracked 338 visitors in the Regenstein African Journey in Lincoln Park Zoo in 2003 between September 11th and November 14th; they collected this data by noting the duration people were in the exhibit, and by using software to observe their behavior. In their paper, they stated that a person was engaged if they stopped for longer than 2 seconds, facing the exhibit, and within six feet of the graphic. The authors explain there was no difference in engagement between genders, but there was a difference between age; older people spent more time engaged (2009). Text panels did not have high attracting power; however, the interpretative elements—which try to simulate the condition of the habitat—had higher levels of holding power. Visitors who spent more time with zoo staff were likely to have longer visits but spent less time looking at interactive exhibits. Visitors also move through the exhibits quickly, and people spend more time with larger animals. Interactive exhibits were most appealing to visitors, and visitors with children did not spend as much time interacting or looking at the exhibits. Furthermore, Skibins and Powell (2018) also explored the relationships between zoo visitors and their subsequent attitudes towards conservation. The authors created a survey and tried to incorporate 'affection' towards animals before and after visiting the zoos. Visitors were approached by survey personnel, rather than people needing to take a QR survey. The authors created a "Conservation Caring" scale, which measures visitors' connections to a specific animal. Those who had higher levels on the authors' "Conservation Caring" scale were more likely to support environmental efforts. In this paper, one of the main predictors for willingness to act was prior experiences with wildlife, therefore, I believe that if someone had a prior visit to the Henry Doorly Zoo, then they would be willing to learn more about animals.

Conversely, Macdonald (2015) explores the idea of visitors making public commitments and seeing if these influenced people's behavior at home. In the article, the treatment group writes a pledge (to keep their cat indoors overnight) on a card, which is then taped onto a wall in the Wellington Zoo. The author enacted an experiment to answer this question—they randomly surveyed adults in the Wellington Zoo. After the survey, those in the treatment group would sign pledge cards; if the visitors filled them out, the author contacted each person six weeks after the survey and inquired if they followed through with their pledge. 691 visitors were approached and filled out the survey, while sixty-seven had cats, and were able to continue to the pledge/follow-up stage of the study. There was a statistically significant difference between the control and treatment groups; the people who made pledge cards followed through on their behavior and reported following the behavior 100% of the time, compared to 25.4% of the control group. By implementing similar strategies in the Henry Doorly Zoo, visitors may follow through with their intended actions at a higher level.

By creating a public pledge, as stated by Macdonald (2015), people were more likely to follow through with the intended behavior. Conversely, this project aims to explore the relationship between visiting a zoo and being willing to learn more about helping animals; we would like to understand if people are following through with this behavior. In bridging this gap, individuals may learn how to help animals by volunteering their time. Individuals may have different intentions when volunteering. Liu and Jia (2021) explain that individuals may volunteer based on their religious beliefs, political values, and belief in social justice; these behaviors are present in China. Conversely, Brown, Meer, and Williams (2019) state that in the United States, people may be more likely to volunteer their time—even when the opportunity cost of volunteering exceeds the monetary value of a donation. Additionally, Fekadu and Engdawork

(2021) explain that volunteer participation depends highly on societal context. The authors concluded that access to credit services, being a member of a group, access to non-farm income services, and other factors greatly impacted community participation in a watershed management program.

