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THE EFFECT OF NATURE DOCUMENTARIES ON CHILDREN'S PERCEPTIONS OF ENDANGERED SPECIES

An Interactive Qualifying Project Report
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Donna Lamaestra

Heather L. Murphy

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Approved:

Professor Doyle

Advisor

Abstract

Several episodes of the PBS series *Kratts' Creatures* were shown to children between the ages of seven through twelve to determine how their perceptions of threatened and endangered species were affected by nature documentaries. Surveys completed by each child before and after the video showed how much they were learning. The series did instill a greater respect and admiration for the animals, but the children remembered little of the information presented.

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Executive Summary

This project deals with discovering children's perceptions towards animals they see on television. The idea that the nature documentaries shown on television might have an effect other than positive was initially posed by Bill McKibben in his book The Age of Missing Information. In this book, McKibben and a small army of volunteers recorded every television program broadcast over the Fairfax cable system during a 24 hour period. McKibben then watched and catalogued this mountain of videotaped evidence. In one chapter of his book, *Noonday*, he compared a day hiking in the woods to all of the nature documentaries he had seen. The contrast between nature television and nature found in McKibben's own backyard was dramatic. He was not chased, roared at, attacked, or given any notice by the animals he encountered on his hike. The natural world was not as exciting or dangerous as nature filmmakers would have the public believe.

In a society with as short an attention span as America, the directors of these nature documentaries often feel pressure to embellish their work. This embellishment might be by outright falsification, such as painting a pet shop ferret's feet so as to make it a dead ringer for its highly endangered cousin the black-footed ferret of North America, or by clever editing. Lions sleep most of the day. However, if a month's worth of footage from the Savannah is cleverly edited, then all the viewer need see is lions on the hunt. Such embellishments influence how people believe an animal to behave and how people feel about that animal. Someone watching lions run at top speed all day will believe that what they are witnessing is the lion in its natural habitat. If for one

continuous hour all that lion does is kill, the perception is then created in the viewers' minds that a lion is a savage killer.

Much research exists on the perceptions of adults towards animals. His 1983 study entitled Children's Attitudes, Knowledge and Behaviors Toward Animals is unique in its focus of children. In this study prepared for the US Fish and Wildlife Service, Kellert determined that children favor the higher animals such as mammals. Children, much like adults, like animals that are physically appealing—adorable, cute, and cuddly are popular adjectives people use when asked to describe their favorite animal. Kellert asked the children about pets they had, books they read, and facts they had learned about in school.

This project represented the next logical step of determining how television is also influencing children's beliefs and attitudes about animals. The research subjects for this project were children from the Worcester Boys' and Girls' Club. The Public Television Series (PBS) *Kratts' Creatures*, featuring the brotherly adventures of Chris and Martin, was chosen as the nature documentary to be studied. It is one of the first nature shows designed for an audience of children. Also, it is a program that the children might choose to watch on their own. At thirty minutes, each episode fulfills the requirements of being long enough for educational material to be presented but short enough to hold the attention of children aged seven to twelve. The Kratt brothers hold degrees in biology and zoology, respectively. *Kratts' Creatures* aims to introduce children to animals they may have never heard about, such as the kookaburra or the ocelot, and to excite them about all the creatures of the world. *Kratts' Creatures* does an excellent job of bringing

the complex ideas of nature conservation down to a child's level of understanding. Any child who can understand the creature balance, that all creatures have their own special place in the world, is much more likely to become an environmentally conscious adult.

Five episodes of the *Kratts' Creatures* series were selected to be shown to the children of the Boys' and Girls' Club. The episodes were chosen so as to not create a bias and featured a variety of threatened animals from lions to sea polyps. The children completed a brief survey of approximately ten questions relating to the species featured in that *Kratts'* episode. After viewing the thirty minute video, the children completed a survey with the same questions. The data from all surveys was analyzed to determine if there had been a significant change in perception towards animals just from the children having seen the *Kratts'* episode. The surveys were written with the vocabulary and cognitive skills of children in mind. Each video had an audience of approximately ten to fifteen children.

The children generally liked the animals featured in the series. The surveys consisted of fact questions, opinion questions, questions relating to the degree of threat facing an animal, identification questions, and geography questions. The fact questions were mentioned in each video and the children could learn the answer by paying very close attention. Opinion questions asked about a child's like or dislike of a particular animal. The children were also asked to predict the level of threat they believed an animal to face. The 1996 IUCN Red List of Threatened Animals is the reference used in assiging the threat level faced by an animal. Some of the creatures from *Kratts' Creatures* was considered at Low Risk by the IUCN, or World Conservation Monitoring

Center, and one of the creatures, the Tasmanian tiger, was declared extinct almost fifty years ago. The surveys contained two types of identification questions. One type of questions asked the children to identify an animal based on pictures. They simply needed to pick the animal out of a creature line-up. The other type of identification question asked the children to identify an animal based on word choices alone. The geography questions sought to discover if the children knew the locations of some of the exotic locations featured in the episode. The children were asked where the Great Barrier Reef was located, what Tasmania was, and where a tropical forest could be found.

The children did not do so well on the fact questions. This poor performance was probably due to that fact being mentioned briefly only once in a *Kratts' Creatures* episode. Repetition is a key component of learning. If the information had been stressed more and repeated throughout the episode then the children probably would have learned more facts. Generally, the children liked the animals more after having watched the episode about them. *Kratts' Creatures* debunked many myths about individual creatures and presented the creatures in a favorable light seeking to explain that all creatures have a place on the planet. The questions relating to the degree of threat faced by an animal were very revealing. In general, the children underestimated the level of threat faced by a species. The children did generally believe an animal to be at greater risk after having viewed the episode of *Kratts' Creatures*, but still underestimated that threat. The children fared poorly on geography questions as well. Many of them had never heard about the places being discussed in the video and the places were mentioned only briefly in the *Kratts' Creatures* episode.

This project found that the PBS series *Kratts' Creatures* had a favorable influence on children and how they see nature. The children did not get specific, factual information out of the videos so much as they learned a greater respect for all creatures. They liked specific animals more after having seen and learned about them. The children liked the videos and some even said they would watch it at home on their own because it was so much fun. The best thing that the children took away from this experience was a greater appreciation and respect for nature.

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Introduction

On May 3, 1990, with the help of hundreds of volunteers, Bill McKibben, author of The Age of Missing Information, recorded over 1,000 hours of television from the Fairfax cable system. Nearly every minute of television during a twenty-four hour period was captured on videotape. The equivalent of reams of data, or volumes of literature, was contained on those hundreds of videotapes. Later that summer, McKibben went for a walk. Simple as that. A mile from his back door, he camped under the stars. During the day, he hiked up a neighboring peak, went for a swim, and made supper. The great experiment undertaken by McKibben that summer was to compare these two days—one lasting an excess of 1,000 hours and the other a more conventional twenty-four hours. More importantly, his experiment offers a comparison of the information each day imparted. "So I'll concentrate on contrasting television's message with the ideas about the world and our place in it that come from a day in the natural world," (McKibben, 1992).

McKibben cites many facts about the television viewing habits of Americans:

> Two thirds of Americans tell researchers they get "most of their information" about the world from television, and the other statistics are so familiar we hardly notice them—more American homes have TVs than plumbing and they're on an average of seven hours a day; children spend more time watching TV than doing anything else save sleeping; on weekday evenings in the winter half the American population is sitting in front of television; as many as 12

> percent of adults (one in eight) feel they are physically addicted to the set, watching an average of fifty-six hours a week; and so on. (McKibben, 1992)

Clearly we are a society that has come to rely on television. It has become an integral part of our society. What are the impressions of the world that all of this television viewing is creating in our minds? "TV is a pipeline to the modern world, and a convenient shorthand for some of its features. Still, that does not mean that TV 'merely' reflects our society. By virtue of its commonplace, it also constantly reinforces certain ideas," (McKibben, 1992). Children must be particularly vulnerable to these inaccurate perceptions given their age, innocence, and the massive amounts of time they spend in front of the magic box. We have chosen to focus on children because they are the most easily influenced demographic. The perceptions formed by a child of today will influence the decisions made by the adult of tomorrow.

In The Age of Missing Information, McKibben sought to contrast two days—one spent in the real physical world and the other spent in the television-defined world. He went to his mountain, not a mile from his back door, to regain some fundamental knowledge that has all but been erased from our society. We as a society have become divorced from the physical world. And with this separation we have lost a valuable path to enlightenment. For thousands of years the wisest of men from ancient civilizations have known that God, or an understanding of our place in the cosmos, can be found in a grain of sand or a leaf falling from a tree. Understanding of the complex tides of life that drive our world is apparent in the physical world. Truth and understanding of our place

in the cosmos can be found in a ripple on a pond, but no one has yet to find this fulfillment from a blender, a microwave, or a television. We are losing contact with the natural world. It is disappearing indirectly in a spiritual context. The age where man felt a harmonious union with Mother Nature is dead. Our contact with the physical world disappears in a literal sense as everyday more and more names are added to the list of endangered species. "This is perhaps the ultimate loss of information—too sophisticated to burn books, we burn the planet. Each day information leaks away—some branch of life that evolved for millions of years is gone, and the next day two more, and six the day after that," (McKibben, 1992).

McKibben's book explores the spiritual death modern society faces as a result of television. The physical death of endangered species mirrors the spiritual death McKibben observes when man is removed from nature. In our project, we wanted to address the physical death that society allows in the name of modernization. For this reason, we have chosen to focus on endangered species of animals. Since children are the future of tomorrow and television is the media of today, we wanted to know how television is affecting the way children are divorcing themselves from the natural world. The only time an endangered species or exotic animal is seen on television occurs during the time span of a nature documentary. So our project focuses on how nature documentaries on television affect how children see the natural world, specifically the part of it that is dying.

We have chosen the Public Broadcasting System (PBS) series *Kratts' Creatures*, produced by Paragon Entertainment Corp., Maryland Public Television and the Earth

Creatures Company, as our example of a nature documentary for several reasons. First, it is easily available over local cable systems. Second, it is the only nature documentary geared to a target audience of children. Third, as an award winning and upbeat program we can place a reasonable expectation that the series will stand up to scrutiny, hold the children's attention span for thirty minutes and be a fair representation of the genre of nature documentaries.

How are children being affected by the information they see on television, particularly any information obtained relating to endangered species? Is the information that is forging their perceptions accurate? In his chapter for The Age of Missing Information entitled *Noonday*, McKibben explores the world of nature documentaries and compares what he viewed from his mountain of videotape to what he observed atop his backyard mountain. During his day hike, he followed the path of a brook. Along the way he stopped to admire the small worlds of life contained in still pools beside the brook. "I stopped occasionally as the small clear pools to admire the water striders, their legs dimpling the tense surface, their small bodies casting impressive shadows on the creek bottom as they went about their inscrutable business," (McKibben, 1992). Along his hike he observed thrushes frolicking in the trees and a majestic vulture circling overhead. This is reality, yet would never be footage in a nature documentary because it is too boring and mundane to show on television. "Still and all, by the standards of television nature, the water striders and the thrushes and even the vultures were hardly worth mentioning. I had not been gored, chased, or even roared at. I had failed to tranquilize anything with a dart..." (McKibben, 1992). Wolfgang Bayer, an acclaimed nature

photographer, admits to spray-painting pet-shop ferrets to resemble the very endangered black-footed variety and starving piranhas so they were more ferocious on camera. A television viewer can be shown a flock of birds parading about while the narrator simultaneously explains how very rare these birds are. It would be a logical question for anyone to wonder how bad these birds actually have it seeing as how there are so many in the nature film. Lions are shown on the hunt bringing down a zebra while the narrator tries to explain how a lion can nap and lounge for twenty hours of the day. All of this manipulation of reality present in nature films raises the point that we are not always given the most accurate information by television programs.

McKibben makes the case for his experiment that anyone can learn more from a day hike than from the most renowned nature documentary. Real nature won't play on television because it is boring. Television only shows the action packed, suspenseful moments found in nature and edits out the boring context. We see the lion killing the zebra. But rarely do we see the sleeping lion and never are made to understand that sometimes the zebra escapes the lion and the lion must go hungry. "The upshot of a nature education by television is a deep fondness for a certain species and a deep lack of understanding of systems, or of the policies that destroy those systems," (McKibben, 1992).

How are children affected by nature documentaries on television? Does television influence their perceptions of endangered species? Is the bulk of information they are exposed to accurate? This project will address these questions as they relate to children between the ages of seven and twelve. We will show them five episodes of the Public

Broadcasting System (PBS) series *Kratts' Creatures*, produced by Paragon Entertainment Corp., Maryland Public Television and the Earth Creatures Company, to children at the Worcester Boys' and Girls' Club after school program. We will collect data on their perceptions of different endangered animals by asking them to complete a survey before and after each episode. The results will be analyzed along with the accuracy of the information presented in an attempt to gauge how children view endangered species and how television affects these perceptions. The data collected can then be used to find the best way of educating children about conservation. Our hypothesis is that the children will learn relevant and factually accurate information from the series as well as having fun. We feel that the data will show a significant change in the children's perceptions towards the animals that they have viewed. The data should be in accord with the current body of data existing on adults' preferences and perceptions and the data existing on children's attitudes towards animals. Species conservation is dependent on public opinion. We hope to impart an awareness of species conservation to these children that will last their entire lives.

Literature Review

Initially, Bill McKibben posed the question of how television affects the population's perceptions toward endangered species in his book The Age of Missing Information. In the twentieth century, the world is filled with embellishments aimed at making it more exciting. It is then no wonder that nature documentaries have not been immune to these embellishments. What one sees is not reality, yet in the context of a television show, it may be viewed as such. McKibben thought that television nature documentaries skewed public perception of wildlife through the inaccuracies they portrayed. We intend to show how nature documentaries shown on television, specifically those that would normally be watched by children, are affecting the perception of an endangered species. We believe that these programs have a positive effect on how children perceive wildlife. People assume what they see on television is real and use the information in forming an opinion on the subject matter. In the context of a nature documentary, watching an animal performing daily tasks in its natural habitat is bound to affect how we judge and view that species.

A fair amount of research demonstrating adult perceptions of endangered species exists. Stephen Kellert of Yale University has researched the topic of perceptions towards animals extensively. In his paper "Attitudes, Knowledge, and Behavior Toward Wildlife Among the Industrial Superpowers: United States, Japan, and Germany," Kellert concluded that adults in each of the three countries "were significantly more likely to express interest, affection, and concern for animals than were other age groups, especially

the elderly," (Kellert, 1993). During a ten-year period, Kellert assessed adult attitudes, knowledge, and behavior toward animals in the United States, Japan, and Germany. The methodology for this study was a general population survey in each country. The American survey involved personal interviews with 3107 adults residing in every state but Hawaii. This survey included 182 questions and took approximately 45 minutes to complete. The Japanese study involved personal interviews with 450 randomly selected individuals in Tokyo and three rural locations as well as 50 focused interviews with a sample of experts on nature and wildlife in Japanese culture. The survey included 198 questions and took approximately 43 minutes to complete. The focus interviews were conducted with a sample of people recommended as having great familiarity with Japanese attitudes toward wildlife and nature. The German survey consisted of 1484 personal interviews from all regions of the former West Germany. "Citizens from all three countries showed strong emotional attachments to individual animals, as suggested by the relatively frequent occurrence of the humanistic attitude within each country," (Kellert, 1993). All countries favored larger and higher vertebrates, especially mammals and birds. Aesthetics were important to each country as well. The Japanese tended to have a narrower positive perception of nature. "Japanese appreciation for animals was generally restricted to species possessing unusual aesthetic and cultural appeal in certain highly controlled circumstances. Americans and Germans, in contrast, tended to evince a broad appreciation of wildlife in a variety of natural settings and habitats," (Kellert, 1993). The restricted Japanese appreciation for animals and nature was emotional and aesthetic, as opposed to analytical. The German public expressed a strong desire to

sacrifice practical human benefit for the sake of nature. Americans generally exhibited tendencies to protect nature and had strong affection for animals in general (Kellert, 1993). Young adults (aged eighteen to thirty-five) in Germany and the United States expressed a great deal of concern for the ethical treatment and conservation of wildlife. In a comparison of educational groups, Kellert found that in the US and Germany, college-educated respondents had a greater appreciation and concern for animals and nature than did respondents from other educational groups. This difference in appreciation and concern was particularly large between the college-educated group and that group with only a grade-school education.

It is interesting to note that the current body of research suggests that Americans are interested in specific animals having aesthetically pleasing traits and/or cultural significance but show little concern for the knowledge of wildlife species and supporting ecosystems. (Kellert, 1993) In other studies, it has been demonstrated that a crucial aspect of favoring wildlife conservation is knowledge of the animal and its habitat. (DeKay, 1993) Americans appear to view the animals out of context of their natural habitat and this would have a less than ideal impact on the perception of an endangered species.

In a survey conducted for the US Department of the Interior Fish and Wildlife Service, Kellert examined the attitudes, knowledge level, and behaviors toward animals by children. His research sought to describe children's uses and perceptions of animals, and to discern possible developmental stages in the evolution of attitudes towards animals. Twenty-two primary and secondary public schools were randomly selected

from urban, small city, suburban, and rural areas of the state of Connecticut. Kellert considered only public schools. After sending a letter stating the intentions of the survey, sixteen schools agreed to participate. The total sample size was 267 children: 63 second graders, eighteen. Teachers were instructed not to choose the brightest students or those with a natural aptitude for nature, but to select every fourth student from alphabetical class listings (Kellert, 1983). 68 fifth graders, and 69 eleventh graders. The children ranged in age from six to eighteen. Teachers were instructed not to chose the brightest students or those with a natural aptitude for nature, but to select every fourth student from alphabetical class listings (Kellert, 1983).

