Disney's Animated Animals: A Potential Source of Opinions and Knowledge

Stephanie Eidt

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Advisor: Karyn Collie, Ph.D.

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Introduction

Psychologists have traditionally assumed that what is not innate to all people is learned in discrete pieces, shaping how we perceive and experience the world. Humans can be described as cumulative assortments of their cultures. This is evident in the differences in food, clothing, and social norms among countless other aspects of cultures. Herzog (2010) describes the concept of sociozoology, in which opinions about animals are highly influenced by culture, as is seen with the dog that is a beloved pet in the United States but an annoyance in Saudi Arabia. In Western society and increasingly around the world, culture draws from popular media, making it undeniably influential in how we determine the value of ideas, objects, and organisms.

The growing impact of the media cannot really be overstated. It has been described as a "teaching machine" on level or on greater footing than the traditional outlets of family, school, and church (Giroux, 1994). Preissler and Carey found that young children are capable of transferring new labels from pictures to their real-world counterparts (as cited in Ganea, Ma, & DeLoache, 2011, p. 1422), and Ganea et al. (2011) demonstrated this ability specifically with the transfer of biological information from books to actual animals. Handing a toddler the remote control or a tablet is giving him an opportunity to soak up particular interpretations of the world for better or worse. This power to influence can only be controlled by the selection of discrete units, rather than the content within each one. Thus, it becomes critically important which outlets parents allow their children to access in determining how they interpret the world.

Media can become particularly salient with repeated exposure. Developing strong attachments to media, particularly movies, is common in young children, resulting in a desire

to experience the chosen media over and over (Alexander, Miller, & Hengst, 2001). Alexander, Miller and Hengst (2001) found that all of the children from age two to five in their sample developed attachments to at least two different movies or books, with a mean of five. The repeatability of movies arguably makes them the most important media source for the acquisition of lessons, consciously or not (Lawson & Fouts, 2004).

With the increasing urban and technological orientations of American society, the average citizen's connection with nature is declining, as famously mourned in the book *The Last Child in the Woods* by Richard Louv. Often times, this means that children are experiencing wild animals in storybooks and movies long before they encounter them in the forest (Winkler-Rhoadesa, Medin, Waxman, Woodring, & Ross, 2010). Because of this phenomenon, the media morphs itself into a stronger reality than reality itself. One study found that children from a number of countries including France, Morocco, Turkey, and Portugal, were all more willing to protect exotic species that they had only seen in zoos or in the media over local species (Ballouard, Brischoux, & Bonnet, 2011). Strong bias towards a few charismatic species, representing 80.5% of survey responses, "suggest[s] a strong uniform influence of the media" (Ballouard et al., 2011).

However, media as a science teacher may not necessarily be negative because of an apparent deficit in children's natural knowledge. In one survey, a typical college student could only identify a tree to the specificity of "tree" (as cited in Ross, Medin, Coley, & Atran, 2003, p. 28). Eight-year-old British students scored 25% better on identification of Pokémon characters (average 78%) than on a similar quiz of native species (average 53%) (Balmford, Clegg, Coulson, & Taylor, 2002) while 72% of a sample of American students in 2nd, 5th, 8^{th,} and 11th grade could not identify a mallard duck (Kellert, 1984/1885). Although

materials gleaned from the media could be useful, confusion and misinformation may be compounded when the portrayal of animals is not accurate.

The media may intentionally or unintentionally perpetuate stereotypes surrounding animals, which may be assumed to be true by the general public. Advertisements use animals symbolically to describe their products, extending the ancient folklore similes like "sly as a fox," "blind as a bat," and "busy as a bee." Although these phrases may be rooted in rudimentary facts, they create implications that can radically affect how people view and consequentially respond to animals (Lerner & Kalof, 1999). The elasticity of the public's view of animals in light of the media can be demonstrated by the history of America's "wild" donkeys. Donkeys became an invasive species to the southwest United States when they were left behind by miners upon the end of the Gold Rush (Wills, 2006). In the 1920s, to combat their growing destruction of native flora, which put additional pressure on native species, the National Park Service rangers implemented eradication of the donkeys by hunting, a practice which received no major public attention (2006). Upon the release of a children's chapter book in 1953 by Marguerite Henry featuring Brighty, a donkey that loved his desert home, the public began to protest the inhumane removal of donkeys from their homeland (2006). Public opinion, swayed by a story that "reinvented" natural history, became influential enough to change procedures for removal of the species (2006). The public's fickleness about animals can also be demonstrated by the love-hate relationships Americans have with wolves and sharks. The media plays a crucial role in determining whether people see animals as dangerous or appealing a la *Jaws* or Discovery Channel's Shark Week.

Disney movies become an ideal outlet to study animal representations because of both their universality and target audience. The Walt Disney Company, worth $179.5 billion as of May 2015, is a multi-platform entertainment network including theme parks, movies, cruises, TV networks, books, and magazines, among others (Forbes.com, 2015). At the crux of the company's success are the movies produced by the Walt Disney Animation Studios, creating characters like Dumbo, Belle, and Winnie the Pooh. The classic storyline and artistic detail make the movies appeal to a wide range of viewers across cultures. Ringel describes Disney cartoons as a "global media village" perhaps due to the increasing homogeneity of ideas spread by these movies (as cited in Lutts, 1992, p. 160). Although the characters are typically not original ideas, the stylistic designs created for the movies make them Disney property, which can then be put on everything from bubble baths to backpacks to balloons and distributed throughout the theme parks and beyond. Aggressive marketing through widespread dissemination offers practically limitless exposure to the Disney brand and its plethora of paraphernalia, perpetuating attachment to the movies.

As a children's medium first and foremost, the Walt Disney Animation Studios works hard to protect its image as wholesome entertainment for the entire family. Many American parents grew up on the movies themselves and want to provide the same "magic" for their own children. In theory, parents need not worry about the content of these films and can allow their children to watch them repeatedly at home, further strengthening brand attachment and most likely continuing the cycle to the next generation. Although Disney movies are traditionally viewed as purely entertainment, studies have shown that children may glean information and create assumptions about the world from them. Transfer studies from animated films have been done regarding death (Cox, Garrett, & Graham, 2004-2005),

mental illnesses (Lawson & Fouts, 2004), and tobacco and alcohol (Goldstein, Sobel, & Newman, 1999). No direct causation can be cited, but the researchers noted that the potential for transfer exists and that repeated exposure may increase the internalization of ideas. In one notable study, children's gaps in information about the sloth's habitat were hypothesized to sometimes be filled in with information from the movie *Ice Age*, which features a prehistoric sloth (Wagoner & Jensen, 2010). Although the information was ultimately erroneous, the children stored the movie information as possible truth to be referenced later (2010). Because Disney movies often feature animals and nature, they become potential sources for children (and adults) to learn about the animal kingdom.