While Hacker & Miller (2016) explore visitors' attitudes after attending an exhibit, Ross and Gillespe (2009) explore what makes an exhibit more likely to attract and hold visitors' attention. Furthermore, Skibins and Powell (2013) state that having these up-close encounters with animals greatly impacts one's intent to conserve nature. Skibins and Powell (2013, 12) state," …in this way, zoos may be able to capitalize on the experiential condition and provide immediate opportunities for behavior adoption" (2013). By implementing these findings in tandem, one gives a comprehensive overview of how exhibits can simultaneously hold people's attention and educate them. Additionally, these papers suggest that having interactive experiences and up-close interaction with the animals can improve one's stance towards conservation; therefore, zoos should strongly consider these variables while assessing their exhibits. Additionally, Hacker and Miller (2016), Skibins and Powell (2013), Goff, Waring, and Noblet (2002), and Macdonald (2015) use surveys to collect their data. These papers explore consumer behavior at zoos and related attractions. Furthermore, most papers (except the Macdonald article) used participants from the United States; therefore, the results may apply to the Henry Doorly Zoo. One drawback to these studies is that many of them only studied each individual's willingness to act, but they did not actually observe if those individuals followed through with their intentions. These studies could follow up with the survey respondents, much like Macdonald (2015) did. Additionally, the chosen papers have similar findings, which may be attributable to most papers using a survey to conduct their experiments. Consequently, since these observations were complementary, these research papers appear robust; they surveyed different zoos across the world, with a representative sample of visitors in each study. Furthermore, these findings were consistent throughout the last two decades. In the next section, we will discuss the data and empirical model used to explore the ideas proposed in this literature review.

2. Data and Empirical Model

The data for this research project were provided by Dr. Thomas Beatman, Manager – Research and Evaluation, at the Henry Doorly Zoo. These datasets include survey and exhibit data. To collect the survey data, Dr. Beatman sets up signs with QR codes at the end of certain exhibits and rotates these signs every week. QR codes are present for a week, and every exhibit is intended to have two blocks of surveys within a ten-week period. The survey asks about visitor demographics (such as age, zip code, if they are a zoo member, etc.), and questions regarding the visitor experience. For example, some of these visitor experience questions ask respondents to indicate their level of agreement with certain statements, such as "The animals at the Zoo live a good life." Each agreement question was rated on a Likert scale. In our dataset, there were 318 respondents. Please note that the survey does not measure if respondents actually followed through with this pledge.

Dr. Beatman also provided a dataset that includes information regarding the physical characteristics of each exhibit. There are 13 exhibits at the Henry Doorly Zoo, and this dataset provides the length, number of graphics, total words, and other information for each exhibit. The exhibit dataset also includes the Flesch-Kincaid score for each exhibit, which can be described as its reading level. Additionally, Dr. Beatman analyzed the word content for each exhibit—this refers to the percentage of words that relate to certain categories. These categories include zoo-specific information (such as zoo history), geology and ecology information, nature information, animal facts, and conservation information. Please refer to the Data Appendix for more information on each variable used in this project.

We would like to determine if survey respondents, after attending an exhibit, would like to learn more about helping animals. To answer the research question posed in this project, the author created an ordered logistic regression model. The main dependent variable in this model is the agree.animals.learnmore variable, which asks the survey respondents to indicate if they wanted to learn more about helping animals. More specifically, the respondent is asked their level of agreement with the statement: "I wanted to learn more about what I could do to help animals." This question's responses ranged from "Strongly Disagree" to "Somewhat Agree," to "Strongly Agree," with six possible responses. The author aggregated this variable into four groups: one with "Strongly Disagree," "Disagree," and "Somewhat Disagree" in the responses, one with "Somewhat Agree" responses, "Agree" one with as a response, and "Strongly Agree" as another group. Consequently, the agree.animals.learnmore variable is defined as 1 when the survey participant responded "Somewhat Agree", 2 when the survey participant responded "Agree", and 3 when the survey participant responded "Strongly Agree". Additionally, this variable is defined as 0 when the survey respondent indicated they "Strongly Disagree," "Disagree," and "Somewhat disagree," since we assume they do not want to learn more about animals; the specific level of disagreement is irrelevant for this project. Our dependent variable is similar to the left-hand-side variable in the econometric model described in Hacker and Miller (2016), where the authors attempted to measure visitor promises after attending a zoo exhibit. Our model follows the form:

$$agree.animals.learnmore = \beta_0 + \beta_1\, prior\_visit_i + \beta_2\, zoo\_member_i + \beta_3\, read\_half\_many\_signage_i + \beta_4 read\_almost\_all\_signage_i + \beta_5 read\_all\_signage_i + \beta_6 btwn\_18\_and\_24_i + \beta_7 btwn\_25\_and\_34_i + \beta_8 btwn\_35and\_44_i + \beta_9 btwn\_45\_and\_54_i + +\beta_{10} over\_55_i + \beta_{11} exhibit\_age_i + \beta_{12} exh.readlevel_i + \beta_{13} exh.length.\log_i + \beta_{14} exh.species.\log_i + \beta_{15} exh.nature_i + \beta_{16} exh.animalfacts_i + \beta_{17} exh.conserve_i + \varepsilon_i$$

The independent variables of this econometric model are grouped into two different sections: visitor characteristics and exhibit characteristics. Please see the Data Appendix for more information regarding these characteristics and how we defined these in our model. In this research project, the variable associated with zoo membership is the main independent variable of interest. This variable ties into the research perspective of understanding differences between zoo members and non-zoo members. Hacker and Miller (2016) included these visitor characteristics and the exhibit content in their model, as well. In this paper, the authors used survey data to determine visitors' conservation intent at the San Diego Zoo—the differences between a member and a non-member were nonsignificant at the 95% confidence level. However, the p-value for conservation intent differing between zoo members and non-members was 0.067, which was significant at the 10% level. The author believes that members will be more inclined to learn more about helping animals. Furthermore, if the importance of animal rights and conservation is effectively communicated to the visitors, then the willingness to learn more about helping animals should not differ much between members and non-members. Skibins and Powell (2018) also explored the relationships between zoo visitors and their subsequent attitudes toward conservation. In this paper, the main predictor for willingness to act was prior experiences with wildlife, therefore, I believe that if someone had a prior visit to the Henry Doorly Zoo, then they would be willing to learn more about animals. Consequently, I believe there is a positive correlation between a prior visit and a willingness to learn more about pro-conservation efforts.

The exhibit characteristics are also integral to our model specification. Macdonald (2015) indicated that zoo exhibits must have strong conservation messaging to make people more willing to act in animals' best interests. Furthermore, educational facts about nature and animals can be an important way to educate individuals about these issues. Consequently, my a priori expectations for the exh.nature, exh.animalfacts, and the exh.conserve variables are as follows: in each exhibit, as the percentage of words in these categories increases, then the visitors' willingness to learn more about animals will increase. Additionally, I believe that as the readers read more signage, they will be more inclined to learn more about animals; in other words, the read_all_signage variable should have the strongest positive relationship with the agree.animals.learnmore variable, the read_almost_all_signage variable will have a weaker positive relationship with the dependent variable, and so on. Skibins and Powell (2018) explain that having an emotional connection to animals is a strong indicator of wanting to be involved in conservation movements. Therefore, we assume that once people learn more about the animals' environments and related animal facts, they will become more emotionally attached to them; consequently, they will want to learn more about ways they can help the animals. This assumption has some limitations, as we cannot measure if this behavior is actually present. Regardless, in this project, we assume this relationship exists, as we aim to gain information on zoo visitors' behavior after attending an exhibit. I also believe that as the exhibits' Flesch-Kincaid score (reading level) increases, people will be less willing to learn more about animals. As the reading level increases, fewer people can comprehend the exhibit's information, which will negatively affect our dependent variable.

3. Analysis of Results

Before analyzing our regression results, we must first understand some descriptive statistics present in our data. There were 318 responses in total; however, there were 305 responses in our data after omitting missing data. From Table 1, 59.3% of our sample was a member of the Henry Doorly Zoo. Conversely, the variable exh. conserve shows that the average percentage of words about conservation is 23.868%, with a standard deviation of 16.608%. This tells us that the exhibits are fairly varied in the amount of conservation content. Additionally, the minimum percentage of conservation words was 0%, and the highest was 52.171%. Of the 305 responses in our sample, 45.2% of respondents self-reported that they read half or many signs in the surveyed exhibit. Furthermore, 17.7% and 5.9% of respondents stated they read most and all signs, respectively. This indicates that over 68% of survey respondents said that they read half or more of the signage in their respective exhibits, and 32% of respondents read less than this amount. There is a myriad of age groups within our respondents, with 10.2% of survey respondents being between 18 and 24, around 31.1% between 25 and 34, 28.5% between 35 and 44, and the other 18.1% being 45 or older. This indicates that we have a varied amount of respondent ages in our sample.