Kellert chose an interview technique for gathering the data:

> The most appropriate data-gathering technique for this research was a personal interview. This technique was selected over written or group-administered questionnaires in order to enhance the quality of the data and to allow the interviewers an opportunity to adapt wording, explain concepts, and sustain interest levels according to the needs of individual children.

Kellert's interviewers were research assistants and graduate students at the Yale School of Forestry and Environmental Studies. The required interview time ranged from ninety minutes for the second graders to sixty minutes for the eleventh graders. The fifth grade interviews averaged seventy-five minutes. Most interviews were conducted at the students' schools during regular school hours. In an attempt to make the questionnaire

more readily understood by the children, they were given flash cards listing all answer choices for difficult questions. Every effort was made to minimize distorted data:

> The potential affects of fatigue and limited attention spans of younger children were carefully considered during the questionnaire construction. Procedures employed to minimize the potential for distorted responses due to the length of the interview included: locating the more demanding questions at the beginning of the survey, including colorful slides with the knowledge test, and concluding the interview with the film methodology.

Kellert and his research assistants screened seventy-three animal-related films for footage depicting various attitudes towards animals. From this footage, a thirty-minute silent film was constructed. The film was shown to each child individually and during the showing an interviewer administered an eighty-seven-question survey regarding attitude toward wildlife. In Kellert's study, ten attitudes towards animals were classified. These attitudes were Naturalistic, Ecologistic, Humanistic, Moralistic, Scientistic, Aesthetic, Utilitarian, Dominionistic, Neutralistic, and Negativistic. Following are the definitions used by Kellert in his study for each attitude:

> Naturalistic: Primary interest and affection for wildlife and the outdoors.
>
> Ecologistic: Primary concern for the environment as a system, for interrelationships between wildlife species and natural habitats.
>
> Humanistic: Primary interest and strong affection for individual animals, principally pets.

Moralistic: Primary concern for the right and wrong treatment of animals, with strong opposition to exploitation or cruelty toward animals.

Scientistic: Primary interest in the physical attributes and biological functioning of animals.

Aesthetic: Primary interest in the artistic and symbolic characteristics of animals.

Utilitarian: Primary concern for the practical and material value of animals or the animal's habitat.

Dominionistic: Primary interest in the mastery and control of animals typically in sporting situations.

Neutralistic: Primary orientation an active avoidance of animals due to indifference.

Negativistic: Primary orientation an active avoidance of animals due to dislike or fear (Kellert, 1983).

In addition to recording the child's answers, the interviewers also recorded non-verbal reactions to the film such as covering of the eyes. "For example, a child's first reaction to the 'scientistic' segment of the film (fetal pig dissection in a school laboratory) may have been nonverbal—varying form silent curiosity to covering their eyes—or verbal—varying form 'Gee! That's neat!' to 'Gross!'" (Kellert, 1983). Such spontaneous responses were considered in determining scores.

In addition to attitude questions, Kellert's study contained forty-five knowledge questions including a series of true/false and multiple choice questions, a pictorial identification test of individual animals, questions regarding the primary foods consumed by various animals, and a film segment focusing on ecological relationships and

processes. And what did Kellert discover about children's perceptions from his survey? "The results generally suggested that children's knowledge of animals is quite limited. Basic biological understanding of many animals appeared to be lacking, and comprehension of fundamental ecological processes was deficient," (Keller, 1983). Only 29% of Kellert's subjects understood that a koala is not really a bear and less than 30% were aware that the spring peeper is a frog. Kellert states:

> The lack of ecological understanding among children was most apparent in the film testing segment. For example, the large majority tended to interpret predation and nutrient cycling in anthropomorphic and negative terms, rarely appreciating or identifying the ecological values of these activities. For example, the efforts of the dung beetles were generally considered "disgusting," and many children regarded predation as "wrong" or regrettable.

Kellert found that children generally did well on identification questions and were rather knowledgeable about the primary diets of a variety of species. Upon comparing his research of adults to that of children, Kellert discovered that children had a greater understanding compared to adults of biological characteristics of animals and of "lower" life forms such as invertebrates. However, "...both the children and the adult samples revealed relatively little knowledge of endangered or threatened species—only one quarter of either sample obtained the correct answer on questions concerning these animals," (Kellert, 1983).

In Children's Attitudes, Knowledge, and Behaviors toward Animals, Kellert found the most common attitude children exhibited towards animals was humanistic:

> Also indicative of the relative 'popularity' of the humanistic attitude was the finding of "lovable animals" as the most preferred type of animal, cited by 39% of the children. In general, strong emotional affection for individual animals, and a general tendency toward anthropomorphic attachments to animals, appeared to be the most typical animal-related perception of the children surveyed.

The second and third most frequently occurring attitudes were the naturalistic and negativistic. The moralistic attitude ranked fourth in overall frequency:

> Concern for the ethical treatment of animals among the children was suggested by 70% objecting to the harvesting of wild animals for their fur. Additionally, only 26% supported hunting for recreation or sport purposes, 80% opposed hunting for sporting purposes only, and 91% objected to trophy hunting.

The least frequently occurring attitudes were the ecological and scientistic:

> The tendency for each attitude to emphasize a conceptual and factual understanding of animals suggests intellectual and cognitive perspectives of animals are somewhat uncommon among children in our society. The rarity of the scientistic attitude was reflected in "scientifically interesting animals" being cited by only 6% of the children as their favorite type of animal. The uncommonness of the ecologistic attitude was suggested by a typical reaction of indifference or confusion to the ecologistic film testing segments. Additionally, animals "important to the balance of nature" was cited by only 4% of the children as their

> favorite type of animal.... The naturalistic attitude was far more common among children than adults, suggesting a strong appreciation of animals and the out-of-doors is more characteristic of younger people in our society.

Thirty-nine percent of children preferred "loveable" animals and 12% preferred "beautiful" animals (Kellert, 1983).

Based on his study, Kellert was able to draw a parallel between age and performance of attitude and knowledge questions:

> Younger children tended to stress the needs and benefits of people over animals, and expressed minimal concern for the rights of animals or the protection of their natural habitats.... Younger children also revealed far less interest in animals, particularly wildlife, especially in comparison to 11th graders.... Additionally, second graders were less knowledgeable and conceptually informed about animals and the natural environment....

Based on the age demographic, Kellert was able to conclude:

> ...The transition from 2nd to 5th grade primarily involved a substantial increase in emotional concern and affinity for animals. From 5th to 8th grade, a dramatic expansion in cognitive and intellectual understanding of animals was observed. The period from 8th to 11th grades witnessed major increases in moral, ethical and ecological concern for animals and the natural environment. All three transition periods were, thus, characterized by major changes in basic perceptions and understanding of animals. Each period,

> therefore, represents important, although varying opportunities for environmental education.

Based on an animal preference scale consisting of five responses (really like, like, don't know, don't like, and really don't like) for thirty-three animals, Kellert was able to determine the children's preferences for specific animals. "The three most preferred animals were all well known and the only domestic animals in the scale—the dog, horse and cat. The dog and horse were also the two most preferred animals in the adult survey…" (Kellert, 1983). The three most preferred animal categories were domestic, soft and attractive animals. The three least preferred were unattractive, dangerous and invertebrate animals. These results are consistent with those reported in the national adult survey," (Kellert, 1983).

Kellert's conclusions regarding second graders were surprising:

> A tendency exists in our society to idealize the perceptions and presumably benign relations to animals of very young children. The inclination exists to believe young children have some natural affinity for living creatures regarding them as little friends or kindred spirits. The results of this study suggest quite the reverse. Very young children were the most exploitive, harsh and unfeeling of all children in their attitudes toward animals. They expressed far greater willingness to subvert the needs and nature of animals to enhance the well being and desires of people and, perhaps not surprisingly, revealed the least knowledge or understanding of animals. These results suggest our cultural idealization of the relationship of very young children to animals is not only incorrect, but may foster a

> distorted understanding of the needs of young people.... These results suggest environmental education efforts involving children between 6 and 10 years old primarily focus on the affective realm, mainly attempting to instill in young children a sense of emotional identification and feeling for animals.

Based on studies conducted by DeKay and McClelland ("The Effects of Additional Information on Expressed Species Preferences"), applicable data would be accumulated by surveying individuals. In the paper by DeKay and McClelland, the research subjects were college undergraduates. Their research showed that as subjects were provided with more information in addition to what they already knew there was a trend towards a greater understanding of species conservation.

Though no data is known to exist specifically correlating television and perceptions of endangered species, we believe that data from this study will support the current body of research and hope to see a trend towards a greater understanding of conservation.

Because our target audience consists of children ages seven to twelve, it must be proven that they are capable of understanding the purpose of the experiment and able to comply. Based on psychology textbooks (Meyers, 1992 & Loftus, 1992) it has been found that children ages seven to twelve possess the ability to think logically. This would infer that if asked to watch nature program and answer questions, they would have no difficulty. By age twelve, an individual is demonstrating formal operational thinking, that stage of cognitive development when people begin to think logically about abstract

concepts. The ability to demonstrate formal operational thinking is often present in children younger than age twelve, and twelve is only a vague guideline for its existence. Children as young as seven are capable of solving theoretical propositions and deducing consequences using an "*If* this, *then* that" style of logic. At this stage of development, an individual has the power of abstract reasoning, being able to deduce a conclusion from given facts, and can calculate consequences of actions. Given this information on the cognitive development of children, it is logical to believe that the target audience at the Boys' and Girls' Club will be able to watch a video and answer questions pertaining to that video. They will not be asked to consider cause and effect relationships (formal operational thinking) and so will not be asked to perform an in capable thought process. A logical response to a few questions will provide the needed data and according to modern developmental theory our audience can provide it.

Methodology

In all studies conducted to date attempting to determine perceptions towards wildlife, the research subjects were adults. In this project, children were surveyed. Though different methods must be employed to account for the developmental differences of children, the results of this study can be contrasted to and compared with the current body of research in a general context.

The importance and validity of this type of research is often confronted with the criticism, "What does this have to do with the real world?" In order to make this research as valid and applicable as possible, we have taken advice from Research Paradigms, Television, and Social Behavior. The major factor that links the study to the real world is the selection of material to be viewed. Choosing a selection for viewing that the subject would prefer to watch ensures this. Children between the ages of seven and twelve would most likely not choose to watch a standard nature documentary nor understand most of the terminology used in narration. Some scenes may also be too violent for younger children. While these documentaries have their own value with adults, they are an inappropriate stimulus for this study. By this reasoning, the PBS series *Kratts' Creatures* produced by Paragon Entertainment Corp., Maryland Public Television and the Earth Creatures Company will be used. It is aimed at children aged seven to twelve and is quite popular. The material will also be more appropriate for the age group because it is directed at them. Most importantly this is a series that a child may choose to watch on his own.

To ensure that the episodes to be shown are chosen without bias we will select episodes that feature a variety of types of animals. We will avoid choosing only those which we may have a particular fondness for. Offering a wide variety in stimuli will also show us what type of animal children have the most misunderstandings about or which one they learn most about. The Public Broadcasting System's (PBS) children's program *Kratts' Creatures* aims to educate children aged seven to twelve about animals and endangered species. But how does this television show affect their perception? Assuming it does, are they left with an accurate portrayal of the species?

To address these issues, arrangements were made with the after school program of the Boys' and Girls' Club of Worcester to show several episodes of the series *Kratts' Creatures* over the course of a week to a group of approximately ten to fifteen children aged seven to twelve. The children were asked to complete surveys relating to the animals presented in the episode and then watch a thirty-minute presentation of *Kratts' Creatures*. After viewing the video, the children were again asked to complete the same survey. These surveys have been analyzed for significant changes in the children's perceptions of the animals just viewed on television. No information other than the video was provided. The accuracy of their responses to risk of extinction after viewing has been compared to information from an unrelated source, the 1996 IUCN Red List of Threatened Animals.

The surveys were written with the vocabulary and cognitive skills of the age group in mind. Questions cover how endangered a species is believed to be and the lifestyle or habitat of the animal. There are also opinion questions relating to how much

the child liked or disliked a particular animal. The topics in each survey directly relate to the episode of *Kratts' Creatures* being shown at that time.

Results

Kratts' Creatures is a new approach at wildlife documentaries. The series is aimed at children ages seven through twelve. The brothers Chris and Martin hold respective degrees in biology and zoology. Their first goal with the program is to introduce animals to children and get them excited about the creatures of the world. Another goal is to educate them and destroy any misconceptions they may have about the animals.

The information is presented in an exciting and sometimes comical manner. This helps keep kids interested in the program. The goal in showing the following episodes to the children at the Boys' and Girls' Club was to see what they were learning from the program if anything. The project was also able to see how well the program was doing in stimulating interest about animals.

Lion, King of the Beasts?

Episode Summary

The episode begins with Allison searching for her map of Kenya. The brothers are in Africa checking out all the creatures. The brothers have returned to caveman days to look at what man thought about animals. Man fascination with animals led to myth and folklore attributing human traits to them. A snake is crafty and deceitful. An owl is wise. An elephant never forgets. Wolves howl at the moon. In addition, the lion is king over all the animals.

The lion is not he biggest cat in the world that is the Siberian tiger. Nevertheless, lions can weigh up to 550lbs. They are the top predators in the Savannah. Lions will usually go after antelope, zebra, wildebeest, and even giraffe. It easy to call a lion "king", but creatures do not give each other titles. It is a big creature misconception and the brothers are determined to break it. They are going to go find and go on the prowl with the lions. Lions live is large groups called prides.

The brothers have found a herd of impala, the lions favorite prey. Usually two or three lions will hunt together. The impala look nervous. That means there must be a lion near by. The impala run away in a zigzag pattern. This is a defense against predators chasing them. The lions will not know which direction the impala will turn next and cannot pounce. The impala also run fast. Only the fast and fittest will survive in the Savannah. Zebras also have defenses against lions. Their pattern makes them blur together in the herd. The lion cannot distinguish a single creature. They are also fast. Zebras reach speeds up to 50mph. If a wildebeest sees a lion, it will not run away. Instead, it will approach it. This may seem crazy, but as long as the wildebeest knows where the lion is, it is not in any danger. Once the lions loose the surprise factor, they will give up the hunt. Warthogs send out a warning to each other and hide underground. They cannot dig their own burrows, so they have to use burrows abandoned by other creatures. They back in so they can defend themselves and their young.

Lions have to compete for food with leopards, hyenas, and cheetahs. They are not above stealing food from any of these creatures. Hyenas have power in their pack size. Leopards have stealth and cheetahs have speed. People have misconceptions about

hyenas. In reality, they are fierce hunters and crafty scavengers. They will steal food from lions. A leopard will give up its dinner to a lion if confronted. To prevent this, they drag it into a tree. Cheetahs are the smallest casts, but no animal can run faster. The cheetah reaches speeds of 70mph. However, it is usually too tired after catching food to defend it. Lions can easily steal it.

There are plenty of creatures on the Savannah that are not afraid of the lion though. Hippos weigh seven thousand pounds and spend most of their time in the water. Lions are not good swimmers. Sometimes a lion will try to take down a baby hippo on land, but not usually.

Elephants also have nothing to fear from lions. Lions will sometime try to attack the babies, but the herd will surround them and charge if the lions do not back off. Elephants weigh eleven thousand pounds.

The Nile crocodile does not worry about lions. Neither do termites. They build 14ft high towers to protect themselves. There are lots more creatures not afraid of lions. A lion will get out of the way if a horde of driver ants are on the move and birds like the hornbill just fly away when they see a lion coming.

In the old prehistoric days, no one was afraid of lions. They were just tiny mammals then. The first ancestral lion was Felix atrox, fierce cat.

The brothers have found a pride. The lions are resting now, but soon night will fall and they will be ready to hunt. Lions are more active at night. The cubs get up and begin to play with each other. One lion tastes the air. Finally, a group heads out to hunt.

They find a herd of impala and ambush one. Lions devour their prey very quickly and leave little left when they are done.

Lionesses make 90% if the kills, but the males still get to eat first. Allison has a problem with this, but the brothers explain that the males do lots of important work too. The males will guard the carcass and take down bigger animals. Male lions are also responsible for defending the pride. Lions from other prides will try to kill the cubs. They have an intimidating roar to scare off other lions. Their mane will also scare away others. A lion begins to grow his mane when he is three and it will continue until he is five. It makes the lions look larger. Animals generally do not pick on bigger animals. The mane also helps protect the head and neck from scratches and bites if the lion gets into a fight.

Hyenas are the lion's top competitor. They weigh 170lbs, but are stronger and bigger than they appear. The have great strength in numbers. A lion cannot take down an entire pack. Hyenas also have one of the strongest jaws in the world. They not just good scavengers, but good hunters as well. They are not given much attention because they compete with the lions. The competition is so fierce, that lions and hyenas will kill each other's young on sight.

They have one similarity, both live in-groups. A lions' pride can have 3-12 females, 2-4 males, and many cubs. Lions are the most social of all the cats. They will purr to each other, like housecats. Living in a large group makes raising cubs easier. The females have their cubs at the same time. They can leave to hunt knowing that the pride

will look after the cubs. Cubs do not begin to hunt until they are eleven months old. Until then, they practice by play fighting with each other.