Bell notes that animated films are created meticulously frame by frame, preventing anything from accidentally "slipping in," as opposed to possible bloopers like anachronisms in live-action films (as cited in Pandey, 2004, p. 52). Walt Disney wanted the animated animals to be drawn as realistically as possible, even bringing live animals to the studio to study their movements and behaviors. Dubbed "hyper-realism," Disney's nature scenes and creatures, particularly in Bambi, are famous for being as close to a recreation of natural landscape as possible (Wells, 2009). However, because the animated movie's nature is completely created by humans, it could be manipulated to suit the whims of Walt Disney and his animators and their successors. Movie critics and scientists alike have criticized Disney movies for their unfaithfulness to nature beyond surface aesthetics. Animals are portrayed fictitiously, such as showing opossums hanging by their tails and turning predators into malicious killers that do not belong in the harmonious Eden (Lutts, 1992). These movies create an idealized nature to which the real thing cannot compare, perhaps somewhat analogous to Photoshop for wildlife.

Disney may also perpetuate animal stereotypes. Cute and "harmless" herbivores, from horses and rabbits to mice and monkeys, are often cast as the protagonists and helpful allies (Leventi-Perez, 2011). When carnivores are cast in these roles, no mention is made of their eating habits, such as with Raja the tiger in *Aladdin* or Bagheera the Black Panther in *The Jungle Book.* More concerning, however, is the villainization of certain animals, perpetuating discrimination against them (Leventi-Perez, 2011).

A larger trend in animation is the manipulation of animals into surrogate stuffed animal by neoteny. Often the protagonists and sidekicks are given eyes and ears of clearly exaggerated size, even for newborns. Mickey himself has undergone a slow shift toward infancy as Disney has gradually developed its signature style (Gould, 2008). Anthropomorphism corrodes an animal's naturalness even further because by definition the animal becomes more personified. Typically this occurs by talking and expressing emotion, but behavior may be further extended to wearing clothes, playing instruments, having a job, etc. The practice is not new to animation or storytelling, extending back to the original "personality animation" found in the 1914 short *Gerdie the Dinosaur* (Erickson, 2010). Anthropomorphic animals have become a hallmark of Disney films, accounting for a large portion of those animals appearing as main characters in 77 movies from 1937 to 2012 (Hurt, 2010). These characteristics instill a sense of childlike innocence but may erode the real animal's wildness because they appear more as cuddly pets than non-domesticated creatures (Ganea et al., 2011). Viewers may connect with anthropomorphic and/or neotenic animals on an emotional level, but these techniques may prevent the transfer of quality biological information or worse yet, transfer erroneous information.

In this study, the potential correlation between popular opinions of wild animals and how they are portrayed in Disney animated films was examined. Because repetition is an important factor in learning, both the character's prominence in the movie and the participants' familiarity with the movie itself were considered. I hypothesized that, in general, popular opinions and the animated movie portrayals would match, particularly regarding more central characters. Tamir and Zohar demonstrated confusion among children concerning facts learned from anthropomorphized animal books even among high schoolers (as cited in Ganea et al., 2011, p. 1423). Perhaps children see them as "fuzzy people" with distinct feelings, goals, and personalities, in addition to having furry tails or colorful patterns. The more anthropomorphic an animal, I hypothesized, the less transfer between movie representation and participant attitudes to real animals occurs. To further tease apart the potential for learning, animal "facts" as presented in Disney films were examined as well. I hypothesized that participants would be most likely to support false facts when the animal is important and less anthropomorphic within the Disney film. True facts may be accredited to other sources in addition or instead of Disney, but false facts point to false learning.

Methods

To determine the most relevant and popular Disney animated movies, a pre-study survey was administered to Malone University traditional undergraduate students. The most recognizable movies were assumed to have the largest potential for animal information transfer and so were targeted for this study. Students were asked about their familiarity of 36 different Disney animated movies via an anonymous Google Forms survey. The survey was based upon two basic questions per movie: 1. How many times have you seen [the movie]?

(0, 1, 2-5, or 6+); and 2. How recently have you seen [the movie]? (less than one year, 1-5 years, 6-10 years, 11-14 years, 15+ years, or not applicable). The movies were ranked by the total number of responses of 2-5 or 6+ for the first question, but ties were broken by responses to the second question (how many people have seen it within the past 5 years). The top movies (with usable animals) were used for further analysis, working down in popularity until all categories of animals were covered (to the extent possible).

Beginning with the most popular, the movies were watched to code the animals for anthropomorphism, importance within the movie, and the tone of the animal's depiction. Only wild animals were considered because of the higher possibility of other, larger influences surrounding attitudes towards domestic species. Animals presented in several movies were also excluded due to the potential complication between movies. The goal was to select three animals for each of the eight categories as determined by their coding combinations (anthropomorphic high or low; importance high or low; and good or bad). Official identification of species for Disney animals was based on descriptions from the DisneyWiki site (http://disney.wikia.com/wiki/The_Disney_Wiki). Each movie was only represented by up to two characters, and no movie could use the same combination of categories twice. Because of unforeseen unequal representation of the eight categories within the movies, unequal representation is presented within the survey and limitations are addressed within the discussion of the paper.

Anthropomorphic coding was based on the following definition developed by Brabant and Mooney: "1) ability to communicate; for example, it spoke or read; 2) emotion; for example, it smiled or cried; 3) appearance; for example, it wore clothing or carried paraphernalia associated with humans; or 4) action; for example, it did something only

humans do, such as play golf or drive a car" (as cited in Lerner & Kalof, 1999, p. 572). Animals were scored for each of the categories by their behavior in their movie. Low anthropomorphism was represented by only exhibiting portion one and/or two of Brabant and Mooney's definition for the majority of their screen time (i.e. only one brief incident of dressing up). High anthropomorphism was represented by exhibiting portion three, four or both for the majority of their screen time. Animals that undulated between low and high anthropomorphism were not used to increase the dichotomy of the category.