Table 1 Near Here

There were also some significant correlations between the continuous variables in our sample. The exhibit_age variable was strongly correlated with the exh.animalfacts variable—see Table 2 for more information. These yielded a correlation of 0.772, which indicates that the older an exhibit is, the more animal facts will be included in the exhibit signage. Additionally, exhibit_age was negatively correlated with the exh.nature and the exh.conserve variable—these yielded a correlation of -0.412 and -0.355, respectively. Consequently, we assert that younger exhibits tend to have more verbiage related to nature and conservation compared to the older exhibits. The exhibit reading level (exh.readlevel) was positively correlated with the percentage of conservation information included in the signage. Conversely, the reading level was negatively correlated with the percentage of animal and nature facts in the exhibits. This indicates that as the reading level of an exhibit increases, the percentage of animal and nature facts in the exhibit tends to decrease, but the percentage of conservation facts increases.

Table 2 Near Here

In this research project, we would like to understand behaviors that make zoo visitors more likely to want to learn more about helping animals. To explain these behaviors, the author created an ordinary least squares (OLS) and an ordinal logistic regression model. Firstly, we would like to understand if our OLS model has explanatory value—to do this, we will conduct a hypothesis test. Let our null and alternative hypotheses be as follows:

$$H_0: \beta_1 = \beta_2 = \beta_3 \dots = \beta_{17} = 0; \qquad H_1: \beta_1 \neq \beta_2 \neq \beta_3 \dots \neq \beta_{17} \neq 0$$

Under the null hypothesis, we say that our model has no explanatory value; conversely, under the alternative hypothesis, the model does have explanatory value. We set our level of significance (α) to be 0.05. From Table 3, we see that our F-statistic is 4.308. This F-statistic, under the null hypothesis, has an F-distribution with 17 and 287 degrees of freedom, respectively, and yields a p-value less than 0.01. Therefore, since our p-value is less than our significance α, we reject the null hypothesis, and we conclude our OLS model does have explanatory value and can assist us in explaining the level in which zoo visitors want to learn more about helping animals. The author also used robust standard errors and coefficients in this model; this was done to correct for the heteroskedasticity present in our data. Additionally, to understand the degree to which our model has explanatory power, we must look at the OLS model's R-squared value. This R-squared value tells us how good the model fit is. Table 3 indicates that the R-squared of the OLS model is 0.203. This tells us that our OLS model explains 20.3% of the variation in how zoo visitors desire to learn more about helping animals.

Table 3 Near Here

In addition to the OLS model, the author created an ordinal logistic regression model to determine what makes zoo visitors more likely to want to learn more about helping animals. Of the variables included in the regression model, the read_half_many_signage, read_almost_all_signage, read_all_signage, and btwn_18_and_24 variables were statistically significant; this result agreed with the OLS model. Furthermore, all these variables were statistically significant at the 1% level, which indicates that they were also significant at our α level of 5%. Therefore, we can say that when a zoo visitor reports that they read half/many, almost all, and all exhibit signage, then they are more likely to want to learn more about helping animals. Additionally, being 18 to 24 years old is also a significant indicator of visitors' willingness to learn more about helping animals.