Lions are cool creatures, but they are not kings. The human titles have to go. No creature is more important than another is.

The episode closes with the brothers taking a catnap in the sun and the dusk of man, where it is repeated that no creature is king over the others.

Results

The children did fairly well on these questions. Twenty-five children completed the survey before the video. Fifteen (60%) completed the second survey after the video. (See appendices A and B.)

Question 1 asked the children to identify the lion's picture. The children knew what a lion was before the video.

Question 2 asked what the biggest cat in the world is. Their was little change in the correct response before and after. However, more children who answered incorrectly before the video changed their answer to lion after the video.

Question 3 was a true or false question stating, "Lions can't climb trees." Responses changed little after the video. The children seemed to be confused by the double negative in this question.

Question 4 was another true or false question. It asked if lions were good swimmers. Most knew the answer before the video and a slightly higher percentage knew it after.

Question 5 asked if lions live alone or in-groups. A very high percentage knew the answer before the video. This did not change afterwards.

Question 6 asked which animals will steal food from lions. Many knew the correct answer before the video, but even more knew the answer after. After the video, the children also realized that zebras and hippos did not.

Question 7 asked when lions were most active. The percentage of correct responses definitely increased. The lions were shown being active during the night and sleeping during the day.

Question 8 asked where lions live. The percentage of correct responses did not change significantly after the video. A slight majority knew the answer.

Question 9 asked how endangered the lions are. The children thought that lions were less endangered after the video. The highest response was that lions are not in any danger. According to the IUCN they are Vulnerable.

Question 10 asked how much the children liked lions. Lions were liked before the video and liked even more afterwards.

Discussion

The children seemed to learn from this video. They were already familiar with the animal and the show stimulated more interest in it. The video was very good about not misleading the children's perceptions. For example, when the narration said lions were active at night, the segment showed active lions at night. The video also showed lions sleeping during the day.

The children seemed to enjoy this video and were left with a higher regard for the lion. The program's main goal is to impart a greater awareness of wild animals. This episode certainly met that goal. It also met the goal of educating children about animals.

Hangin' with the Monkeys

Episode Summary

In the episode "Hangin' with the Monkeys" Chris and Martin search the Central American tropical forest to find five species of monkey. The episode begins with an overview of the rain forest. There are three types: the cloud, dry, and lowland rainforest. A short clip accompanied the identification of each. The Kratt Brothers embark on a pseudo scavenger hunt for monkeys. The checklist consists of the spider monkey, the squirrel monkey, the capuchin and the howler. And the for comedy's sake, the "grease monkey" was included.

Before any monkeys are discovered, some of their predators are. The ocelot is the primates' biggest threat in the wild. An ocelot is one of the big cats of Central America. It is very good at climbing, but it usually cannot catch a monkey is a tree. Boa Constrictors have also been know to eat monkeys. This rather large snake squeezes its prey and like most snakes swallows it whole. Boas use vibrations to find prey as well as tasting the air with their tongue. On average the boa eats every two weeks, but it can survive up to one and a half years between meals. Jaguars also pose a threat to the smaller mammals of the tropical forest. Several non-predatory animals were also encountered before the first monkey.

This Spider monkey was the first monkey on the list to be found. They are known as the acrobats of the forest. The brothers decide that they got their name because they look like spiders when their legs and arms are stretched out. They eat fruit from the trees and are picky eaters. They will throw away food they don't want. This fruit is then eaten by small pacas. This leads to a small circle of dependence. The pacas eat the fruit the monkeys throw down from the trees. They then spit out the seeds to grow a new tree for the monkeys to live in. The monkeys continue to throw down fruit and the cycle goes on. The prehensile tail is introduced after the spider monkey segment. These tails act as an extra arm. A short fact segment showed that none of the monkeys in Africa have prehensile tails. Baboons and chimpanzees were shown as examples of monkey without prehensile tails. The tails are used to help the rain forest monkeys keep their balance and climb trees. They are much better at it than humans, which was proved by one of the brothers in a failed attempt to mimic the monkeys.

This leads to the discussion of how monkeys are like humans, or in evolutionary terms how humans are like the monkeys. Twenty million years ago the ancestral primate appeared, next monkeys, the first ape, the chimpanzee, the gorilla, then the orangutan, and finally humans. Humans and monkeys are similar in behavior as well, the example: monkey bars. Some foods are also common, like fruit and sap.

The smallest monkey in the world lives off of sap. It is the pygmy marmoset found in South America. It is also called little lion because of its mane. The monkey is roughly the size of a hamster and has many predators like hawks. The capuchin has also been known to feast on the little monkey.

The next species on the list is the howler monkey. They are named for their very loud territorial call. They can be heard a half a mile away even through the thickest tropical forest. Howlers are the cows of the forest. They eat leaves in the canopy. They live in large troupes where the elders will teach the younger monkeys until they are old enough to take care of themselves and perhaps join another troupe. Many other animals also live in groups like fish and lions.

After trying to howl like a howler monkey the brothers decide to get out of the troupe's turf and look for the next monkey on the list: the squirrel monkey. These are one of the most resourceful species. They eat a wide variety of fruits and bugs. One thing that sets them apart from the other rain forest monkeys is their tails. Squirrel monkeys do not have prehensile tails. They also live in large troupes. Allison discovers that females form the core of the group and is about to explain more when the Kratt brothers interrupt her. They have found the last monkey on the list.

This is the capuchin. These are perhaps the smartest of the rain forest monkeys. They have very good communication using sounds, expressions and touch to convey meaning. The capuchins also eat fruit and bugs. This led to a quick overview of some different bugs including ants, grasshoppers, caterpillars, and the Hercules beetle.

Results

Fifteen children completed the survey before the episode was shown. Fourteen (93.33%) also completed the second survey after the video was shown. (See appendices A and B.) In general, the children did not do very well on this video.

Question 1 asked about the location of the tropical forest. While geography may be difficult in that age group, peer pressure influenced this question more than anything else did. One child was certain Alaska was the answer and announced it very loudly. The children then proceed to inform the other children that they were wrong. While this only occurred before the video was shown, the effect probably lasted through the video. The correct answer was only stated once briefly at the beginning of the episode.

Question 2 asked for the number of different types of rain forest. There were no changes in responses before and after the video. All the children knew before and after that there was more than one type of rain forest, but they consistently overestimated the number.

Question 3, about the type of animal an ocelot is saw a small shift to the correct answer after the video. Still, only a minority was correct. The ocelot was clearly shown in the video. Moreover, the different species of monkeys covered was very clear.

Question 4 was about the capuchin. Almost half of the children knew it was a monkey before the video and a large majority knew it after. This is a significant shift to the correct answer. The capuchin was one of the highlighted species of monkey and thereby given much more time during the video.

Question 5 is concerned with how endangered capuchins are. There were no large changes in responses before and after the video. Half of the children responded that the capuchins are in no danger. They are in fact vulnerable according to the IUCN. Many children underestimated the threat to the species.

Question 6 is concerned with the spider monkey. The results were very similar to question five. There was little change after the video. The majority thought the spider monkey to be in no danger. The spider monkey is listed as vulnerable and endangered, depending on the sub species. The children underestimated how endangered monkeys are.

Question 7 was an opinion question about the intelligence of monkeys. Before the video, half responded that monkeys are really smart. Afterwards only a small percentage responded in this way. One decided after the video that monkeys are smarter than people, but all the others believed that monkeys were less smart after the video than before.

Question 8 was another opinion question about how people like or disliked monkeys in general. The children, with small exceptions, liked monkeys more after the video. While they may not have gotten the facts of the video, they were becoming more exposed to the animals and liking them.

Question 9 was a true or false question about the range of the howler monkey's howl. There was an increase in the number of correct responses after viewing the video. This indicates that the children were paying attention to the video. The fact was mentioned only once directly, but it was towards the end of the episode.

The children did not do as well on question 10. This true or false question may have been too advanced. It asked if monkeys in Africa have prehensile tails. The video concentrated on monkeys in the rain forest not Africa. However, it was clearly mentioned in the video. The lack of geography aptitude may also have been a factor in the response. Some monkeys in the rain forest have a prehensile tail, but none of the monkeys in Africa do. The children who did not do well correctly recognizing the location of the rain forest, may not have been able to recognize that the monkeys in Africa were different from the majority shown in the video.

In Question 11 there was a dramatic change from one incorrect answer to another. This question asked which of the listed species was the smallest monkey. The majority of the responses shifted form chimpanzee to spider monkey. The percentage of correct responses did not significantly change. The chimpanzee is a better known monkey; this could explain the high percentage of answers before seeing the video where the other species were introduced. Spider monkey sounds like a small monkey due to name alone.

In the video it is not regarded as being any smaller than the others are. The correct answers answer was very clear in the episode and the pygmy marmoset was shown. However, it was not one of the major species discussed.

Question 12 asked if monkeys preferred to love alone or in groups. A decrease in correct responses was observed. It was clearly stated that some of the species lived in troupes. However, the monkeys were usually shown alone or in small numbers. The visual data conflicted with the narration.

Discussion

The children liked monkeys more after watching the video, but educationally they did not get much out of it. The video concentrated on too many different species for the children to learn about them individually. Many creatures did not get enough airtime to be remembered. The children were also presented with some conflicting information. The species of monkeys were always shown alone or in a very small group. At the same time the narration says that the live in large troupes. The children learn better by visual data and were left with an incorrect impression.

However, the children did responded as liking monkeys more after the video. This is very significant. Making children more conscious of animals is the main goal of the program. And it is being met.

In Search of the Tasmanian Tiger

Episode Summary

The episode "In search of the Tasmanian Tiger" began with a brief prologue indicating that Tasmania was discovered in 1642. It was an island 200 miles of the coast of Australia and home to many unique animals. The Kratt brothers, Chris and Martin, were retracing a fictitious 1920's expedition to find the Tasmanian Tiger. They followed the journal of co-host Allison's great uncles to find the elusive creature. Their concern

was that tigers are only found in Asia. The brothers then proceeded to give a brief overview of a few big cats and where they live. Lions, cheetahs and leopards are all found in Africa. South America is home to ocelots and jaguars. Bobcats, lynx and mountain lions also called cougars live in North America. In all there are 37 big cat species in the world, none of which are found in Tasmania.

"Old" film clips of Allison's uncles were intermittently shown through the episode. The Kratt brothers follow the journal exactly finding many interesting creatures on the way. Some were given only brief clips with barely enough time to identify the animal. Others were given more attention. The first major animal encountered was the Tiger Snake. It is approximately five feet long and is the most venomous snake in Tasmania. A somewhat random question was asked by one of the brothers, "What happens if the snake bites itself?" The answer: nothing, the snake is immune to its own venom.

The episode then turned to Dingoes. About 5000 years ago the species migrated from Asia to Australia. They competed with the indigenous predators, the Tasmanian tiger and Tasmanian devil, for food. Eventually the dingo caused both the other species to die out on the mainland. However, the dingo never migrated to the island of Tasmania and the tiger and devil were able to take refuge there.

The next animal encountered was the Kookaburra. This bird is known for its distinctive call, its laugh. After telling a few bad jokes to see the bird's response the Kratt brothers admitted that the birds weren't really laughing. The call was to tell others that they were in its territory.

Weird howling and a half-eaten rotten carcass led to the discovery of the next animal, the Tasmanian Devil. This creature looks nothing like the Tasmanian Devil of Saturday morning fame. They are scavengers who like to eat alone. The howling and growls are intended to frighten away others in the area, but many times more are attracted to these warnings than are intimidated by them. The devils will fight each other for the food and the biggest is likely to lose to the hungriest. These animals have amazing jaws and are capable of chewing through a leather boot or the leg bones of a kangaroo. Their incredible immune system also allows them to eat raw rotten meat. The young grow up in pouches similar to the kangaroo, but they also learn to fight at an early age.

It was emphasized that these creatures are no threat to humans and like other animals are misunderstood. As short segment dedicated to misunderstood animals mentioned spiders, sharks, African wild dogs, bats, snakes and wolves. Shark attacks were reported at less than 75 per year. Odds were given that a person is more likely to be attacked by a cow than a shark. There has never been a documented case of an African wild dog attacking a human. Bats mainly eat insects and a healthy bat has never attacked a human. And snakes are scared of humans and most species are harmless.

Tasmanian devils were referred to as "rare." This is due mostly in part to their hunting, which was made illegal in 1940. The same holds true for the Tasmanian Tiger. The devil is now a protected species and has so far been saved from extinction.

The brothers still have not been able to find a Tasmanian Tiger and the extinct animal file is checked. The last know tiger died in 1936. Allison's great uncles were

able to find the creature on their expedition in the 20's. Another old film segment revealed the Tasmanian Tiger in captivity. The creature is given a brief memorial.

The episode however does not end on this poignant note. There have been reported sightings of a striped animal that might just be the tiger. The species might still be alive and the Kratt brothers decide to search the entire island to find out if it could be true. The episode ends with a final silent moment and a still shoot of the late Tasmanian Tiger.

Results

Nine children completed the survey before the video. After the video, seven (78%) remained to complete the data set. (See appendices A and B.) In general, the children did not know the correct answers before or after the video.

Question 1 was a geography question about Tasmania. The correct answer is clearly and briefly stated at the beginning of the video. It could also be inferred by the continual comparison between Australia and Tasmania. However, the children are learning something. Before the video all but two of the children believed that Tasmania was an imaginary cartoon land. This decreased drastically after watching the video. While they did not learn exactly where Tasmania was, they did learn that is was a real place.

Question 2 asked what would happen if a tiger snake bit itself. Before watching, one child knew the correct answer, after two. This is not a very large increase. The

majority was still wrong. The video is very clear on the answer and the children just not paying attention is one possible reason for their inaccuracy. However, the fact was only mentioned once. Children usually cannot learn or remember something stated that quickly.

The children knew more about question 3. They were asked what type of animal a kookaburra is. A majority knew the answer before seeing the video. This did not increase significantly after watching the video. The video merely reaffirmed the opinions of the children who answered correctly.

Question 4 was about the kookaburra's distinctive laugh. However, the children did not do nearly as well as they did on the last. The results before and after did not show a significant change. The answers are spread even over the four options. There was not a majority response to any of the answers. The correct answer was clear in the video, but as seen before it was only mentioned once. This is not enough to teach a young child.

Question 5 was the last in a series of questions about the kookaburra. It asked about how endangered that bird is. The children thought it was more endangered after the video. The kookaburra is a very common bird and currently in no danger of extinction.

Question 6 was a true or false question about where the dingo lives. Only 22% answered the question correctly before viewing the video. Afterwards, there was a large increase. The question related to a very important concept in the video and the answer was mentioned several times. However, more children may have been able to answer the question in different format. The question may have been too difficult for some of the children to comprehend. The statement really has two parts, one about Tasmania and one

about Australia. The confusion occurs because one of these parts is true, while the other is not. This makes the overall answer false, but it could be very confusing to young children if they know part of it is true.

Question 7 was a clearer true or false question about where the Tasmanian tiger and devil lived a long time ago. A very large percentage knew thew correct answer before the video (78%). After the video 100% of the children responded correctly. The concept behind this question was very important in the video and mentioned several times.

Question 8, about the diet of Tasmanian devils, showed a very marked improvement. None answered correctly before the video, however after watching it 43% answered correctly. This question was answered several times in the video and also shown in the video. The fact is also unique and more likely to catch their attention.

Question 9 was about where babies of Tasmanian devils live. It also showed some improvement. No one answered correctly before and 29% answered correctly after. The question is from a fact mentioned once in the video. The answer is also shown in the video. Images help people learn and remember things. However immediately following this was a contradicting image of the babies clearly outside the pouch play fighting among each other. This led to the 43% who incorrectly answered that the babies lived in their parent's nest.

Question 10 was about how endangered the Tasmanian devil is. The children though that it was more endangered after the video. However, the devil has recovered enough to be considered at low risk.

Question 11 asked about the status of the Tasmanian tiger. Only one child identified the correct answer after the video. The children may have been given misleading information at the end of the video when the brothers believe they might have seen the animal. They also might be confusing the tiger and devil.

Discussion

This exposed children to Tasmania. For many, it was a new place. The children did not learn all of the facts, but they did gain a general awareness, which is the first goal of the series. The data that they did not learn usually was something mentioned only once. Repetition is a very important part of learning. It is therefore not surprising that performance was poor for questions regarding these facts. Some information also seemed to be misleading in the video. For example, babies of Tasmanian devils live in their parents' pouches. A baby in a pouch was shown quickly, but the babies playing with each other as the brothers talked about how they learned to fight immediately followed the segment. This led to many children believing that the babies live in dens. The extinction of the Tasmanian tiger was also misrepresented. The species is announced to be extinct, but then the brothers talk about reported sightings and the possibility that the tiger could still be alive. This left a strong impression on the children. Only one child realized after the video that the Tasmanian tigers were all dead now.

Whatever the flaws of the video, the most important fact is that the children are learning something. Many children did not know that Tasmania was a real place. After

the video, while they could not identify its proximity to Australia, they did not answer an imaginary cartoon land.