Attitude portrayals were coded on a dichotomous scale: Villains and accomplices to main villains and characters that are annoying/troublesome to the protagonist were labeled "bad" while protagonists, sidekicks, and characters helpful to protagonist in other ways were labeled as "good." Characters determined to be neutral or conflicted were not used in this study as neutral attitudes are more difficult to tease apart and beyond the scope of this study. Animals with conflicting representations within the same movie, like the good and bad lions of *The Lion King* were also not considered. Importance to the movie was scored by broad estimates of screen time: "Unimportant" equates to less than five minutes of total screen time while "important" covers characters with more than 7.5 minutes of total screen time (rounded to the nearest 10 seconds to help account for reaction time error). Using these three scales, animals were placed into the eight categories (described in detail in Appendix B) to look for correlational trends within the main survey.

Once the animals were coded, selected, and sorted into their corresponding categories, the main survey was distributed to traditional undergraduate Malone students via an anonymous Google Forms survey. One supplemental labeled color picture for each animal was available during the survey. Pictures displayed neutral poses and were cropped or edited

to avoid answering any of the animal fact questions used in the survey. Participants were first asked the basic demographic questions of gender and department of study to possibly assess differences between sub-populations. To neutrally access the participants' attitudes towards specific animals, they were asked to select two adjectives from a randomly shuffled dichotomous list, as listed in Appendix C. The participants could also opt to input one "other" word of their choice instead of one from the list. These "other" response words were coded as positive, negative or neutral to determine the participants' overall attitude towards each species (on a scale from -2 to 2). Only dichotomous answers (-2 and 2) were assessed in the analysis. To attempt to decipher sources for developing opinions, participants were then asked to denote all of the categories where they had experienced or learned about each species individually (1. Documentary [movie or tv]; 2. Zoo, wildlife sanctuary, etc.; 3. The wild/nature; 4. School, educational talks, etc.; 5. Non-fiction books, magazines, internet research; etc.; 6. None of the above). These factual-based experiences may trump those of childhood media and are thus worth comparing. To simplify data analysis, categories 2 and 3 were lumped into a "real animal exposure" subgroup while categories 1, 4 and 5 formed an "educational exposure" subgroup.

Drawing from the pool of previously listed animals (to save time and prevent participant fatigue), animal knowledge transfer was examined through 17 true and false questions regarding the animal's natural history or behaviors, with two for each animal (Appendix D). One additional question concerning mandrills asked the participant to choose the correct facial coloration from three photos. All questions were founded on behavior or appearance based on the portrayals in Disney movies. Six facts were portrayed falsely while

11 were accurately depicted in the movies. Questions were administered in random order by the survey software.

Following these questions, the participants were asked to rate their familiarity with the Disney animated movies that encompass the selected animals to determine if the movies could actually be a potential influence on their attitudes and learning of the animal. Questions were identical to the pre-survey questions described above. Correlations were examined via a nominal regression analysis of participants' attitudes towards animals as compared to the Disney's movies portrayal of the corresponding animal accounting for the additional independent variables of gender, major (biology vs. other), educational exposure to the animal, real exposure to the animal, anthropomorphism of the animal, importance of the animal in the film, how recently the movie was seen and how frequently the movie was seen. A similar statistical analysis was done comparing accurate knowledge of animals' natural history and behavior as compared to their portrayal in Disney films and the aforementioned variables. JMP software was used to run all statistical tests.

Results

The pre-survey was taken by 31 students, and the results are shown in Appendix A. Eighty-five students participated in the main survey, 61 females and 24 males. Approximately half (41.7%) were within the biology major subset while the other half was distributed between all other options. Most participants were familiar with Disney movies, increasing sample size but limiting the comparative outgroup. The most familiar movie was *The Lion King*, which had only one responder having never seen it, while *Robin Hood* was the least familiar, with 19 responders unacquainted with the movie.

Opinions

Average opinions of animals are depicted in Figure 1. Nine of the opinions matched the animal's portrayal in the Disney film while eight did not. Storks received the highest average rating with a 1.6 out of 2. Hyenas were the most negatively portrayed with an average of -0.9. Overall, animals were portrayed slightly more positively than negatively with an average score of 0.5. Opinion in general was significantly influenced by major (biology vs other), gender, educational exposure, and real exposure in descending order as depicted in Table 1. Additional factors influencing those who were familiar with the movies are shown in Table 2. Participants were more likely to positively rate good Disney characters than bad ones if the characters were important (Figure 2a). This effect was minimal if the animal was not an important character. Importance and character as standalone factors had no significant influence on opinion, but this can mostly be attributed to their significant interactions described above.

Highly anthropomorphic protagonists and antagonists showed little difference in participants' opinions, but those animals featured in less anthropomorphic roles were more likely to be rated better if they were portrayed as good characters (Figure 2b). Highly anthropomorphic characters were rated marginally better on average, but this effect was much less noticeable. Biology majors showed little preference between good characters and bad characters, but other majors were more likely to rate animals higher if they were portrayed well in the movie (Figure 2c). There was no effect of importance and character portrayal as standalone factor (Figure 2d and 2e).

Facts

The average participant was correct on 69.5% of the 18 questions asked. Average scores for each question are presented in Figure 4. It should be noted that the number of participants who had not seen the movies was decidedly smaller, creating uneven comparison groups and thus comparative rates. Significant effects on accuracy of facts are shown in Table 3. When Disney portrayed animals correctly, participants were more likely to answer correctly, particularly regarding bad characters (Figure 5a). This effect was negligible when the animal was a good guy. On a broader scale, if Disney was correct about the presented fact, participants were more likely to answer correctly. Having real and/or educational exposure to the animal had no significant effect on general accuracy (Figure 5b and 5c). Finally, trivia accuracy was not significantly better for either good animals or bad ones (Figure 5d).