Some other independent variables in the ordered logistic regression model were not statistically significant. Most of the age variables were not significant in determining if people wanted to learn more about helping animals. Additionally, being a zoo member was not statistically significant in our model. The exhibit characteristics were not significant in determining if people wanted to learn more about helping animals. Moreover, the reading level of each exhibit was not significant in determining if people wanted to learn more about helping animals. Additionally, the exhibits' percentage of animal facts, conservation facts, and nature facts was not statistically significant. The length and the number of species were also not statistically significant. We discuss these observations after we discuss the model's average marginal effects.

To understand the average marginal effects for these statistically significant variables, please refer to Table 4. For the btwn_18_and_24 variable, if someone states that their age is between 18 and 24, on average, they are 34.9 percentage points more likely to "strongly agree" with the statement "I would like to learn more about helping animals," compared to the 17 and under respondents, holding all other variables constant. Additionally, these individuals are 1.8 percentage points more likely to simply "agree" with wanting to learn more, ceteris paribus, which was a wide difference. On the other hand, if someone states they read all the exhibit signage, then, on average, they are 50.7 percentage points more likely to "strongly agree" with the statement compared to the base group, holding all other variables constant. Conversely, these individuals are 9.5 percentage points less likely to simply "agree" with wanting to learn more, ceteris paribus. If someone stated that they read almost all of the exhibit signage, then, on average, they are 32.6 percentage points more likely to strongly agree with the statement "I would like to learn more about helping animals," holding everything else constant. If someone stated that they read more than half or many of the exhibit signage, then, on average, they are 13.7 percentage points more likely to strongly agree with helping animals compared to the base group, holding everything else constant. These results indicate that as one reads more signage, one is more likely to want to strongly agree with wanting to learn more about helping animals.

These results mostly line up with the a priori expectations and the prior research. Hacker and Miller (2016) state that being a zoo member was not a significant indicator of wanting to act and learn more about helping animals. Furthermore, Table 3 supports this behavior, as the member variable was not statistically significant for the ordered logistic regression or the OLS model. Consequently, people may want to become zoo members for reasons other than supporting conservation and environmental movements. For example, individuals may want to become zoo members for entertainment or other purposes. The effect of reading more signage also aligns with prior research and the results of my economic analysis. As people read more about animals, they are more engaged and willing to learn more about helping them. This behavior agreed with the results presented by Ross and Gillespe (2009).

Conversely, there were some differences between the results and my a priori expectations. Skibins and Powell (2013) proposed that prior experiences with wildlife were the main predictor for zoo visitors' willingness to act for environmental and conservational movements. I also believed that this behavior would be present in the data. However, in the ordered logistic regression model, a prior visit did not significantly affect one's willingness to learn more about helping animals. This indicates that individuals may visit the zoo for reasons other than educational purposes. Additionally, Skibins and Powell (2013) state that having stronger conservation messaging could create greater participation in environmental movements. I believe that this behavior would have been present in the econometric model. However, in the ordered logistic regression model, the amount of nature and conservation facts was not a significant factor in people's willingness to learn more about helping animals. Consequently, people may place a greater emphasis on watching the behaviors of the zoo animals, rather than digesting the exhibit's educational content. The other exhibit characteristics were not significant in determining if people wanted to learn more about helping animals. This observation indicates that the exhibit content might not have much influence on visitor perception. Furthermore, this further supports the idea that people might go to the zoo, not just to educate but to entertain themselves.

4. Concluding Remarks

By using and analyzing an ordered logistic model, I found that reading a higher level of signage made one more willing to learn more about helping animals. Being between 18 and 24 was also significant in determining their willingness to learn more. Additionally, being a member of the Henry Doorly Zoo was not significant in determining one's agreement with the statement: "I wanted to learn more about what I could do to help animals." At the beginning of this project, I believed that people mainly became zoo members to support conservation movements. However, in my personal experience, individuals may want to become a member to entertain their children, to get cheaper admission, or to walk around and enjoy the zoo's ambiance. Consequently, the Henry Doorly Zoo may want to market zoo membership as not just a way to support the Zoo's mission, but for other reasons. I also learned that there may be a disconnect between reading educational content and willingness to learn more about animals. The exhibit characteristics were not statistically significant in determining one's willingness to learn more about helping animals. This indicates that when someone reads the signage, there may be a loss between the audience and the intended message. Consequently, this project was an extremely insightful window into understanding how individuals behave in a real-world setting.