Leopard, Prince of Stealth

Episode Summary

This episode begins with an introduction to the big cats of Africa. These animals are all predators and carnivores. That means they eat meat, and meat is other animals. It all part of a big creature balance. The top carnivores are lions, hyenas and leopards. Leopards are Allison's favorite big cats. The elusive hunter is a deadly killer, but that is only part of the story. There is a lot more to the creature than how it eats. The brothers are determined to find one on the Savannah.

The leopard can be found in Africa and Asia. It has the largest range of all the cats. The leopard hunts alone. It stalks and pounces. The leopard weighs about 150lbs. Pound for pound, it is the strongest of all the big cats. The leopard will drag its food into a tree to keep it away form predators. It is the best climber. The leopard eats and sleeps in the trees. It spends most of its time up there. The brothers explain that it comes down at night to hunt.

Leopards are territorial animals. They communicate through smell and will mark their territory. They also leave food around to let others know that the area is taken. Even though they live alone in large areas, they have a lot of competition for food. Cheetahs, hyenas and lions live in the same area and compete for the same food. These are all very good predators. Hyenas have power in their numbers. A leopard will stay

away from them. Cheetahs have unmatched land speed. They can run up to 70 mph. Lions live in prides of about 13. They take down the big animals. African wild dogs have an 80% success rate in hunting. Therefore, it is not easy for a leopard to get a meal.

The herbivores are animals that eat plants like zebras, rhinos, giraffes, wildebeests, impalas, elephants, hippos, and antelope. Most of these animals are prey for the leopard. They must be constantly on guard for carnivores. As the brothers point out, even the small herbivores have worries. The meercat eats millipedes and a mongoose will hunt for snakes. There are even predators in the water. The Nile crocodile uses stealth to catch prey.

Even with carnivores to worry about, life as a herbivore is still easier. They have evolved great defense mechanisms. Many animals on the Savannah have camouflage. Zebras use disruptive pattering to confuse the predators. It is difficult to single out a single zebra from the group. Giraffes blend into the background. However, leopards use camouflage to sneak up on their prey, hence their spots. Herbivores also use their noses and ears to detect a predator before it gets too close. The swivel ears allow them to hear in all directions. A warthog will squeal to warn others when a predator like a cheetah is approaching. They run away at 35mph into their burrows. They turn around and back in so they can defend themselves if anyone decides to try to follow them in.

While the brothers were sharing all the information about the other animals, they lost track of the leopard. To lure it back out, they disguise themselves as antelope and wear a lunch sign on their backs. They join a herd to wait for the leopard. A leopard shows and they run to the safety of their jeep. The brothers realize that if they had been

real prey, they would not have had a chance against a leopard. They were the slowest animals out there and they ran in a straight line. Running in a zigzag is another defense. It confuses the predator. A predator cannot pounce if it does not know the prey's next move. Leopards rely on pouncing and surprise to catch a meal. They typically get within 15 feet of their prey without being noticed. The leopard can jump ten feet in the air and cover 20 feet in a single pounce. However, they will not chase prey beyond 54 yards.

When a leopard does catch food, it will drag it into a tree to keep it away from its competitors. However, if confronted the leopard will give up its food to avoid a fight. It is hard to get a meal and keep it, so the leopards eat a variety of animals from frogs and rats to the bigger animals. Flexibility is the key to their survival.

Carnivores get a bad rap for killing herbivores. However, if there were no carnivores, there would be too many herbivores. There would not be enough plants to feed them all. Carnivores and herbivores exist in a special balance. Both are important members of the creature world. Leopards learn to hunt as cubs. They play and fight together to practice.

The episode ends with Chris and Martin taking a nap in a tree just like the leopard.

Results

The children did not do very well on this survey. Fifteen children completed the survey before the video. After the video, ten (67%) remained to complete the data set. (See appendices A and B.)

Question 1 asked the children to identify a picture of a leopard. Most recognized it before the video. Those that did not recognize it did not know it was a cat either. No one circled the lion, but a small percentage circled the hippo. After the video, all responded correctly.

Question 2 was looking for the definition of a herbivore. A smaller percentage of the children were correct after the video than before. It was mentioned several times in the video, but it was also a new vocabulary word to many. It can also easily be confused with the word carnivore.

Question 3 asked where the leopard lives. There was a small increase in the percentage of correct answers, but most children again had geography problems.

Question 4 asks where the leopard spends most of its time. There was little change in the correct responses before and after the video. However, the was an increase in the percentage of children who answered "in a burrow." The video never shows a leopard in a burrow and it shows the leopard in a tree several times. It is also unlikely that the children could confuse the leopard, which they identified correctly in question 1 with a warthog.

Question 5 was a true or false question about leopards hunting alone. The number of correct responses increased significantly after the video.

Question 6 asked why the leopard has spots. There was little change in the percentage of correct responses before and after the video. A larger percentage of the children believed that the spots were there to help keep the animal cool. The video was very clear on this answer and dedicated and entire section to camouflage. The leopard is also seen sneaking up on other creatures.

Question 7 was a complex question on why carnivores are important. There was a small increase in the percentage of correct responses, but a majority of the children did not respond correctly. The concept was alluded to during the video, but was only mentioned once. The balance of nature is a complex concept to teach a seven-year-old in a few minutes.

Question 8 asked how endangered leopards are. There was little change in response before and after the video. There was one response that the leopard was extinct. The North African leopard is actually Critically Endangered.

Question 9 asked how much the children liked leopards. Responses shifted to liking the leopard less after watching the video.

Discussion

The children did not like this video. They did not do well on the questions and they did not like leopards as much after watching it. The concepts in the video may have

been a little complex for the children. Nevertheless, if they paid more attention, they could have scored a little better. The video did spend less time on the leopard then other shows did on their highlighted creature. Perhaps this caused the children to loose interest early in the episode. The video had a lot of narration and less action or comedy.

Polyp Power!

Episode Summary

The Kratt brothers are headed towards the coast of New Guinea. They spot a sea turtle and begin to follow it hoping that it will lead them to the "greatest construction job of all time." The sea turtle can travel over 2000 miles and stays under water for several hours at a time. The brothers have a hard time keeping up with it, but finally get a break when the turtle comes topside to take a nap floating on the surface. The brothers have been led to the East Coast of Australia.

The great construction job is the Great Barrier Reef. It contains over 3000 coral reefs and 30 keys and islands. It is 1250 miles long and can be seen from space. It began seventeen million years ago. (Modern man first appeared 40,000 years ago.) The reef offers food and shelter to the many animals that live in this habitat. There are thousands of known species from six-foot sharks to microscopic creatures.

The brothers don scuba gear to investigate reef life. While exploring, Ttark explains that the reef is a who, not a what. It is made up by lots of tiny creatures called

polyps. The reef is full of lots of other creatures though. The brothers find a crab fight, an eagle ray and lots of fish. They also see many strange animals. With some it's hard to tell flora form fauna. The brothers quiz each other by one pointing out something and the other identifying it as plant or animal. These included the moray eel, a huge clam, a jellyfish, an anemone, turtle weed (a plant), sea cucumber (an animal), and soft coral. Polyps, the tiny creatures responsible for the reef were next on the line up.

Polyps are simple animals. They have only a mouth, stomach and tentacles. Different species produce different types of coral. Five types were shown: staghorn, mushroom, brain, plate, and gorgonian. The construction job is compared to how humans build. To gain a better perspective on the size of the reef this estimate was given: if you were a polyp and you wanted to build the reef it would have to be 40 miles high. That would take a lot of cement. And that's similar to what the polyps do. They build themselves a cup like home out of calcium carbonate. They build these new home on the skeletal homes of their ancestors. After millions of years a coral reef is created.

The Great Barrier Reef exists in a delicate ecological balance. The coral supports the plants and the plants are eaten by the herbivores like fish, a carnivore like a shark then eats the fish. Several types are sharks hang around the reef. Some are big, and some are small. Many creatures have ways of avoiding the carnivores though. One is camouflage; if they can't see you they can't eat you. The lionfish has poisonous barbs in its fins. The puffer fish puffs itself up so that they predator will think it's too big to swallow. The trumpet just looks like a plant. Most small fish also travel in schools.

The brothers continue to explore the underwater world. They look at how some creatures swim differently. They also encounter the clown fish. This fish lives in the tentacles of a sea anemone. They have a mucous coating that protects them from the poison on the tentacles. There is also a type of fish where the males are purple and the females are yellow. But, if something happens to the male, the lead female will turn purple and become male.

While searching for other interesting creatures, the brothers and Allison make a terrible discovery, something is killing the reef. A section of the reef is dead. They are determined to find the cause. Several culprits are inspected. First suspect is the sponge. The sponge is a creature, not a plant. Some are soft and some are hard, like coral. Sponges burrow into to the coral; this is called coral bleaching. But, this also helps coral stay together in deep water. The next suspect is the parrotfish. This fish has a beak that it uses to grind on the coral. It eats polyps and algae. The parrotfish creates a bag of mucous to hide in when it sleeps. Eels can not smell it through the bag. But this fish can't be destroying the reef, it's supposed to eat coral. In nature there is a balance between all things. There are many cases where smaller fish eat parasites off the larger fish. Its' all part of the balance of nature. The crown of thorns starfish also naturally eats coral.

Allison and the brothers are still searching for a cause when they realize how much is in danger with the reef. If the reef is in danger, so are the thousands of species that call it home. The coral also supports islands that are home to many birds. The reef is

a very important habitat. Finally the culprit is found. It is humans. The major causes of reef destruction are from pesticides and reckless boating.

But there is hope, new coral is always forming and as long as measures are taken to protect what is left of the reef, it will recover in time. The episode closes with a sequence on animal diversity highlighting many of the creatures seen previously.

Results

Overall, the children did well on the survey about the Great Barrier Reef. Twelve children complete the before survey. Only six (50%) completed the second. (See appendices A and B.)

Question 1 was a geography question about the location of the Great Barrier Reef. The location was clearly mentioned once at the beginning of the episode, but the children did not recognize the correct answer on the survey. Geography has had consistently poor results in all surveys.

Question 2 was a true or false question. It asked if the reef could be seen from space. The percentage of correct responses did not change after the video. It was mentioned once early in the episode. It appears that the children are not remembering facts from the video. This could be because they are only mentioned once.

Question 3 was looking for an approximate estimation of the length of the reef. Before watching the episode, the answers were divided evenly, indicative of random guessing. After the video most children responded 100 miles. The correct estimation

was 1000 miles. The reef is actually 1250miles long. The actual length was given at the beginning of the video. And the large size of the reef was emphasized throughout. However, it is unclear what the concepts of size are to a seven-year-old. A response of 100 may indicate that they thought the reef was very large.

Question 4 touched on one of the most important concepts of the video, how the reef was made. There was an increase in the number of correct responses after the video. The children were paying attention and some were learning.

Question 5 asked for an estimation of the number of known species living in the reef. The correct answer was thousands. There was a significant increase in correct responses to this question. Other answers were a few and millions. Clearly the majority of the children are recognizing the many diverse creatures found in the reef. The correct answer was mention in the video and many different creatures were highlighted throughout the episode. It was also strongly emphasized that the reef is home to many different creatures.

The plant or animal segment of the episode inspired questions 6 through 9. In general, the children did well on this section. Question 6 was a sea anemone. This was one of the creatures shown in the segment. There was a slight increase in correct responses after the video. However many still thought it was a plant.

Question 7 was a jellyfish. Most of the children recognized it as an animal before the video. After the video all the children responded correctly.

Question 8 was a sponge. This creature was not included in the plant and animal segment, but sponges did have there own segment later in the video. The number of

correct responses decreased after the video. Children may not have recognized the picture as a sponge.

Question 9 was a starfish. Most recognized it as an animal before the video. Afterwards, the actual percentage did not change, but the remaining children did not answer as opposed to answering incorrectly before.

Discussion

The children seemed to enjoy this video and they learned from it. The episode did an excellent job of introducing the diversity of reef life. The children were also able learn about how the reef was constructed. This is a difficult concept to teach a seven-year-old, but the children did seem to grasp it. In a larger subject group, we would expect very good results for the concepts presented in this video.

Comparison of Videos

The children did better on the lion and reef surveys. The majority did poorly on the monkey survey and on the leopard survey. However, they enjoyed most of the videos. The only episode they did not enjoy was Leopard, Prince of Stealth.

The children were already familiar with the lion. This let them learn more information than if the animal has just been introduced. The children also liked the lion before the video and liked it even more after. The episode is exciting. The brothers take viewers into a lion pride and on the prowl with them. This episode accomplished its goals. There was a more information than the children could learn quickly, but it provided an excellent foundation for future studies.

The children liked monkeys, but had a hard time learning form the video. This episode presented too much information too quickly. The children were unfamiliar with the different species of monkeys and had a hard time remembering individual facts about each. Children require more time to learn than what was given to the information presented. The video was misleading in one aspect. The narration claimed that the monkeys lived in large troupes, but the monkeys were never shown in a large group. The children learn better visually and were left with the misconception that monkey live alone.

The Tasmanian tiger video introduced a new place full of new creatures. Most of the children were not aware that Tasmania was a real place before the video. This episode also left children with a misconception. The Tasmanian tiger is extinct.

Extinction was a new concept to most children. The video ended by saying that some people have reported seeing the tiger. The brothers set out on a mission to see if the rumors are true. This left children with a false impression about the finality of extinction and the status of the Tasmanian tiger.

The children did not enjoy the episode about leopards. They responded to liking the leopard less after viewing the video. This episode dealt with the more complex issues of the balance of nature. It was a bit too much for the seven-year-old audience. The episode also spent considerably less time on the leopard that other shows spent of their highlighted animals. The children became bored before the got to really see the leopard. The episode was also far less comical than other episodes. This comedy is what helps to retain the children's interest.

The children enjoyed the episode about the coral reef. While it wasn't as comical as other episodes, it had a fast pace and lots of new and exciting creatures. The show did not concentrate on one creature, but on reef ecology. This allowed lots of weird looking creatures to be shown. Most of the creatures were new to the children and kept them interested.

Fact Questions

The children had difficulty with many fact questions. A clear pattern is seen in there responses. Poor results were seen on questions whose answer was mentioned only once in the video. The children simply can not learn new information that quickly. The information is clear in the video, but mentioned too quickly to be remembered. Questions that related to an answer explain many times in the video saw much better results. The children were paying attention enough to learn something.

The children also did better on questions that had visual answers in the video. Learning by seeing is easier than by hearing. On questions were that answer was spoken and not shown results were poor. In some instances, a wrong impression was given by the video when images conflicted with the narration. For example, in the episode about monkeys, the narration said they lived in large troupes, however, the monkeys were always shown alone or in very small groups.

The children also had some difficulty estimating numbers. This may be attributed to their education thus far. Seven-year-olds are just beginning to understand mathematical concepts. They may not yet have a grasp on numbers into the hundreds and thousands.

The children did better on simple true or false questions. They had difficulty with complex statements though. Negative statements confused the children. For example, question 3 from the lion survey stated "Lions can't climb trees." The process for finding the correct answer includes a double negative. This idea is too complex for a seven-year-

old. The process would be to first ask, "Can lions climb trees?" The answer is no, but because the statement is negative the correct answer would be true. The two-part true and false question from the Tasmanian tiger survey (question 6) also confused the children. This question stated, "The dingo, a type of wild dog, lives in Tasmania and Australia." The confusion is that the question is half-true. The dingo lives in Australia, but not Tasmania.

Opinion Questions

The major opinion question asked was how much each creature was liked. Most results were very positive. The question was asked about three animals: lions, monkeys and leopards. The monkeys and lions were better liked after the video. The leopard was less liked after the video. This was not an expected result. The leopard is always shown in a good light. It was also emphasized through out the video that carnivores are not bad for eating other animals. Perhaps children did not like this episode as much as the others and consequently have a lower opinion of the animal.

Another opinion question was asked on the monkey survey. It related to the intelligence of monkeys. The children thought monkeys were less smart after the video. This could be due to previous experience with monkeys. Monkeys are usually seen performing tricks of some sort. While the video says they are smart, catching bugs and very primitive communication does not seem too exciting to seven-year-olds. As compared to humans, they are not very intelligent, but in comparison to some animals, they are highly advanced.

IUCN Related Questions

Questions about how endangered children thought certain animals are related to the 1996 IUCN Red List of Threatened Animals. The IUCN, or World Conservation Union, is part of the World Conservation Monitoring Center, whose function is it to provide information services about conservation. The Red List database cross-references animals with their degree of threat. The following criteria for Critically Endangered, Endangered and Vulnerable are taken from the IUCN website.

> Critically Endangered (CR)
> A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):
>
> 1. Population reduction in the form of either of the following:
>
> 1. An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
>
> a. Direct observation
>
> b. An index of abundance appropriate for the taxon

c. A decline in area of occupancy, extent of occurrence and/or quality of habitat

d. Actual or potential levels of exploitation

e. The effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. A reduction of at least 80%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

2. Extent of occurrence estimated to be less than 100 km^2 or area of occupancy estimated to be less than 10 km^2, and estimates indicating any two of the following:

1. Severely fragmented or known to exist at only a single location.

2. Continuing decline, observed, inferred or projected, in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Area, extent and/or quality of habitat

d. Number of locations or subpopulations

e. Number of mature individuals.

3. Extreme fluctuations in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Number of locations or subpopulations

d. Number of mature individuals.

3. Population estimated to number less than 250 mature individuals and either:

    1. An estimated continuing decline of at least 25% within 3 years or one generation, whichever is longer or

    2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

        a. Severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)

        b. All individuals are in a single subpopulation.