Discussion

The largest effects on opinion were largely intuitive. Biology majors were more likely to use positive words to describe animals, and this denotes an overall greater affinity towards them. Although the general public has conflicting and often contradictory opinions of animals, biology majors possibly have a more universal appreciation for them. This could stem from individual interes,t motivating educational exposure and/or real-world exposure through more frequent zoo visits or nature walks, which was supported by the survey. Females stereotypically find animals more cute and cuddly and this was supported by their more positive averages. The data partially supports this theory as females were more likely to use the word “beautiful” while males were more likely to use the words “dangerous,”

"dumb," "smelly," "ugly," and "unnecessary." Gender differences in animal opinions are worth studying further to reveal how their relationships differ.

The significance of real and educational exposure suggests that these experiences positively affect how we think about animals. Watching animals in real life can make them seem more real because their size, colors, and behaviors cannot be conveyed as strongly in print or even through photos. Although it can be intimidating, real-world exposure can also create an emotional bond to the individual animal which may be expanded to the entire species and beyond. Educational exposure highlights the instrumental value of animals within their ecosystems. Learning how bees and vultures provide valuable services may (and arguable should) increase our opinions of them.

Because only those participants familiar with the movies were included in the analysis of the potential movie related effects, those effects found to be significant may be correlational to the movie's influence on opinion. Although the outgroup of those not exposed to Disney was too small to have significant results, these participants showed no preference for good or bad characters, hinting at the possibility of Disney as a source of learning (causation) rather than only perpetuating cultural stereotypes (correlation only). As predicted, opinion was more likely to match the movie's portrayal if the character was important. An important character presumably makes a stronger impression on the viewer and therefore influences his/her opinion more. These characters could also be children's favorites more often because they are typically the focus of merchandise like stuffed animals.

The results of this study also support the hypothesis that the level of anthropomorphism affects potential transfer from Disney's portrayal of animals. Only those characters with a low level of anthropomorphism showed a significant difference between

opinions of good and bad. Anthropomorphism could be masking transfer because the animal is not truly recognized as representing its species. An alternative explanation is that anthropomorphism could contribute to an animal's endearment regardless of whether it is portrayed positively or negatively, as could be supported by the overall preference for anthropomorphic animals. Perhaps an animal with a hat and shoes is cute regardless of its behavior. The 2016 Disney film *Zootopia* which focuses on a community of "civilized" animals could be examined to study this effect in more detail.

Accuracy of facts correlated with Disney's portrayal and interestingly, the effect was particularly strong concerning bad characters. Overall, if Disney was correct, participants were more likely to be correct, hinting at the possibility of subtle fact transfer from the movies. Real and educational exposure also correlated with correctness, again emphasizing the importance of both direct and indirect animal experience. In this sample, though, these experiences were not as significant as Disney's portrayal.

In order to keep the survey unbiased, participants were not primed with any Disney related questions until all others were answered. Because the survey was voluntary, and due to the ambiguous nature of advertising as "An Animal Survey," the participants may have had an overrepresented interest in animals. This could possibly be demonstrated by the abundance of biology majors who participated. The incentives to take the survey could also have drawn particular people to participate. Other demographical differences were not considered and could also be subtly influencing opinion or animal knowledge as well. Perhaps Malone students are more versed in Disney movies, or underclassmen are more likely to know *Frozen*. Studying college students at a Christian university is just one facet of

the general population, and a more comprehensive study would examine possible overarching effects of the movies on society as a whole.

Although my goals for this study were straightforward, the methodology was trickier than anticipated. First, although most of the animated movies included animals, there were many limitations due to the needs of this study concerning all three categories. A large percentage of the animals observed were domestic (dogs, cats, horses) or repeatedly used (rabbits, general songbirds, bears) and thus did not qualify. I also excluded animals that did not intuitively match the traditional representation of the species, like Jiminy Cricket who anatomically looks little like a cricket and those that were possibly too obscure for the general public, like Zazu the hornbill.

Additionally, many animals did not behave dichotomously enough to qualify for either high or low anthropomorphism. Meeko, the raccoon sidekick of Pocahontas, generally acts as a hungry (albeit extremely friendly) raccoon but short bursts throughout the movie showed him braiding Pocahontas's hair and dressing as the chief. Although these actions were short, the anthropomorphism was strong, and for this study such animals were dropped from consideration. Importance also proved to be less straightforward than originally assumed. Although characters like King Louie the orangutan from *The Jungle Book* and Raja, Princess Jasmine's tiger from *Aladdin*, seem important (at least enough to be remembered) they both have under 3:30 minutes of screen time. Even important characters do not typically top ten to fifteen minutes of screen time. Future studies may consider using an alternative definition of importance because of the only slight differences between characters' screen time. The dichotomy of good and bad characters was less of a problem within one movie as between movies. Although wolves are portrayed negatively in both

Beauty and the Beast and *Frozen*, they serve as Mowgli's adoptive family in *The Jungle Book.* Other movies portrayed the same animal in a similar way, but this presented the same problem. Teasing apart the interaction between potential movie interactions was beyond the scope of this study, so many animals were dropped because of their repeat usage including jaguars, owls, and foxes.

Once all of these limitations were considered, the pool of potential animals was much smaller than originally anticipated. Some categories presented an abundance of options. Animal sidekicks of the princesses were typically sorted into the "non-anthropomorphic, good, unimportant" category. "Non-anthropomorphic, bad, unimportant" animals were also fairly abundant because many villains have sidekicks. Likewise, wild animals attacking the protagonists fit in this category. Because anthropomorphic characters had to present strong human traits to be included, it was difficult to find characters to fit the bill. Although a large portion of Disney animals talk, this has become "normal" enough that high anthropomorphism needed to go beyond this marker to be included. Finally, important villains were difficult to find because the typical villain comprises a surprisingly small portion of the film. As discussed above, for this reason screen time may not be the best way to denote importance, but the definition remained constant for this study. Thus animals were chosen with stipulations that led to uneven representation within the survey. Unequal representation, in addition to definition difficulties, means that the results, though significant, are most likely subtle and preliminary. This, however, does not make the influence of such characters unworthy of study.

Parameters on the animal knowledge portion of the survey revolved around the selection of question material. To prevent responder fatigue, animals were used from the

same pool as the opinion portion. However, this limited the choices for portrayals of animal behavior and appearance. Questions were not selected systematically to fill categories evenly, but were instead a random selection from the variety of characters. Difficulty was also not assessed and could have distorted the results if certain questions were easier than others. If questions were too easy, they could have been answered by intuition or have been common knowledge regardless of whether the movie was correct or not. On the other hand, some questions may not as been as intuitive to the viewer as intended. Perhaps what appeared obvious to me when searching for the facts may have been missed by the average viewer, particularly by children. Future studies should be more intentional about question selection, particularly concerning their level of difficulty and the obviousness of portrayal within the movie.