There were some limitations in this project. Firstly, to take the survey, one needs to use a phone or other device that can scan QR codes; these devices also require internet access to complete the survey. Furthermore, Dr. Beatman indicated that the stands used to present the QR codes are fragile and can be broken or pushed over. The survey data had 305 responses; however, we did not evaluate if this sample was representative of the entire population of Henry Doorly

Zoo visitors. This could be done by analyzing the Henry Doorly Zoo's visitor data and ensuring the population of survey respondents is similar to the zoo's overall visitor demographics. However, this could be improved by procuring a larger, more representative sample of all zoo visitors. For future studies, the Zoo could also physically reach out to visitors after visiting an exhibit—rather than conducting the survey through a QR code. This may create a more representative sample of zoo visitors; however, budgetary constraints may hinder this idea.

The literature review also gave insightful information that may be helpful for the Henry Doorly Zoo. As described by Ross and Gillespe (2009), the authors suggest that zoos may want to make more interactive exhibits, as these elements have higher levels of holding power. Examples of interactive exhibits could include animal training shows or provide opportunities to interact face-to-face with these animals. This higher level of holding power may make zoo visitors more likely to read the exhibit signage. Hacker and Miller (2018) second this claim; by having exhibits with more up-close and personalized experiences, zoos could have a greater impact on people's intent to act. Skibins and Powell (2013) found the main predictor for willingness to act was prior experiences with wildlife. Consequently, the Henry Doorly Zoo should focus on having up-close experiences with the zoo animals. These proposed changes could better position the Henry Doorly Zoo to fulfill its mission "to inspire, educate and engage people to serve as lifelong stewards for the conservation of animals and their habitats."

Data Appendix

Variable	Description
agree.animals.learnmore_clean	Equal to 1 if the survey respondents stated they "somewhat agreed" with the statement that they wanted to learn more about saving animals. Equal to 2 if they "agreed" with the statement, and 3 if they "strongly agreed with the statement. Equal 0 if the respondent replied anything with "Disagree". Based on the agree_animals.learnmore variable from the survey data.
prior_visit_clean	Equal to 1 if the survey respondent stated they had a prior Zoo visit, 0 otherwise. Based on the prior.visit variable from the survey data
mem.zoo_clean	Equal to 1 if the survey respondent stated they were a member of the Henry Doorly Zoo, 0 otherwise. Based on the mem.zoo variable from the survey data
Read_less_than_half_signage	Equal to 1 if the survey respondent stated they read less than half of the exhibit signage, 0

	otherwise. Excluded from the model, as this is used as the base dummy variable for the other read_signage variables. Based on the read_signage variable from the survey data.
read_half_many_signage	Equal to 1 if the survey respondent stated they read half or most of the exhibit signage, 0 otherwise. Based on the read_signage variable from the survey data.
read_almost_all_signage	Equal to 1 if the survey respondent stated they read almost all of the exhibit signage, 0 otherwise. Based on the read_signage variable from the survey data
read_all_signage	Equal to 1 if the survey respondent stated they read all of the exhibit signage, 0 otherwise. Based on the read_signage variable from the survey data.
under_17	Equal to 1 if the survey respondent stated their age was 17 or under, 0 otherwise. Excluded from the econometric models, as this is used as the base dummy variable for the other age variables. Based on the age variable from the survey data.