4. Population estimated to number less than 50 mature individuals.

5. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or 3 generations, whichever is the longer.

Endangered (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

1. Population reduction in the form of either of the following:

    1. An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or

three generations, whichever is the longer, based on (and specifying) any of the following:

a. Direct observation

b. An index of abundance appropriate for the taxon

c. A decline in area of occupancy, extent of occurrence and/or quality of habitat

d. Actual or potential levels of exploitation

e. The effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. A reduction of at least 50%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

2. Extent of occurrence estimated to be less than 5000 km^2 or area of occupancy estimated to be less than 500 km^2, and estimates indicating any two of the following:

1. Severely fragmented or known to exist at no more than five locations.

2. Continuing decline, inferred, observed or projected, in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Area, extent and/or quality of habitat

d. Number of locations or subpopulations

e. Number of mature individuals.

3. Extreme fluctuations in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Number of locations or subpopulations

d. Number of mature individuals.

3. Population estimated to number less than 2500 mature individuals and either:

1. An estimated continuing decline of at least 20% within 5 years or 2 generations, whichever is longer, or 2.A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a. Severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals)

b. All individuals are in a single subpopulation.

4. Population estimated to number less than 250 mature individuals.

5. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or 5 generations, whichever is the longer.

Vulnerable (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

1. Population reduction in the form of either of the following:

1. An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

a. Direct observation

b. An index of abundance appropriate for the taxon

c. A decline in area of occupancy, extent of occurrence and/or quality of habitat

d. Actual or potential levels of exploitation

e. The effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

2. Extent of occurrence estimated to be less than 20,000 km^2 or area of occupancy estimated to be less than 2000 km^2, and estimates indicating any two of the following:

1. Severely fragmented or known to exist at no more than ten locations.

2. Continuing decline, inferred, observed or projected, in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Area, extent and/or quality of habitat

d. Number of locations or subpopulations

e. Number of mature individuals.

3. Extreme fluctuations in any of the following:

a. Extent of occurrence

b. Area of occupancy

c. Number of locations or subpopulations

d. Number of mature individuals.

3. Population estimated to number less than 10,000 mature individuals and either:

1. An estimated continuing decline of at least 10% within 10 years or 3 generations, whichever is longer, or

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a. Severely fragmented (i.e. no subpopulation estimated to contain more than 1000 mature individuals)

b. All individuals are in a single subpopulation.

4. Population very small or restricted in the form of either of the following:

1. Population estimated to number less than 1000 mature individuals.

2. Population is characterized by an acute restriction in its area of occupancy (typically less than 100 km^2) or in the number of locations (typically less than 5). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus

capable of becoming Critically Endangered or even Extinct in a very short period.

5. Quantitative analysis showing the probability of extinction in the wild is at least 10% within100 years

.

There are eight categories describing the degree of threat faced by an animal:

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E)

ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E)

VULNERABLE (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to D)

LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

2. Near Threatened (nt). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

3. Least Concern (lc). Taxa which do not qualify for Conservation Dependent or Near Threatened.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

(IUCN, 1996)

This project dealt with animals falling only into the first six categories. The criteria were simplified to a level that could be understood by children ages seven to twelve. Below is a table showing the correlation of IUCN categories to sentences appropriate to show the relative degree to which children believed the animal to be in danger.

Table 6—IUCN Threat Categories

IUCN Category	Survey Phrase Indicative of IUCN Category
Lower Risk (LR)	a. They are not in danger.
Vulnerable (VU)	b. They are in a little danger.
Endangered (EN)	c. They are in some danger.
Critically Endangered (CR)	d. They are in lots of danger.
Extinct in the Wild (EW)	e. They are almost all dead now.
Extinct (EX)	f. They are all dead now.

The 1996 IUCN Red List of Threatened Animals database classifies the lion as Vulnerable. The correct answer for question nine on the Lions, King of Beasts? Survey (see Appendix A) is: "b. They are in little danger." Nine of the twenty-five children

answering the before survey judged the lion to be at Lower Risk. Five of the eleven children answering the after survey judged the lion to be at Lower Risk (see Figure 1). In both cases, the relative level of threat to the lion was lower than is actually present.

The North African leopard is classified as Critically Endangered. An equal number of children in the before survey (see Appendix A) judged the lion to be Lower Risk and Critically Endangered. In the after survey, the most repeated response was for Vulnerable, showing a shift towards a feeling that the leopard was less threatened than the children had previously suspected (see Figure 2).

The Tasmanian devil (see Appendix A) is classified as Lower Risk. One third of children in the before survey correctly identified the Tasmanian devil as belonging to this category. An equal amount thought the Tasmanian devil to be Vulnerable. And two of the nine children in the before survey thought the Tasmanian devil to be Extinct in the Wild (see Figure 3). The children tended to overestimate the threat to the Tasmanian devil in the after survey. One child indicated that the animal was Extinct, and the majority of children answering the after survey felt the animal to be Critically Endangered.

The Tasmanian tiger (see Appendix A) is classified as Extinct. No one chose this answer on the before survey. Lower Risk, Vulnerable, and Endangered were the three most popular choices for the perceived threat of the Tasmanian tiger (see Figure 4). Of the children answering the after survey, only one of seven correctly identified the Tasmanian tiger as being totally extinct. Most children, four of seven, in the after survey ranked the Tasmanian tiger as being endangered. The general shift was towards realizing

that the Tasmanian tiger was more threatened than the children had believed, but the threat was still dramatically underestimated.

The Kookaburra (see Appendix A for In Search of the Tasmanian Tiger Survey) is classified as being at Low Risk for extinction. The bird is actually fairly common in Australia and Tasmania. The most popular answer for both the before and after surveys correctly placed the Kookaburra as being at Low Risk. Five of 10 children chose Low Risk on the before survey (see Figure 5 in Appendix B). Three chose Vulnerable, the next most threatened classification, and 1 child on the before survey thought the bird to be Extinct in the Wild, though the bird was clearly shown in the video. The after survey results were somewhat discouraging. Three of 7 children answering the survey said the kookaburra was at Low Risk. But two children thought the kookaburra to be Endangered and two children thought it to be Critically Endangered after watching the video. Though the most popular response in the after survey was correct, the majority of children, four of seven, over estimated the threat to the kookaburra after watching the video.

The Capuchin Monkey is classified as Vulnerable. Most children in both the before and after surveys (see Appendix A for Hangin' with the Monkeys survey) ranked the capuchin at Lower Risk. One child from the before survey and one child from the after survey indicated that they believed the capuchin monkey to be totally extinct (see Figure 6).

The Spider Monkey (see Appendix A) is classified as Vulnerable. Again, most children in both the before and after surveys ranked the spider monkey as less threatened

than it actually is. Lower Risk was the most popular choice for both surveys (see Figure 7).

Identification Questions

In the survey regarding lions (see Appendix A for Lion, King of the Beasts? Survey), the children were asked to pick the lion in a line up of pictures consisting of a tiger, a lion, or a bear. The overwhelming majority in both surveys correctly identified the lion. One child taking the before survey chose the tiger (see Figure 8). All children in the after survey chose the lion correctly.

On the before survey (see Appendix A) of the leopard video, three children gave no response when asked to pick the leopard out of a photo line up consisting of a hippo, a leopard, and a lion. Two children in the before group identified the picture of a hippo as being a leopard. The overwhelming majority of the before survey and all participants in the after survey correctly identified the leopard (see Figure 9).

In the Hangin' with the Monkeys Survey (see Appendix A), the children were asked to identify what an ocelot is without having a picture to go by, just word choice. The choices available were a) monkey, b) snake, c) cat, or d) bird. The ocelot is a cat found in Central America. In the before survey, twelve of fifteen respondents thought the ocelot to be a type of monkey. None of the children thought the ocelot was a snake, and only one child thought it was a bird. Two of fifteen children taking the before survey correctly identified the ocelot as being a member of the cat family. Eleven children remained after the video to fill out the after survey. Five children said the ocelot was a monkey (still the most popular answer), one child said the ocelot was a snake, three children correctly identified the ocelot as being a type of cat, one child thought it to be a

bird, and one child did not answer that question. Monkey was still the most popular answer.

Question 4 of the Hangin' with the Monkeys surveys asked the children to identify what type of animal a capuchin is given only the same word choices in the same order as in Question 3 relating to the identification of an ocelot. Fifteen children answered the before survey. Seven thought the capuchin to be a type of monkey, the correct response. Six children thought a capuchin to be a snake and two children thought a capuchin to be a type of cat. No one thought a capuchin was a type of bird. The majority of children also correctly identified the capuchin as being a type of monkey in the after survey—seven of eleven respondents to the after survey said monkey. Three children in the after survey said a capuchin was a type of snake, one said it was a cat, and no one thought the capuchin to be a bird.

In the In Search of the Tasmanian Tiger Survey (see Appendix A), the children were asked to say what type of animal they believed a kookaburra to be. As in the survey about monkeys, there were no pictures to help the children in forming an educated guess. They had to choose based on words alone. Several children asked upon reading the survey if this question was a trick question because they believed we had made up the word "kookaburra." The choices were squirrel, bird, kangaroo, or bat. Nine children answered the before survey. Six children correctly identified the kookaburra as a type of bird. One child thought it to be a kangaroo and two children thought a kookaburra was a bat. Seven children remained to answer the after survey. The most popular answer was

still the correct one with five of the seven children identifying the kookaburra as a type of bird. Two children thought it to be a type of kangaroo.

Identifying various examples of sea life proved difficult for the children. A plausible explanation is that since most children have at one point attended the zoo and/or circus, they would have seen a lion and a leopard in addition to other large mammals. However, a sponge does not have a great capacity to draw large crowds because it can offer no excitement. Generally speaking, the invertebrates pale in comparison to the vertebrates, specifically the higher ones. The children were shown a picture of a sea anemone (though they were not told what it was—merely shown the picture) and asked to classify it as either a plant or an animal, animal being the correct choice (see Appendix A for the Polyp Power Survey). Seven of twelve children in the first survey thought it to be a plant. Five of twelve in the first survey correctly identified the sea anemone as being an animal. In the second survey, respondents were split evenly between plant and animal, each category getting three of six votes (see Figure 10). So percentage wise, more children understood the anemone to be an animal.

In the same survey (see Appendix A), the children were shown a picture of a jellyfish and, without being told what it was, were asked to identify the life form as either a plant or animal. Nine of twelve respondents in the first survey correctly identified the jellyfish as coming from the animal kingdom. Three of twelve respondents to the before survey thought it to be a plant. All six respondents in the after survey correctly identified the jellyfish as being an animal (see Figure 11). Next, the children were shown a picture of a sponge and, without being told what the animal was, were asked to classify it as

either a plant or an animal (see Appendix for survey). Most children placed the sponge as a plant in both surveys. In the before survey, the children were almost evenly split between animal and plant. Five of twelve children said animal and seven of twelve said plant. In the second survey, one child did not answer the question, one child voted for animal, and four of six children opted for plant (see Figure 12).

In the same survey, the children were shown a picture of a sea star (see Appendix A for survey) and were asked to classify it as either a plant or an animal without being told what is was. Ten of twelve children participating in the before survey correctly place the starfish as belonging to the animal kingdom. One child chose plant, and one child did not answer the question. In the second survey, one child did not answer the question and the other five of six children correctly chose animal (see Figure 13). A sea star and a jellyfish are more common than a sponge or a sea anemone, so it makes sense that the children fared better on their identifications of these animals. There was a larger shift to classify the sponge as a plant in the second survey, and this is probably due to the fact that a sponge does not move and resembles more a plant than an animal. In general, the children did better identifying mammalian vertebrates as compared with invertebrates.

Geography Questions

In the survey about Tasmania (see Appendix A for In Search of the Tasmanian Tiger Survey), the children were asked to say what Tasmania was. Their choices were a cartoon character, a country in southern Asia, an island off the coast of Australia, or a large city in Western Africa. The correct answer is an island off the coast of Australia. In the before survey, on overwhelming majority, seven of nine children, indicated that Tasmania was a cartoon land. One child said a country in Asia and one child said a large city in Africa. No one chose the correct answer. In the after survey, no one realized the correct answer. More children chose a country in Asia and less chose a cartoon land (see Figure 14).

In the survey about the Great Barrier Reef (see Appendix A for Polyp Power Survey), the children were asked to give the approximate location of the Reef. Their choices were Hawaii, Australia, Africa, or Japan. Most children in both the before and after survey indicated they believed the Reef to lie closest to Hawaii. In both surveys, the second most popular answer was the correct one. No child said Japan, and only one child in the before survey felt the Reef lies closest to Africa (see Figure 15).

In the survey about the tropical forest (see Appendix A for Hangin' with the Monkeys Survey), the children were asked where the forest was located. Their choices were Alaska, Central America, Europe, or Antarctica. The correct answer is Central America. In both the before and after surveys, the most popular answer was Alaska. The second most popular answer was the correct answer of Central America. One child in

both the before and after surveys indicated that the tropical forest could be found in Europe. And surprisingly, one child in the after survey said the forest was located in Antarctica despite the fact that no one in the before survey had indicated this (see Figure 16).

Individual Responses

In the hopes of discovering a trend amongst individuals and their responses, data was analyzed from every child who filled out both a before and after survey for a particular video. The answers from non-opinion questions, those questions that could clearly be called wrong or right, from each video were then graphed to see what trends, if any, emerged.

The general trend for the Lion, King of the Beasts? Video (see Appendix A for surveys) was improvement. Five of the eleven children who filled out both a before and after survey improved by an average of one question. For example, if a child answered five of the eight non-opinion questions correctly on the before survey, they would probably answer six of eight non-opinion questions correctly on the after survey. Three of the eleven children who completed the survey set, both a before and after survey questionnaire, remained the same. Two children had more incorrect answers on the after survey than the before survey. Each child's score decreased by two questions. The average score on the before survey for Lion, King of the Beasts? was 5.4 out of 8 and the average on the after survey was 5.5 out of 8.

The trend for the Hangin' with the Monkeys Survey was fairly neutral. Of eleven respondents, five retained their scores on the after surveys, three improved by an average of two questions, and three had decreased scores averaging 1.7. The average amongst all children taking the set of surveys for the Hangin' with the Monkeys video was 2.6

questions answered correctly out of 8 for the before survey and 2.7 questions answered correctly out of eight on the after survey.

The average number of questions answered correctly on the before survey for the episode entitle In Search of the Tasmanian Tiger was 2.3 out of 8 questions. The average for the after survey rose to 3.4. Seven respondents completed both a before and after survey. Three of the seven respondents showed no change in score from the before to the after survey. The other four respondents raised their score by an average of two questions.

The average on the before survey for the video Leopard, Prince of Stealth was 2.4 out of 7 questions that were correctly answered. The after average was somewhat higher at 3. The Polyp Power before survey had an average of 4.3 out of 9 questions correctly answered. The after survey average was 4.2 out of 9. Eleven respondents completed both a before and an after survey. Four respondents raised their scores, five respondents showed no improvement, and two respondents showed decreased performance on the after survey, each having a score lowered by two questions.

The average on the before survey for the Polyp Power episode was 4.3 questions correctly answered out of nine. The average on the after survey was 4.2 out of nine. Six respondents completed both a before and an after survey. Three of the six raised their scores, two showed no improvement, and one respondent showed a decreased performance.

What can be said for trends amongst individuals? The data from any child who completed at least three sets of surveys was reviewed to determine what effect, if any,

continued viewing of Kratts' Creatures had on the child's perceptions. The most any child completed was four of five sets of surveys. There were five children who completed at least three sets of surveys. The children had to fill out both a before and an after survey so that we could compare the results caused by the video to the child's initial perceptions. Filling out both a before and after survey for only two videos does not yield enough data to examine or explain any trends that might be present. But if a child has completed three sets of surveys and if the data from each set agrees with the others, then a trend has been established as having come from the videos shown to the children.

There were three children who completed before and after surveys for three videos and two children who completed before and after surveys for four videos. To protect the identities of the children, each child was assingned a code. For example, B01 would be the first boy to participate in taking a survey and G01 would be the first girl. All totaled, there were twenty three boys and eighteen girls who filled out at least one survey, not necessarily both a before and after. As mentioned earlier, no child completed all five sets of surveys. Child B05 completed three sets of surveys—lions, monkeys, and sea life (see Figure 21). He improved his score by 2 questions on the lions survey and the monkey survey. He improved his score by 1 question on the polyp survey. The average improvement on the lions survey for all children completing both a before and after survey was only 0.1 questions. The average improvement on the monkeys survey for all children completing both a before and an after survey was 0.1 questions. And the average improvement on the sea life survey for all children completing both a before and an after survey was a decrease of 0.1. On the before lions survey, B05 scored 5. On the after

lions survey, he scored 7. For the lions survey, his initial score was slightly below average and his final score was above average. His improvement was far above that of average. On the monkey survey, B05 had an initial score of 1 and a final score of 3. His initial score was well below the average of 2.6 and his final score was just above the average of 2.7. His improvement of two questions was well above the average improvement of only 0.1 questions. On the sea life survey, his initial score of five was somewhat above the average of 4.3. His final score of 6 was above the average of 4.2 and his improvement of 1 questions was very good compared to the fact that the average child saw a drop in performance of 0.1 questions.