It would also be beneficial to study a wider variety of children's media. Although Disney is a major player, other sources contribute options at varying levels. Doing a more comprehensive study of sources could possibly find the most dominant sources of animal learning. Another complimentary study could ask similar questions to children to assess how their opinions and knowledge change over time and what sources contribute to these results. Perhaps the average child appreciates or fears animals more than the average adult.

Despite the inherent limitations of placing unique animals into discrete categories, significant results in the predicted direction were observed. Such effects are most likely subtle (and likely subconscious) but nevertheless could be having an overall effect on how the average American views animals. "Bambi" has become jokingly synonymous with naïve tree-huggers, but despite the scoffing, the movie has caused real change in attitudes towards hunting with the overall rise of "wildlife sentimentalists" (Reiger, 1980). The general public

did not want to kill “Bambi’s mother,” blocking proposals to hunt does to prevent deer overpopulation in the years following the movie’s release (Lutts, 1992). Although this is an extreme example of Disney’s potential influence, the fact that the company can serve as a moral teacher concerning the treatment of animals should be acknowledged and ideally used to promote conservation.

As the world continually grows more urban, interactions with nature become more discrete units controlled by humans. Media representations of animals are progressively more important substitutes when the real version is inaccessible (Leventi-Perez, 2011). Animation companies like Disney have further responsibility as their primary audience is children. If children are particularly influenced by the media, it is society’s duty to provide them with information worth learning. Although animated cartoons are primarily tools of entertainment (and profit), using an array of characters rather than repeating age-old stereotypes creates fresh interest and provides opportunities to learn about the immense variety present in the world. Overall, disregarding anthropomorphism, Disney has traditionally been fairly accurate with their animal portrayals, particularly in recent years. Based on the results of this survey, Disney should continue to portray animals accurately and favorably and avoid villainizing particular species as a whole. If we teach children that animals are amazing, unique, and valuable, they are more likely to grow up as stewards of the Earth, willing to care for it for the benefit of all. Baba Dioum wrote: “In the end we will conserve only what we love, we will love only what we understand [and] we will understand only what we are taught.” By this reasoning, if we want people to conserve animals and their habitats, they need to know and appreciate them, which can and should be facilitated through quality, positive media exposure.

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Figure 1. Average opinion of participants by animal grouped by portrayal in Disney movies

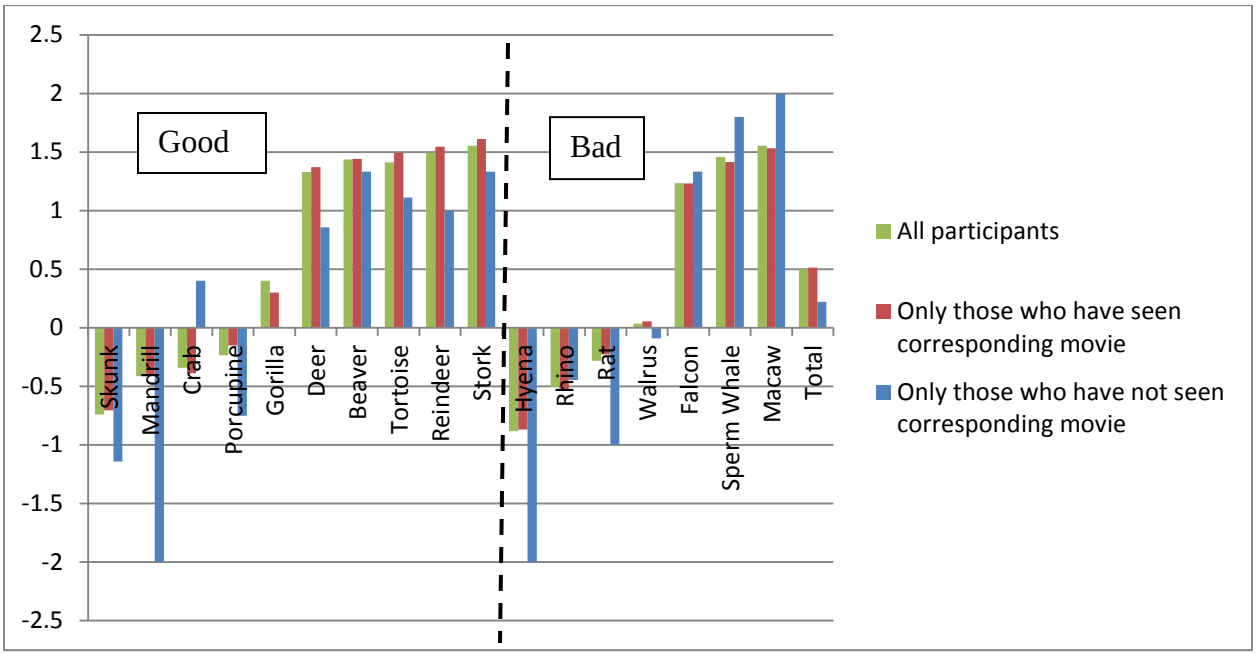
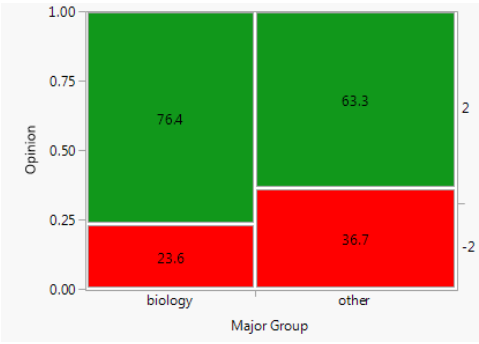


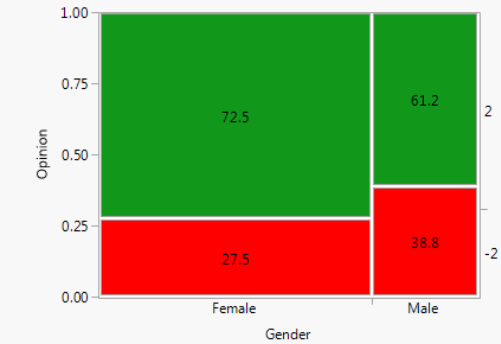
Table 1. Effect of movie exposure-independent variables on opinion

Effect	Chi-square (df)	P-value
Major Grouped	30.3387143 (1)	<.0001
Gender	8.8432861 (1)	0.0029
Educational Exposure	8.23601464 (1)	0.0041
Real Exposure	4.44828665 (1)	0.0349

a.



b.



c. d.