btwn_18_and_24	Equal to 1 if the survey respondent stated their age was between 18 and 24, 0 otherwise. Based on the age variable from the survey data.
btwn_25_and_34	Equal to 1 if the survey respondent stated their age was between 25 and 34, 0 otherwise. Based on the age variable from the survey data.
btwn_35_and_44	Equal to 1 if the survey respondent stated their age was between 35 and 44, 0 otherwise. Based on the age variable from the survey data.
btwn_45_and_54	Equal to 1 if the survey respondent stated their age was between 45 and 54, 0 otherwise. Based on the age variable from the survey data.
over_55	Equal to 1 if the survey respondent stated their age was 55 or older, 0 otherwise. Based on the age variable from the survey data.
exhibit_age	The number of years the current exhibit has been open for. Based on the exh.year variable from the exhibit data.

exh.readlevel	The Flesch-Kinsing reading score of the attended exhibit. From the survey data.
exh.length.log	The natural log of the length of the attended exhibit. From the exh.length variable in the survey data.
exh.species.log	The natural log of the number of species in the attended exhibit. From the exh.species.num variable in the survey data.
exh.nature	The percentage of words in the exhibit that includes information based on nature. From the survey data.
exh.animalfacts	The percentage of words in the exhibit that includes information based on animal facts. From the survey data.
exh.conserve	The percentage of words in the exhibit that includes information based on conservation. From the survey data.

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Tables

Table 1. Descriptive Statistics (after na.omit statement)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
agree_animals.learnmore_clean	305	1.538	1.006	0	1	2	2	3
prior_visit_clean	305	0.826	0.380	0	1	1	1	1
mem.zoo_clean	305	0.593	0.492	0	0	1	1	1
read_half_many_signage	305	0.452	0.499	0	0	0	1	1
read_almost_all_signage	305	0.177	0.382	0	0	0	0	1
read_all_signage	305	0.059	0.236	0	0	0	0	1
btwn_18_and_24	305	0.102	0.303	0	0	0	0	1
btwn_25_and_34	305	0.311	0.464	0	0	0	1	1
btwn_35_and_44	305	0.285	0.452	0	0	0	1	1
btwn_45_and_54	305	0.115	0.319	0	0	0	0	1
over_55	305	0.066	0.248	0	0	0	0	1
exhibit_age	305	10.446	7.284	2	3	11	20	21
exh.readlevel	305	9.629	1.754	4.680	8.480	9.860	10.020	12.440
exh.nature	305	4.996	7.076	0.825	1.271	3.716	6.175	33.275
exh.animalfacts	305	46.497	20.878	24.986	27.155	36.049	73.421	77.541
exh.conserve	305	24.268	16.694	0.000	7.980	32.296	33.105	52.171
exh.length.log	305	5.666	0.629	4.523	5.384	5.493	5.888	7.671
exh.species.log	305	2.980	1.309	0.693	2.398	3.526	3.989	5.293

Table 2. Pairwise Correlations

	exhibit_age	exh.readlevel	exh.nature	exh.animalfacts	exh.conserve	exh.length.log	exh.species.log
exhibit_age	1	-0.053	-0.412	0.772	-0.355	-0.093	0.762
exh.readlevel	-0.053	1	-0.502	-0.458	0.840	-0.315	-0.083
exh.nature	-0.412	-0.502	1	-0.282	-0.265	0.030	0.019
exh.animalfacts	0.772	-0.458	-0.282	1	-0.780	0.053	0.619
exh.conserve	-0.355	0.840	-0.265	-0.780	1	-0.320	-0.390
exh.length.log	-0.093	-0.315	0.030	0.053	-0.320	1	-0.029
exh.species.log	0.762	-0.083	0.019	0.619	-0.390	-0.029	1

Table 3. Regression Results (OLS and Ordered Logit Model)