G12 participated in three surveys—monkeys, leopards, and polyps (see Figure 20). Her scores remained the same in each survey. The average improvement for all children completing both a before and an after survey on the monkeys was 0.1; there was an increase of 0.6 for the leopard video for all children and a lowered average of 0.1 for the polyp survey for all children. Her scores of 2 for the monkey surveys were somewhat below the initial and final averages of 2.6 and 2.7. Her scores of 3 were slightly above the initial average value of 2.4 and in agreement with the final average value of 3. Her scores of five on the sea life survey were slightly above the averages of 4.3 for the initial survey and 4.2 for the final survey.

G02 completed three surveys—lions, monkeys and leopards (see Figure 17). She improved her score by one question for the lion video. Her score remained the same for the leopard video. Her score decreased by 1 for the monkey survey. The average score on the before survey of the lions video was 5.4. The average score on the after survey of

the lions video was 5.5. The average improvement was then 0.1. This child had an initial score of 3 on the lions video, well below average, and a final score for the lions video of 4, still below average. However, her improvement of 1 questions was above average. Child G02 had an initial score of 3 on the monkeys survey, just above the average of 2.6, and a final score of 2, below the average of 2.7. The average improvement was 0.1, but G02 showed an increase in wrong answers. Her scores of 2 on the leopards video were well below the initial and final averages of 2.4 and 3.0. While the average improvement was 0.6 questions, G02 showed no improvement.

G04 completed four sets of surveys (see Figure 18). On the lions survey, her initial score was 5, slightly below the average of 5.4. Her score on the after survey remained the same, as compared with the average 0f 5.5. The average child showed an improvement of 0.1 questions, whereas child G05 showed no improvement. The average on the initial monkeys survey was 2.6. G05 scored slightly above average answering three questions correctly. The final average on the monkeys survey was 2.7. Again, G04 scored just above average, but where as the average child showed an improvement of 0.1 questions, G04 showed none. The average initial and final scores on the leopards survey were 2.4 and 3.0 respectively. G04 answered four non-opinion questions on the before survey, well above average, but only two questions on the after survey. Child G04 showed a drop of 2 questions in going from the before to the after survey whereas the average child showed an improvement of 0.6 questions. G04 initially answered 4 of the 9 non-opinion questions correctly on the sea life survey, as compared with an average answer of 4.3. She was just below average. Her final score of 5 questions answered

correctly was above the average of 4.2 questions. The average dropped by 0.1 questions on the Polyp Power survey, and G04 managed to raise her score by one question.

Child G09 also completed four sets of surveys (see Figure 19). Her initial and final scores on the monkeys survey were 4 and 1 respectively. The average initial and final results were 2.6 questions answered correctly out of 8 and 2.7 respectively. Whereas the average child saw a very slight increase in score, G09 saw her score fall by three questions. For the Tasmania survey, G09 saw no change in her score of 2. The initial average was 2.3 and the final average was 3.4. G09 was below average in each case and dropped further below average for the final response score. G09 answered 3 questions correctly on the leopard survey. With an initial average of 2.4, G09 was slightly above average. The final average for the leopards survey was 3. There was an average improvement of 0.6 questions whereas child G09 showed none. G09 answered two questions correctly on the sea life survey. The averages were 4.3 and 4.2. In both cases G09 was below average in her responses.

As our week at the Boys and Girls Club progressed, B05 generally seemed to be doing a little bit better in his responses. G02 was consistently below average. G12 showed consistent improvement as time went on. G04, with the exception of the leopards video, showed consistent improvement. G09, who was one of the lowest scorers on the after monkeys survey, improved her subsequent scores and at least remained constant for the rest of the week.

Conclusions

People's opinions are affected by television. A show may give them a misconstrued view of how the world really is. This is especially true with nature programs. Like all other programs in the mass media, they are governed by ratings. If people do not want to watch it, it is canceled. This has led to wildlife programs about very few animals, and the great majorities are mammals or birds. Most people favor these animals. (Kellert, 1993) These animals' behaviors are also misrepresented in these programs. People do not want to watch a lion sleep; they want to see it on the hunt ferociously killing an impala. There is little research connecting wildlife programs with perceptions of animals especially for younger children.

According to Kellert's research, younger children have less knowledge about animals and the environment than older children and adults. They were observed to show little interest or concern in animal rights. The PBS series *Kratts' Creatures* produced by Paragon Entertainment Corp., Maryland Public Television and the Earth Creatures Company is attempting to change children's' opinions. The series' first goal is to instill an interest in animals. The second goal is to then educate the children about these animals. The success of these goals were investigated by showing five episodes to children at the Boys' and Girls' Club of Worcester and having them answer a written survey before and after each episodes. Each was shown on a different day.

The sample audience was much smaller than expected and limited the results. There were not enough responses to perform a statistical analysis, but trends were

observed. We believe that these trends would also appear in a larger sample group. The age of group was also unevenly distributed. The majority of the participants were seven and eight year olds. The series is aimed at ages seven through twelve. A slightly older audience was expected. The surveys were written at a median level for seven through twelve-year-olds. The larger younger population led to some difficulty in gathering information from the survey. Many of the children had trouble reading and comprehending the questions. The questions had to be read to many of them. No bias was given to possible answers while reading the question. The data is an accurate view of the children's perceptions, but it must be emphasized that a small number of children participated.

The series *Kratts' Creatures* had a positive effect on the children's perceptions of many animals. Most species were better like after viewing the episode. The program met its most important goal of instilling an interest in animals. However, the educational aspect of the program did not have as noticeable an effect. The episodes are full of information, but the children did not retain most of it. The facts in the videos were presented too quickly for the children to grasp. Information was also rarely repeated. Young children would be better able to learn from the series if less information was presented in each episode. This would also greater time and repetition to be given to the facts.

The videos did not explain the importance of conservation in most episodes. Most of the creatures presented were on the 1996 IUCN Red List of Threatened Species. The children liked the animals, but in most cases did not realize that they were in danger

of extinction. The series has the ability to raise concern for the animals of the world, but chooses not to.

Children who viewed several episodes did not perform above average on the later surveys. Watching the series over a short time did not increase their general knowledge about animals any more than viewing a single episode. However, over a more extended period they may be seen to change.

Future studies should include an extended view of the series. Some episodes repeat information. Perhaps after a few repetitions the children would learn the concepts. Studies should also be conducted on a larger scale. A larger sample audience is needed to ensure the statistical significance of the results. Difference may also be seen in the age group within the target audience. Seven-year-olds may continue to have difficulties while the older children do not.

We would advise verbal testing of the sample audience. Seven-year-olds had too much difficulty with written questions. While this means of surveying is far more expensive and time consuming, it would ensure that the children completely understand each question.

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Appendix A

General Preferences Survey

Name _____

Age _____

Grade _____

Boy Girl

1. Which of these have you had as a pet?

Dog	Ferret
Cat	Rabbit
Fish	Guinea pig
Horse	Hamster
Bird	Mouse
Turtle	Gerbil
Frog	Raccoon
Lizard	Pig
Spider	Other _____

I've never had a pet.

2. How many times have you been to the zoo?
   a. never
   b. 1-2
   c. 3-5
   d. 6 or more

3. How many times have you been to the aquarium?
   a. never
   b. 1-2
   c. 3-5
   d. 6 or more

4. How many times have you been to the museum?
    a. never
    b. 1-2
    c. 3-5
    d. 6 or more

5. How many times have you been to the circus?
    a. never
    b. 1-2
    c. 3-5
    d. 6 or more

6. Do you like to read books about animals?

    Yes No

7. How many books have you read this year about animals?
    a. I haven't read any books about animals this year.
    b. 1-2
    c. 3-5
    d. 6 or more

8. Do you like to watch TV shows about animals?

    Yes No

9. About how many hours per week do you spend watching TV shows about animals?
    a. I don't watch TV shows about animals.
    b. 1-2
    c. 3-5
    d. 6 or more

10. Which shows or channels do you watch?

Zoboomafoo	Nova
Kratts' Creatures	The Learning Channel
Jack Hanna's Animal Adventures	Discovery Channel
Animal Planet	Other _____

11. Which of these activities do you do?

Fishing

Hunting

Camping

Horseback riding

Feed the birds

4 H club

Girl scouts/Boy scouts

Lion, King of the Beasts? Survey

1. Circle the lion.

2. What is the biggest cat in the world?
    a. Siberian Tiger
    b. Lion
    c. Cheetah
    d. Lynx

3. Lions can't climb trees.

    TRUE FALSE

4. Lions are good swimmers.

    TRUE FALSE

5. Lions live:
    a. alone
    b. in groups

6. Which of these animals steals food from lions?
    a. hyenas
    b. zebras
    c. other animals don't steal food from lions
    d. hippos

a. during the day
b. in winter
c. in summer
d. at night

8. In the wild, lions live:
    a. in North America
    b. in Australia
    c. in Africa
    d. in Europe

9. Do you think lions are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

10. How do you feel about lions?
    a. I love them.
    b. I like them.
    c. They are okay.
    d. I don't like them.
    e. I hate them.

Name: _____

Hangin' with the Monkeys Survey

1. The tropical forest can be found in
    a. Alaska
    b. Central America
    c. Europe
    d. Antarctica

2. How many types of tropical forest are there?

    1 2 3 4

3. An ocelot is a type of
    a. monkey
    b. snake
    c. cat
    d. bird

4. A capuchin is a type of
    a. monkey
    b. snake
    c. cat
    d. bird

5. Do you think capuchins are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

6. Do you think spider monkeys are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

7. How smart do you think monkeys are?
    a. They are not smart at all.
    b. They are not very smart.
    c. They are a little smart.
    d. They are really smart.
    e. They are smarter than people are.

8. How do you feel about monkeys?
    a. I love them.
    b. I like them.
    c. They are okay.
    d. I don't like them.
    e. I hate them.

9. You can hear a howler monkey ½ mile away.

    TRUE FALSE

10. Monkeys in Africa have prehensile tails (tails that can be used to hold onto things)

    TRUE FALSE

11. Which of these is the smallest monkey?
    a. spider monkey
    b. squirrel monkey
    c. pygmy marmoset
    d. chimpanzee

12. Most monkeys like to live
    a. alone
    b. in groups

Name:_____

In Search of the Tasmanian Tiger Survey

1. Tasmania is:
    a. a cartoon character
    b. a country in southern Asia
    c. an island off the coast of Australia
    d. a large city in Western Africa

2. What happens if a tiger snake bites itself?
    a. It can't bite itself.
    b. It dies because it has poisoned itself.
    c. It does not die because it is not poisonous.
    d. It is safe from its own poison.

3. What is a "kookaburra"?
    a. a kind of squirrel
    b. a kind of bird
    c. a kind of kangaroo
    d. a kind of bat

4. Why does a kookaburra "laugh"?
    a. to let other kookaburras know that they are on his territory
    b. to warn other kookaburras in the area
    c. to scare away animals that eat the kookaburra
    d. it is a mating call

5. The dingo, a type of wild dog, lives in Tasmania and Australia.

    TRUE FALSE

6. A long, long time ago Tasmanian Devils and Tasmanian Tigers used to live in Australia.

    TRUE FALSE

7. What do Tasmanian Devils like to eat?
    a. They eat fresh fruits and vegetables.
    b. They catch small birds, frogs, and bugs.
    c. They dig for mushrooms and fungi.
    d. They eat dead, rotten animals.

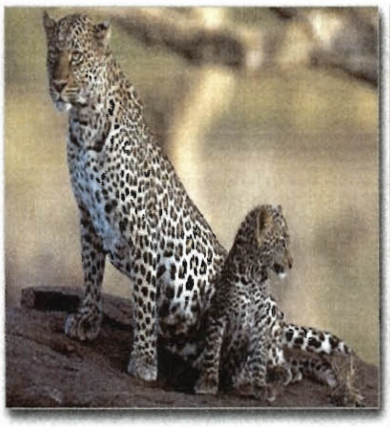
8. Where do the babies of Tasmanian Devils live?
    a. in their parents pouch
    b. in their parents burrow
    c. in their parents nest
    d. they live on their own

9. Do you think Tasmanian Devils are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

10. Do you think Tasmanian Tigers are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

Leopard, Prince of Stealth Survey

1. Circle the leopard.


2. An "herbivore" is an animal that:
    a. eats only other animals
    b. eats only plants
    c. eats both animals and plants
    d. eats only during the day

3. In the wild, leopards live:
    a. in Australia
    b. in North America
    c. in South America
    d. in Africa and Asia

4. During the day a leopard will spend most of its time:
    a. in a tree
    b. in a burrow
    c. in the water
    d. in the sun

5. Leopards like to hunt in groups.
    TRUE FALSE

6. Why does the leopard have spots?
    a. They help the leopard hide and sneak up on other animals.
    b. They help to keep the animal cool.
    c. A leopard doesn't have any spots.
    d. They help the leopard find other leopards.

7. A "carnivore" is an animal that eats other animals. Why are carnivores important?
    a. Carnivores help to eat the plants so there is enough room for all the animals.
    b. Carnivores protect other animals.
    c. Some animals have to eat other animals so there won't be too many.
    d. Carnivores are not important.

8. Do you think leopards are in danger of becoming extinct (all are dead)?
    a. They are not in danger.
    b. They are in a little danger.
    c. They are in some danger.
    d. They are in lots of danger.
    e. They are almost all dead now.
    f. They are all dead now.

9. How do you feel about leopards?
    a. I love them.
    b. I like them.
    c. They are okay.
    d. I don't like them.
    e. I hate them.

Name:_____

Appendix B

Lion, King of the Beasts?

Question	Answers	Before	After	Correct Answer
1	1	4%	0%	
	2	96%	100%	2
	3	0%	0%	
	Not answered	0%	0%	
2	A	32%	36%	A
	B	52%	64%	
	C	4%	0%	
	D	12%	0%	
	Not answered	0%	0%	
3	T	32%	36%	T
	F	60%	64%	
	Not answered	8%	0%	
4	T	20%	9%	T
	F	72%	82%	
	Not answered	8%	9%	
5	A	4%	9%	
	B	92%	91%	B
	Not answered	4%	0%	
6	A	64%	82%	A
	B	4%	0%	
	C	32%	18%	
	D	0%	0%	
	Not answered	0%	0%	
7	A	32%	18%	
	B	4%	9%	
	C	24%	9%	
	D	40%	64%	D
	Not answered	0%	0%	
8	A	16%	9%	
	B	8%	18%	
	C	68%	64%	C
	D	4%	0%	
	Not answered	4%	9%	

9	A	36%	45%%	
	B	16%	27%%	B
	C	16%	9%%	
	D	20%	0%	
	E	0%	0%	
	F	8%	9%	
	Not answered	4%	9%	
10	A	52%	64%	
	B	16%	18%	
	C	24%	9%	
	D	0%	0%	
	E	8%	9%	
	Not answered	0%	0%	

Hangin' with the Monkeys

Question	Answers	Before	After	Correct Answer
1	A	60%	57.14%	
	B	33.33%	28.57%	B
	C	6.67%	7.14%	
	D	0%	7.14%	
	Not answered	0%	0%	
2	1	0%	0%	
	2	0%	0%	
	3	20%	21.43%	3
	4	80%	78.57%	
	Not answered	0%	0%	
3	A	80%	57.14%	
	B	0%	7.14%	
	C	13.33%	21.43%	C
	D	6.67%	7.14%	
	Not answered	0%	7.14%	
4	A	46.67%	71.43%	A
	B	40%	21.43%	
	C	13.33%	7.14%	
	D	0%	0%	
	Not answered	0%	0%	
5	A	46.67%	50%	
	B	13.33%	21.43%	B
	C	6.67%	7.14%	
	D	6.67%	0%	
	E	20%	14.29%	
	F	6.67%	7.14%	
	Not answered	0%	0%	
6	A	46.67%	57.14%	
	B	13.33%	21.43%	B
	C	20%	7.14%	C
	D	13.33%	0%	
	E	13.33%	14.29%	
	F	0%	7.14%	
	Not answered	0%	0%	

7	A	20%	28.57%	
	B	6.67%	14.29%	
	C	20%	28.57%	
	D	53.33%	21.43%	
	E	0%	7.14	
	Not answered	0%	0%	
8	A	53.33%	71.43%	
	B	26.67%	14.29%	
	C	13.33%	7.14%	
	D	6.67%	0%	
	E	0%	7.14	
	Not answered	0%%	0%	
9	T	46.67%	64.29%	T
	F	46.67%	35.71%	
	Not answered	6.67%	0%	
10	T	73.33%	78.57%	
	F	26.67%	21.43%	F
	Not answered	0%	0%	
11	A	13.33%	64.29%	
	B	20%	21.43%	
	C	13.33%	14.29%	C
	D	53.33%	0%	
	Not answered	0%	0%	
12	A	26.67%	42.86%	
	B	60%	50%	B
	Not answered	13.33%	7.14%	

In Search of the Tasmanian Tiger

Question	Answers	Before	After	Correct Answer
1	A	77.78%	42.86%	
	B	11.11%	42.86%	
	C	0%	0%	C
	D	11.11%	14.29%	
	Not answered	0%	0%	
2	A	44.44%	42.86%	
	B	22.22%	14.29%	
	C	22.22%	14.29%	
	D	11.11%	28.57%	D
	Not answered	0%	0%	
3	A	0%	0%	
	B	66.67%	71.43%	B
	C	11.11%	28.57%	
	D	22.22%	0%	
	Not answered	0%	0%	
4	A	33.33%	28.57%	A
	B	11.11%	14.29%	
	C	22.22%	28.57%	
	D	33.33%	28.57%	
	Not answered	0%	0%	
5	A	55.56%	42.86%	
	B	11.11%	0%	
	C	0%	28.57%	
	D	0%	28.57%	
	E	11.11%	0%	
	F	0%	0%	
	Not answered	0%	0%	
6	T	77.78%	57.14%	
	F	22.22%	42.86%	F
	Not answered	0%	0%	
7	T	77.78%	100%	T
	F	22.22%	0%	
	Not answered	0%	0%	