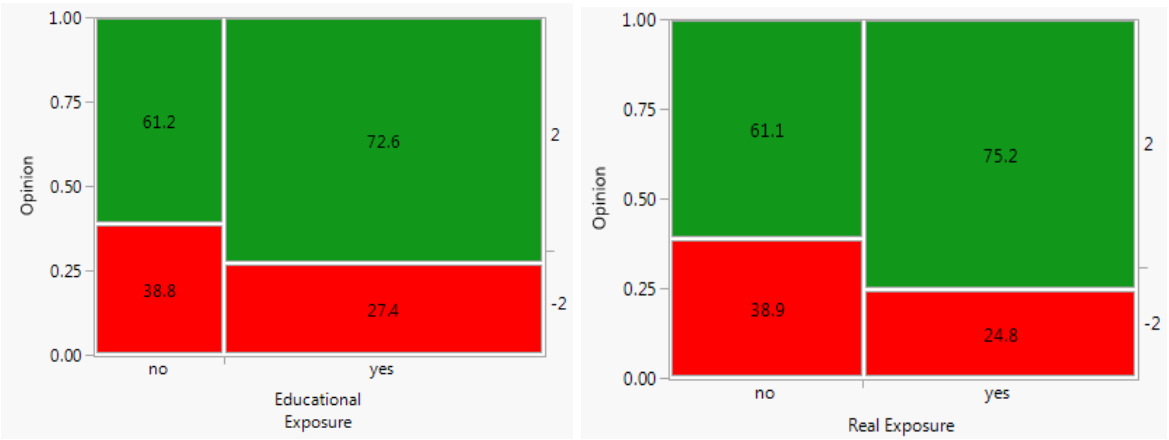


Figure 2. Distribution of opinion based on Disney movie exposure- independent variables by (a) major, (b) gender, (c) educational exposure, and (d) real exposure. Color denotes opinion category on a scale from-2 (two negative words; red) to 2 (two positive words; green) but only consistant opinions (-2 or 2) were used in analysis and are thus shown above. Numbers in the blocks indicate the percentage of responses per column and relative size of columns denotes proportion of sample size per category.

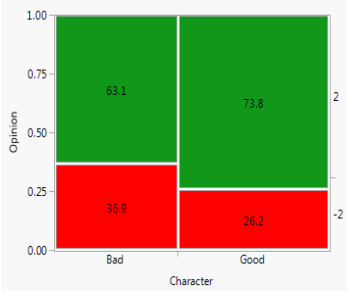
Table 2. Effect of Disney movie-exposure dependent variables on opinion

Effect	Chi-square (df)	P-value
Importance * Character	18.1765195 (1)	<.0001
Anthropomorphism * Character	8.63086073 (1)	0.0033
Major Grouped * Character	4.51108894 (1)	0.0337
Anthropomorphism	3.47423537 (1)	0.0623
Importance	1.00155308 (1)	0.3169
Character	0.942534 (1)	0.3316
Anthropomorphism * Importance	0.90676669 (1)	0.341

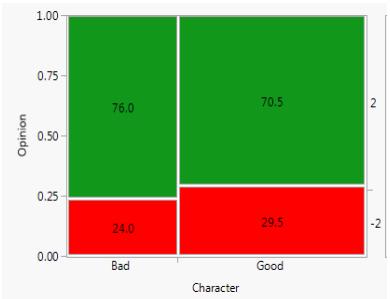
a.

Important Unimportant Total Importance

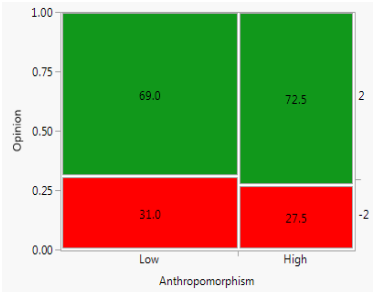
b.



Low Anthropomorphism

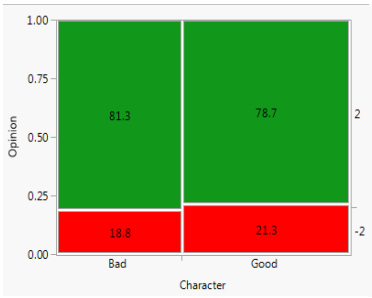


High Anthropomorphism

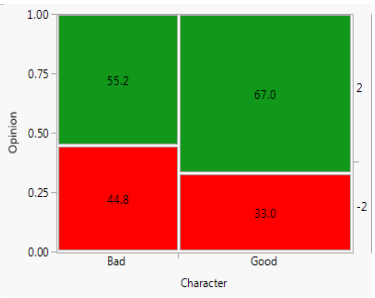


Total Anthropomorphism

c.



Biology

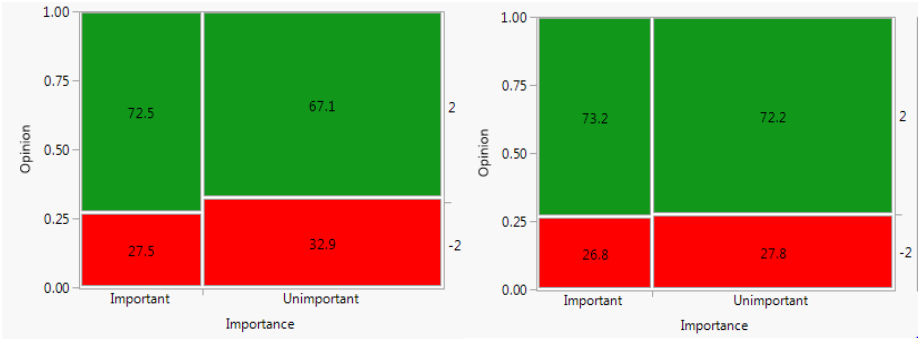


Other Majors

d.

Total Character

e.