	Dependent variable: agree_animals.learnmore_clean	
	OLS	ordered logistic
	(1)	(2)
prior_visit_clean	-0.080	-0.197
	(0.173)	(0.342)
mem.zoo	0.129	0.310
	(0.124)	(0.254)
read_half_many_signage	0.481***	0.939***
	(0.120)	(0.251)
read_almost_all_signage	0.821***	1.718***
	(0.160)	(0.336)
read_all_signage	1.012***	2.380***
	(0.295)	(0.579)
btwn_18_and_24	0.704***	1.597***
	(0.224)	(0.492)
btwn_25_and_34	-0.040	-0.013
	(0.191)	(0.367)
btwn_35_and_44	-0.145	-0.290
	(0.192)	(0.370)
btwn_45_and_54	0.030	0.114
	(0.232)	(0.448)
over_55	-0.177	-0.323
	(0.241)	(0.508)
exhibit_age	0.026	0.051
	(0.017)	(0.038)
exh.readlevel	0.039	0.113
	(0.088)	(0.194)
exh.length.log	-0.233	-0.420
	(0.187)	(0.420)
exh.species.log	0.055	0.038
	(0.149)	(0.318)
exh.nature	-0.030	-0.046
	(0.043)	(0.093)
exh.animalfacts	-0.031	-0.052
	(0.025)	(0.056)
exh.conserve	-0.038	-0.071
	(0.024)	(0.053)
Constant	4.122	
	(3.079)	
Observations	305	305
R2	0.203	
Adjusted R2	0.156	
Residual Std. Error	0.924 (df = 287)	
F Statistic	4.308*** (df = 17; 287)	
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 4. Ordinal Logit Model: Marginal Effects

	effect.0	effect.1	effect.2	effect.3
prior_visit_clean	0.023	0.025	-0.020	-0.029
mem.zoo	-0.039	-0.038	0.034	0.043
read_half_many_signage	-0.113	-0.115	0.091	0.137
read_almost_all_signage	-0.146	-0.218	0.038	0.326
read_all_signage	-0.144	-0.268	-0.095	0.507
btwn_18_and_24	-0.126	-0.206	0.018	0.314
btwn_25_and_34	0.002	0.002	-0.001	-0.002
btwn_35_and_44	0.037	0.035	-0.033	-0.039
btwn_45_and_54	-0.014	-0.015	0.012	0.017
over_55	0.044	0.037	-0.039	-0.042
exhibit_age	-0.006	-0.006	0.005	0.007
exh.readlevel	-0.014	-0.014	0.012	0.016
exh.length.log	0.052	0.053	-0.045	-0.059
exh.species.log	-0.005	-0.005	0.004	0.005
exh.nature	0.006	0.006	-0.005	-0.006
exh.animalfacts	0.006	0.006	-0.006	-0.007
exh.conserve	0.009	0.009	-0.008	-0.010

Appendix Table 1. Descriptive Statistics (before na.omit statement)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
agree_animals.learnmore_clean	318	1.475	1.032	0	1	1	2	3
prior_visit_clean	318	0.827	0.379	0	1	1	1	1
mem.zoo_clean	318	0.594	0.492	0	0	1	1	1
read_half_many_signage	305	0.452	0.499	0	0	0	1	1
read_almost_all_signage	305	0.177	0.382	0	0	0	0	1
read_all_signage	305	0.059	0.236	0	0	0	0	1
btwn_18_and_24	316	0.108	0.310	0	0	0	0	1
btwn_25_and_34	316	0.307	0.462	0	0	0	1	1
btwn_35_and_44	316	0.278	0.449	0	0	0	1	1
btwn_45_and_54	316	0.114	0.318	0	0	0	0	1
over_55	316	0.070	0.255	0	0	0	0	1
exhibit_age	318	10.487	7.288	2	3	11	20	21
exh.readlevel	318	9.624	1.731	4.680	8.480	9.860	10.020	12.440
exh.nature	318	4.932	6.955	0.825	1.271	3.716	6.175	33.275
exh.animalfacts	318	46.677	20.916	24.986	27.155	36.049	73.421	77.541
exh.conserve	318	24.171	16.608	0.000	7.980	32.296	33.105	52.171
exh.length.log	318	5.679	0.635	4.523	5.384	5.493	5.888	7.671
exh.species.log	318	2.986	1.309	0.693	2.398	3.526	3.989	5.293