8	A	22.22%	28.57%	
	B	77.78%	28.57%	
	C	0%	0%	
	D	0%	42.86%	D
	Not answered	0%	0%	
9	A	0%	28.57%	A
	B	33.33%	14.29%	
	C	44.44%	42.86%	
	D	11.11%	14.29%	
	Not answered	11.11%	0%	
10	A	33.33%	14.29%	
	B	33.33%	14.29%	
	C	11.11%	14.29%	
	D	0%	42.86%	
	E	22.22%	0%	
	F	0%	14.29%	
	Not answered	0%	0%	
11	A	33.33%	14.29%	
	B	22.22%	0%	
	C	22.22%	57.15%	
	D	11.11%	14.29%	
	E	11.115	0%	
	F	0%	14.29%	F
	Not answered	0%	0%	

Leopard, Prince of Stealth

Question	Answers	Before	After	Correct Answer
1	1	13%	0%	
	2	67%	100%	2
	3	0%	0%	
	Not answered	20%	0%	
2	A	40%	36.4%	
	B	40%	27.3%	B
	C	13%	36.4%	
	D	0%	0%	
	Not answered	7%	0%	
3	A	33%	18.2%	
	B	27%	27.3%	
	C	7%	18.2%	
	D	27%	36.4%	D
	Not answered	0%	0%	
4	A	40%	36.4%	A
	B	20%	45.5%	
	C	20%	9.1%	
	D	13%	9.1%	
	Not answered	7%	0%	
5	T	60%	36.4%	
	F	27%	54.5%	F
	Not answered	13%	9.1%	
6	A	27%	27.27%	A
	B	47%	36.36%	
	C	0%	9.09%	
	D	13%	27.27%	
	Not answered	13%	0%	
7	A	40%	18.18%	
	B	27%	45.45%	
	C	20%	36.36%	C
	D	7%	0%	
	Not answered	7%	0%	

8	A	27%	18.18%	
	B	13%	36.36%	
	C	13%	0%	
	D	27%	27.27%	D
	E	7%	9.09%	
	F	7%	9.09%	
	Not answered	7%	0%	
9	A	47%	27.27%	
	B	27%	45.45%	
	C	7%	0%	
	D	0%	9.09	
	E	13%	18.18%	
	Not answered	7%	0%	

Polyp Power!

Question	Answers	Before	After	Correct Answer
1	A	50%	66.67%	
	B	41.67%	33.33%	B
	C	8.33%	0%	
	D	0%	0%	
	Not answered	0%	0%	
2	T	50%	50%	T
	F	41.67%	50%	
	Not answered	8.33%	0%	
3	A	8.33%	16.67%	
	B	25%	50%	
	C	25%	0%	C
	D	25%	16.67%	
	Not answered	16.67%	16.67%	
4	A	33.33%	16.67%	
	B	16.67%	16.67%	
	C	16.67%	16.67%	
	D	33.33%	50%	D
	Not answered	0%	0%	
5	A	16.67%	16.67%	
	B	16.67%	0%	
	C	8.33%	50%	C
	D	58.33%	33.33%	
	Not answered	0%	0%	
6	P	58.33%	50%	
	A	41.67%	50%	A
	Not answered	0%	0%	
7	P	25%	0%	
	A	75%	100%	A
	Not answered	0%	0%	
8	P	58.33%	66.67%	
	A	41.67%	16.67%	A
	Not answered	0%	16.67%	