Low Anthropomorphism

High Anthropomorphism

Figure 3. Distribution of opinion based on Disney movie-exposure dependent variables by (a) character portrayal by importance, (b) character portrayal by anthropomorphism, (c) character portrayal by participant major, (d) character portrayal, and (e) importance by anthropomorphism. Color denotes opinion category on a scale from-2 (two negative words; red) to 2 (two positive words; green) but only consistent opinions (-2 or 2) were used in analysis and thus are shown above. Numbers in the blocks indicate the percentage of responses per column and relative size of columns denotes proportion of sample size per category.

Figure 4. Average percent of correct participants by question grouped by accuracy of Disney's portrayal

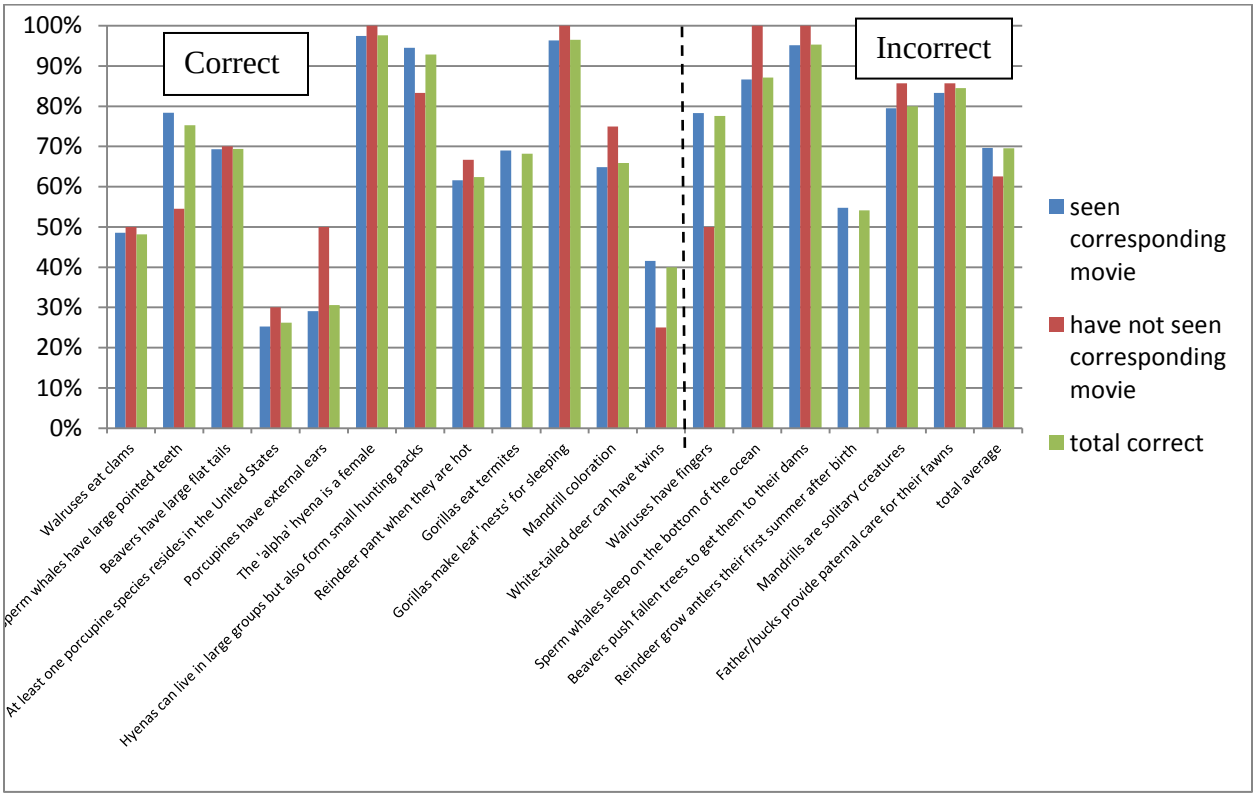
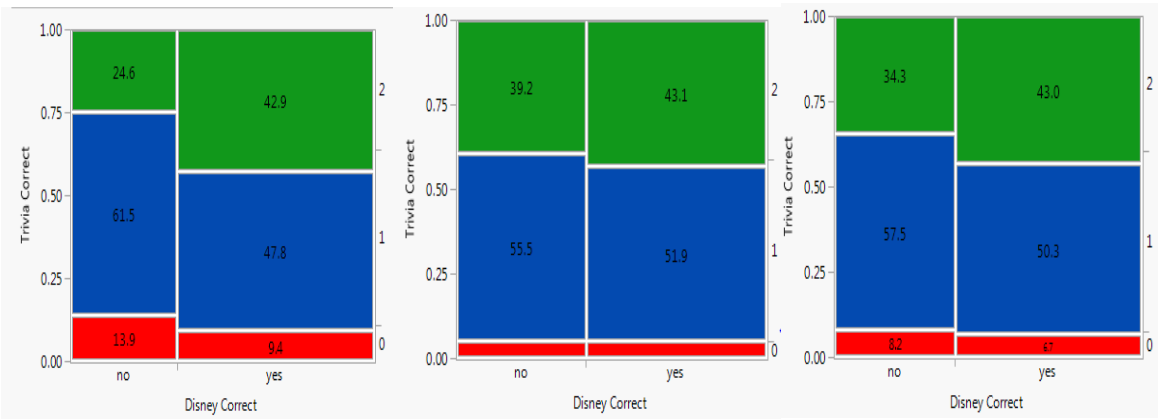


Table 3. Effect of Disney movie exposure-dependent variables on animal fact accuracy

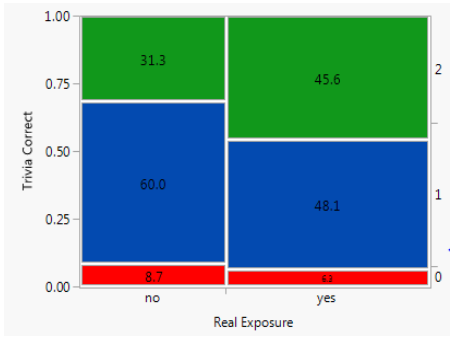
Effect	Chi-square (df)	P-value
Disney Correct * Character	68.46236	<.0001
Disney Correct	10.2837327	0.0013
Real Exposure	6.68777849 (1)	0.0097
Educational Exposure	2.53310599 (1)	0.1115
Character	0.253310599 (1)	0.6161

a.



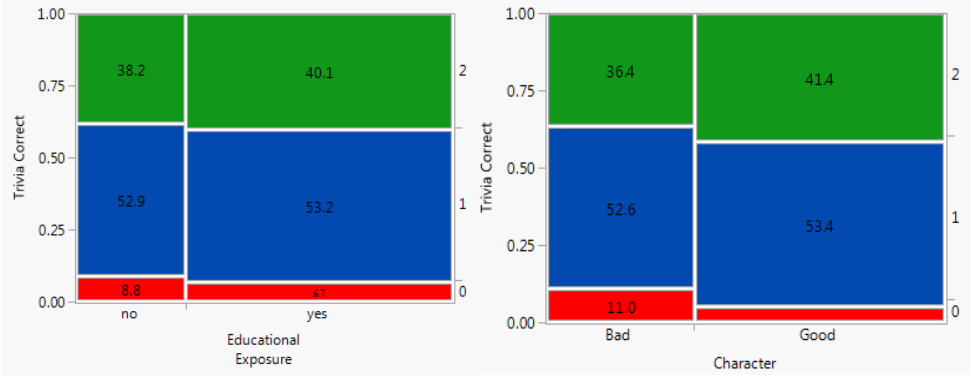
Bad Good Total Character

b.



Real Exposure

c. d.



Educational Exposure Character Total

Figure 5. Effect of Disney movie exposure-dependent variables on animal fact accuracy by (a) Disney correct by character portrayal, (b) real exposure, (c) educational exposure, and (d) character portrayal. Color denotes accuracy of questions per animal (green- 2 correct, blue- 1 correct, red- 0 correct). Numbers in the blocks indicate the percentage of responses per column and relative size of columns denotes proportion of sample size per category.

Appendix

A Pre-Survey Movie Results

Movie Ranked By Pre-survey Results

1. The Lion King- 29 (27 within 5 years)
2. Beauty and the Beast*- 29 (21 within 5 years)
3. The Emperor's New Groove*- 29 (21 within 5 years)
4. Lady and the Tramp- 28 (10 within 5 years)
5. 101 Dalmatians- 27 (15 within 5 years)
6. Cinderella-27 (19 within 5 years)
7. Tarzan- 27 (24 within 5 years)
8. The Little Mermaid- 26 (19 within 5 years)
9. Pocahontas- 26 (18 within 5 years)
10. Snow White and the Seven Dwarfs -25 (15 within 5 years)
11. Tangled- 24 (25 within 5 years)
12. Aladdin- 24 (23 within 5 years)
13. Mulan- 24 (21 within 5 years)
14. Frozen-23 (27 within 5 years)
15. Hercules- 23 (20 within 5 years)
16. Peter Pan- 23 (17 within 5 years)
17. The Aristocats- 23 (15 within 5 years)
18. The Jungle Book- 23 (12 within 5 years)
19. Lilo and Stich- 21 (14 within 5 years)
20. Sleeping Beauty- 21 (9 within 5 years)
21. Bambi- 21 (7 within 5 years)
22. Robin Hood*- 20 (12 within 5 years)
23. Alice in Wonderland*- 19 (12 within 5 years)
24. The Fox and the Hound*- 19 (11 within 5 years)
25. The Hunchback of Notre Dame- 19 (11 within 5 years)
26. Pinnochio-19 (6 within 5 years)
27. Dumbo-17 (8 within 5 years)

asterisks denote ties

B. Categorical information for animals used in main survey

Categorized Animals

Animal	Depiction	Anthropomorphism	Importance	Movie
Walrus	Bad	High	Un (2:30)	Alice in Wonderland
Rhino	Bad	High	Un (1:50)	Robin Hood
Falcon	Bad	Low	Un (1:50)	Mulan
Rat	Bad	Low	Un (1:10)	Lady and the Tramp
Sperm Whale	Bad	Low	Un (2:00)	Pinocchio
Macaw	Bad	High	I (7:50)	Aladdin
Hyena	Bad	Low	I (7:50)	The Lion King
Mandrill	Good	High	Un (4:40)	The Lion King
Turtle	Good	High	Un (2:10)	Robin Hood
Stork	Good	High	Un (3:00)	Dumbo
Beaver	Good	Low	Un (2:00)	Lady and the Tramp
Porcupine	Good	Low	Un (1:00)	The Fox and the Hound
Skunk	Good	Low	Un (4:30)	Bambi
Crab	Good	High	I (10:00+)	The Little Mermaid
Reindeer	Good	Low	I (10:20)	Frozen
Gorilla	Good	Low	I (10:00+)	Tarzan
Deer	Good	Low	I (37:30)	Bambi

C. Adjective choices
(presented in randomly generated order)

Adjective	Category
Dangerous	Negative
Dumb	Negative
Ugly	Negative
Loyal	Positive
Harmless	Positive
Cuddly	Positive
Sneaky	Negative
Graceful	Positive
Unnecessary	Negative
Important	Positive
Scary	Negative
Aggressive	Negative
Smart	Positive
Beautiful	Positive
Other	n/a

D. Questions used in the survey

Question	Accurate Portrayal
Walruses eat clams	yes
Sperm whales have large pointed teeth	yes
Beavers have large flat tails	yes
At least one porcupine species resides in the United States	yes
Porcupines have external ears	yes
The 'alpha' hyena is a female	yes
Hyenas can live in large groups but also form small hunting packs	yes
Reindeer pant when they are hot	yes
Gorillas eat termites	yes
Gorillas make leaf 'nests' for sleeping	yes
Mandrill coloration (see photo below)	yes
White-tailed deer can have twins	yes
Walruses have fingers	no
Sperm whales sleep on the bottom of the ocean	no
Beavers push fallen trees to get them to their dams	no
Reindeer grow antlers their first summer after birth	no
Mandrills are solitary creatures	no
Father/bucks provide paternal care for their fawns	no

E. Supplemental material available for reference during the survey

Walrus

Sperm Whale

Tortoise

Rhinoceros

Beaver

Rat

Peregrine Falcon

Porcupine

Skunk

Mandrill

Macaw

Stork

Hyena

Gorilla

Crab

White-tailed Deer

Reindeer