9	A	8.33%	0%	
	B	83.33%	83.33%	A
	Not answered	8.33%	16.67%	

Appendix C

Figure 1--Lions

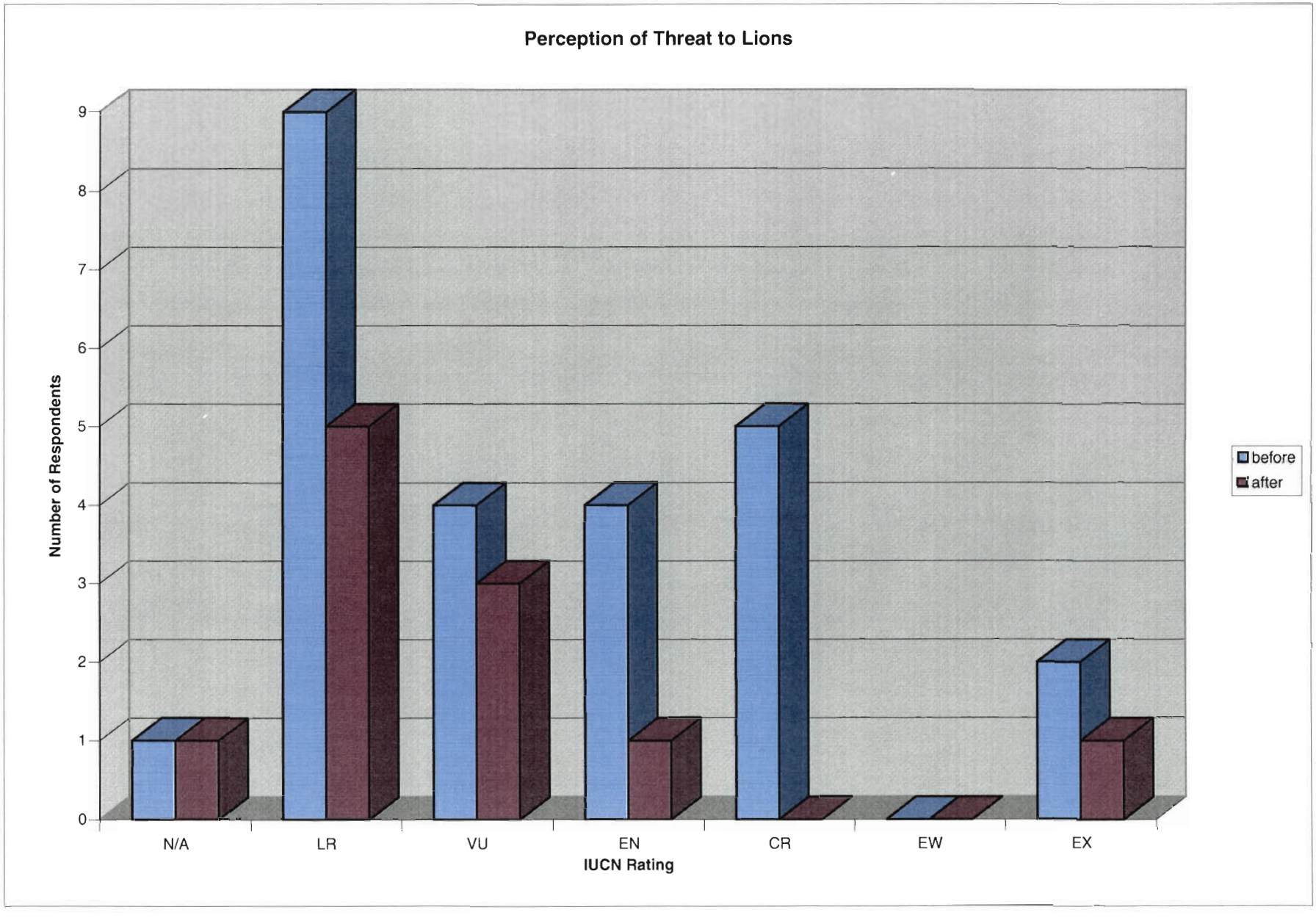


Figure 2--Leopards

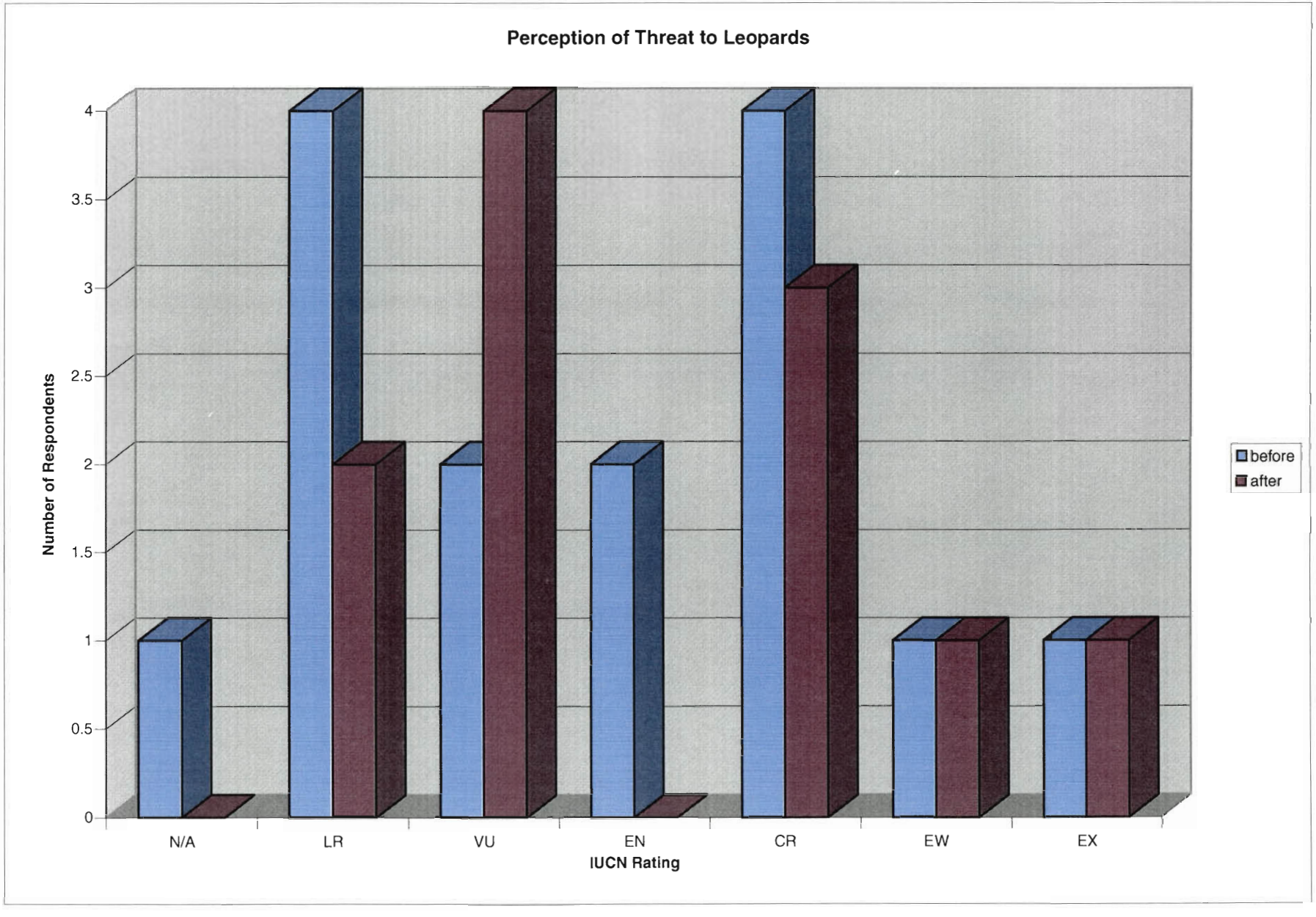


Figure 3--Tasmanian Devils

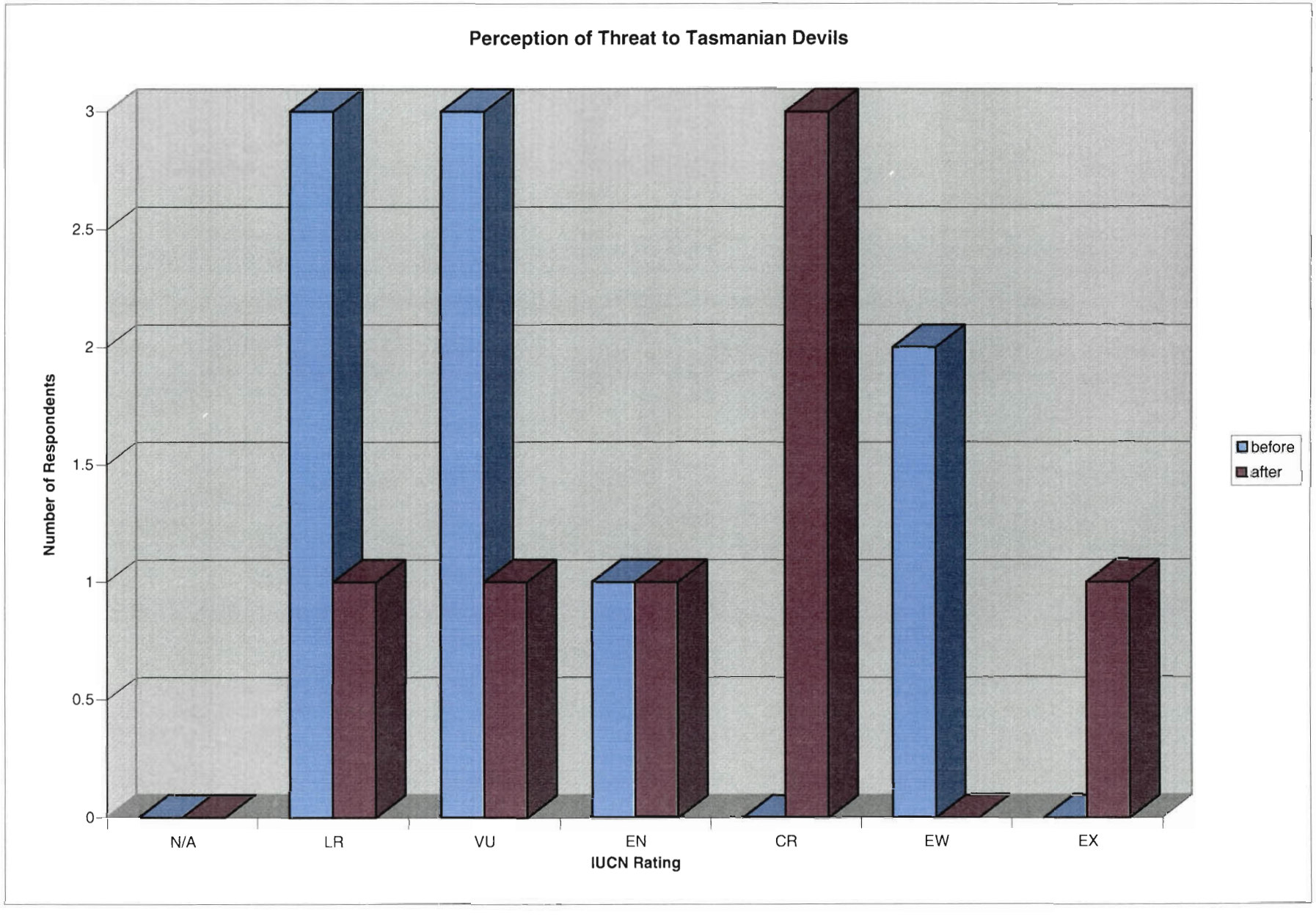


Figure 4--Tasmanian Tigers

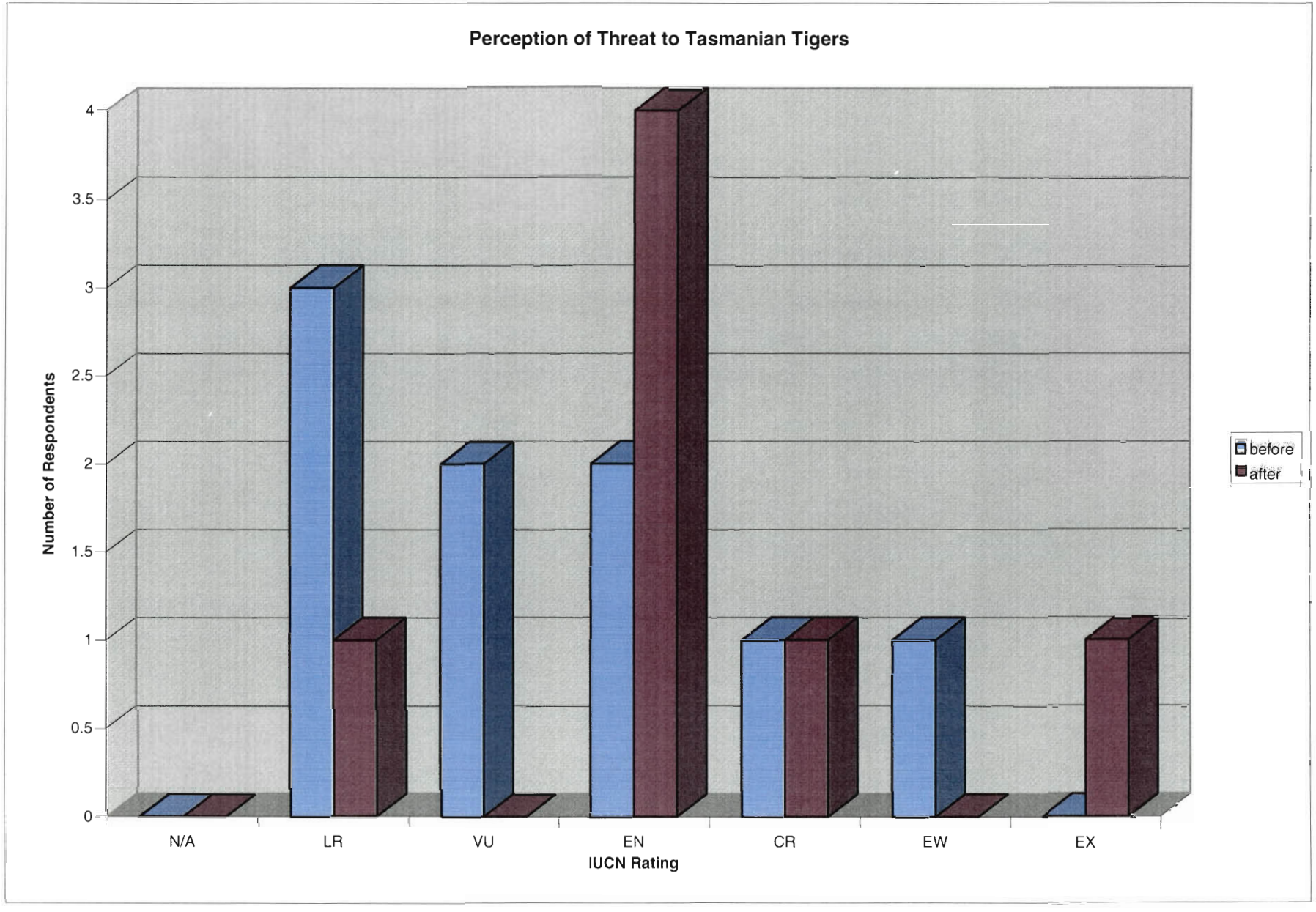


Figure 5--Kookaburras

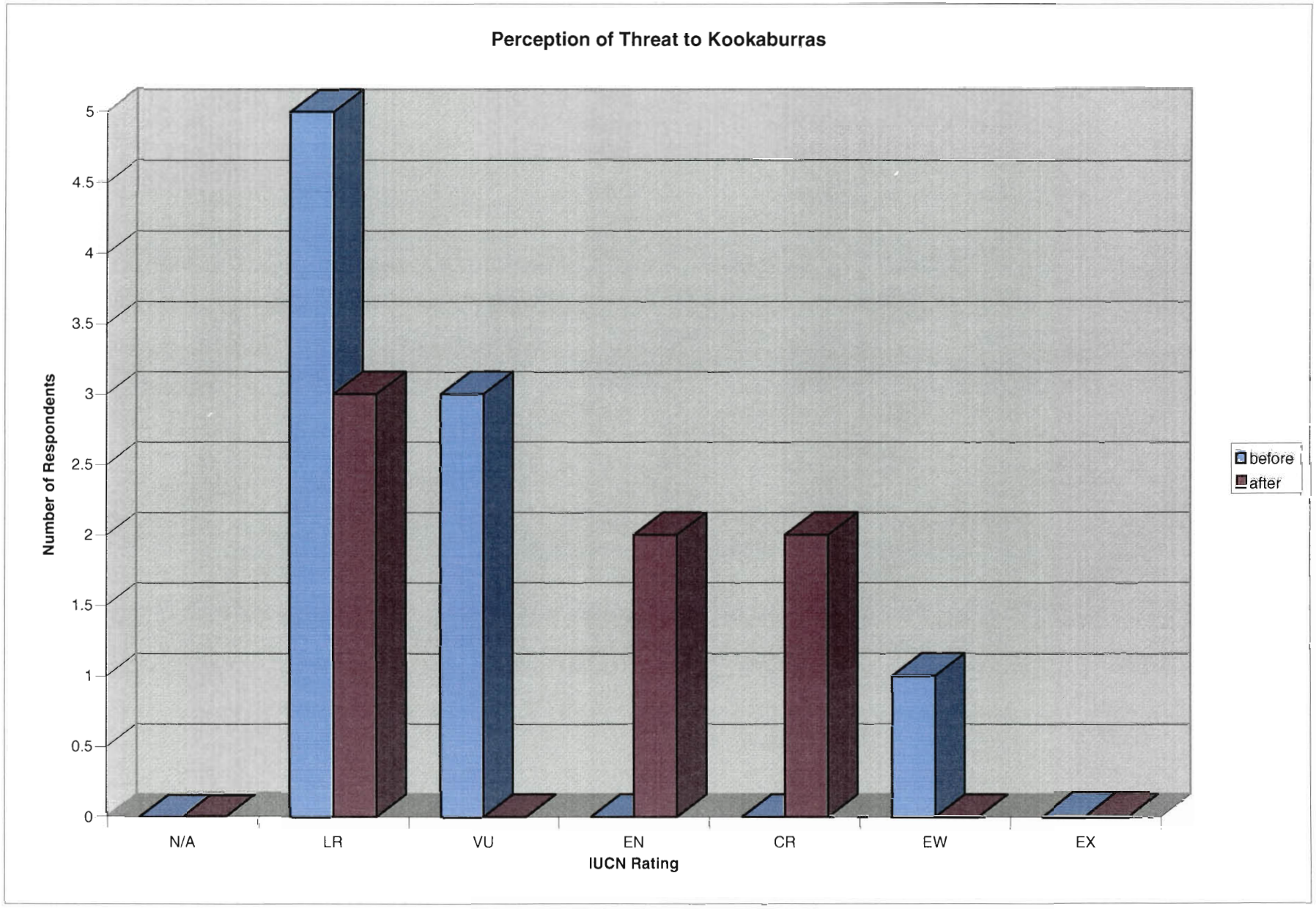


Figure 6--Capuchin Monkeys

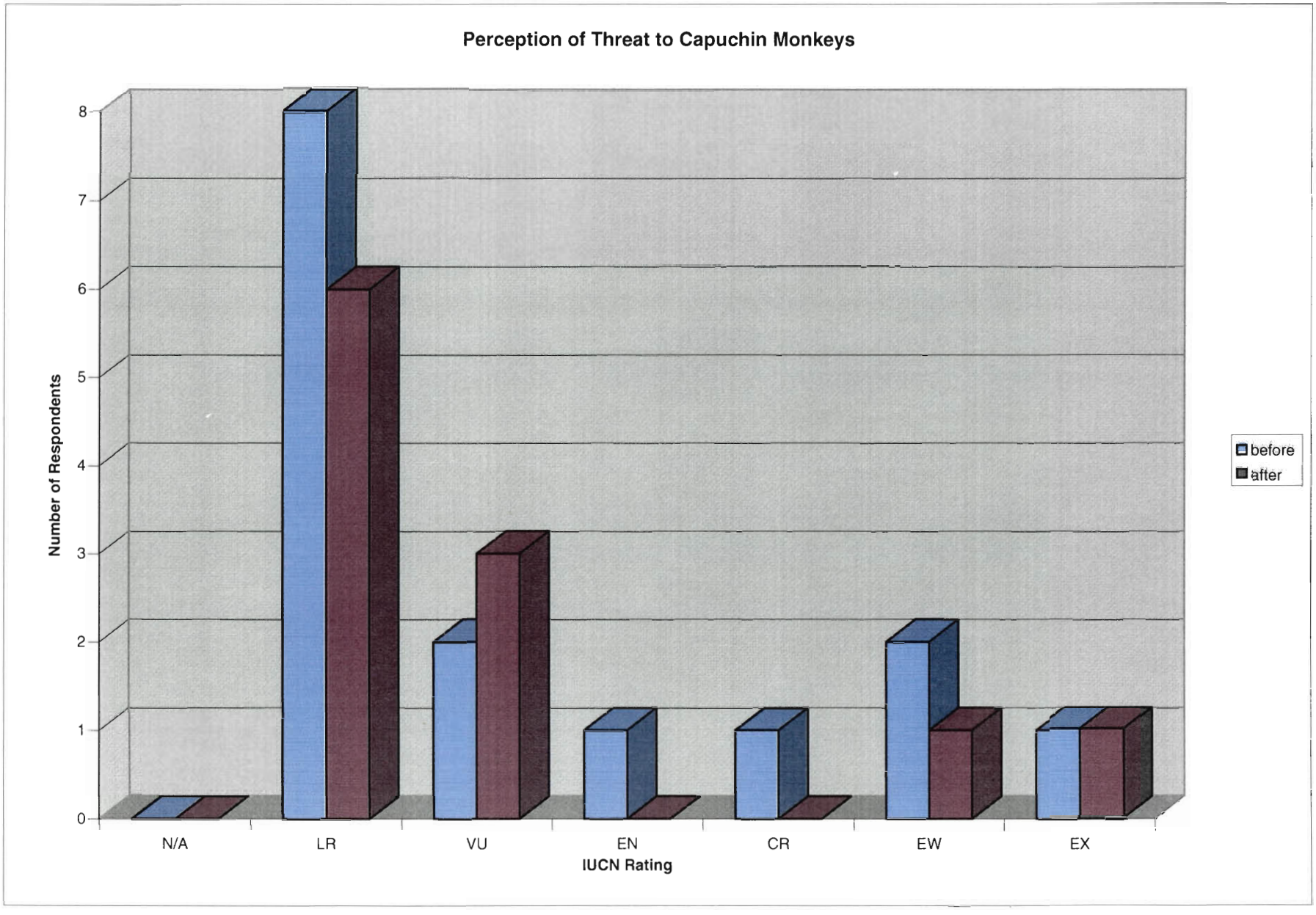


Figure 7--Spider Monkeys

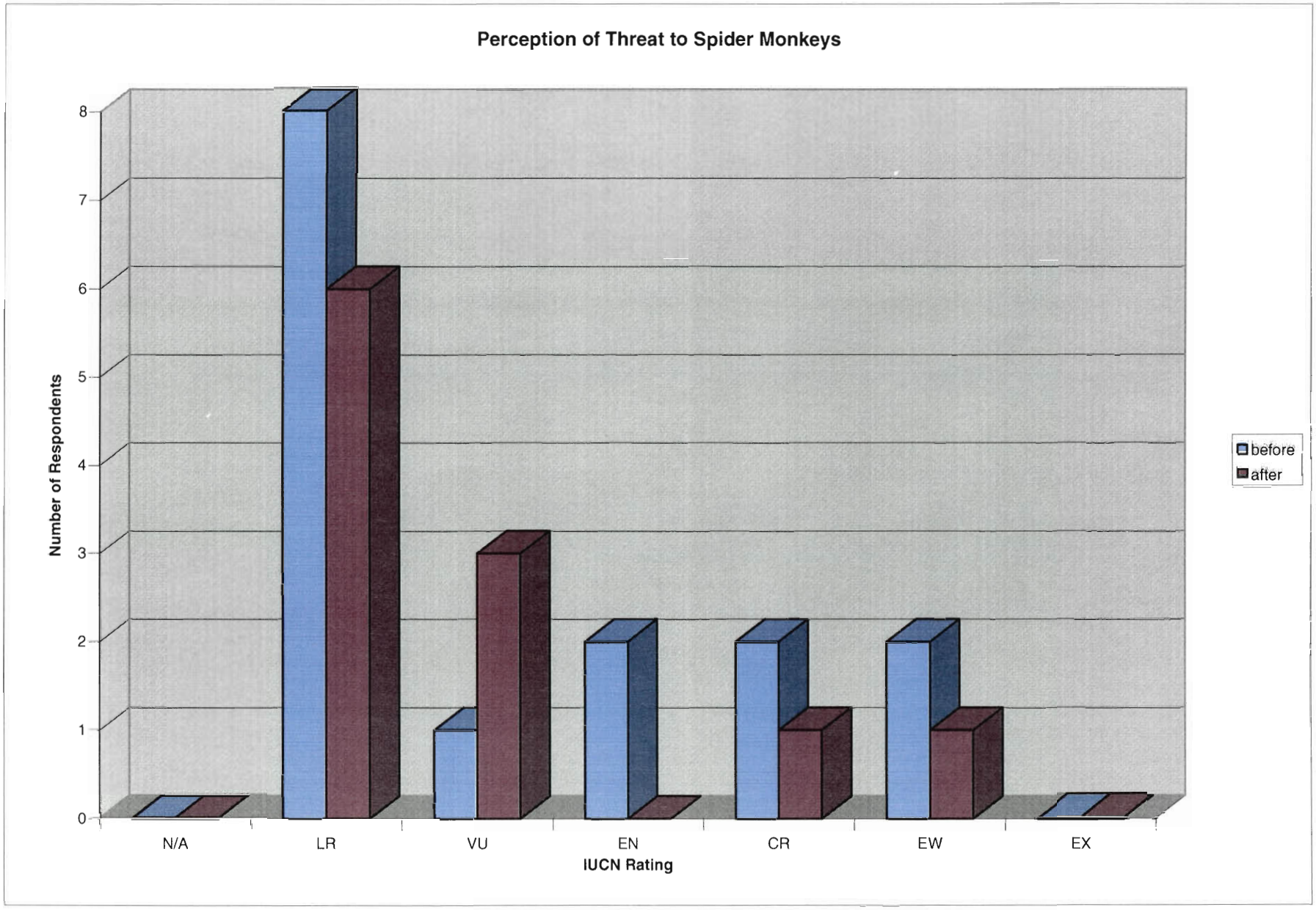


Figure 8--ID of Lion

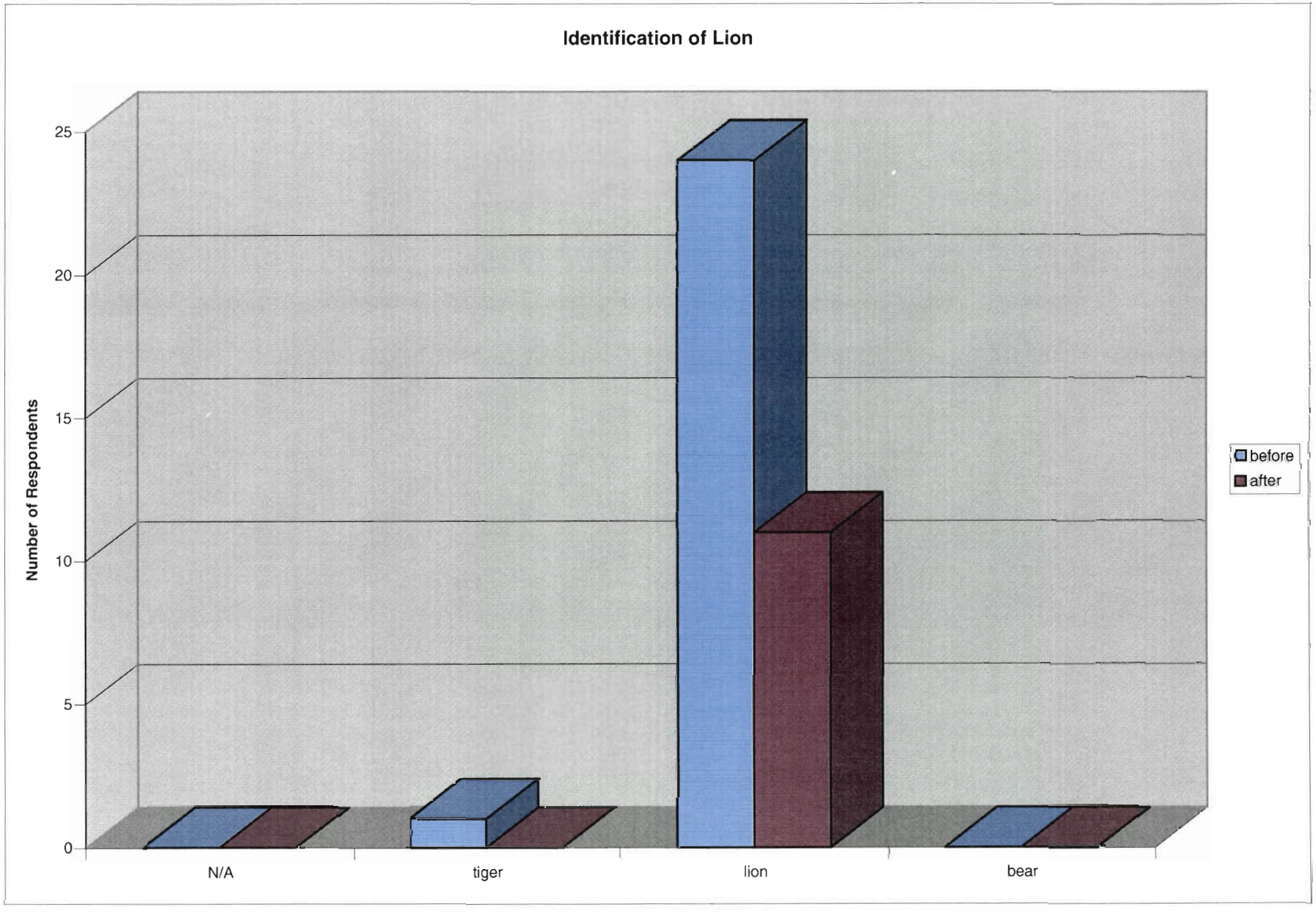


Figure 9--ID of Leopard

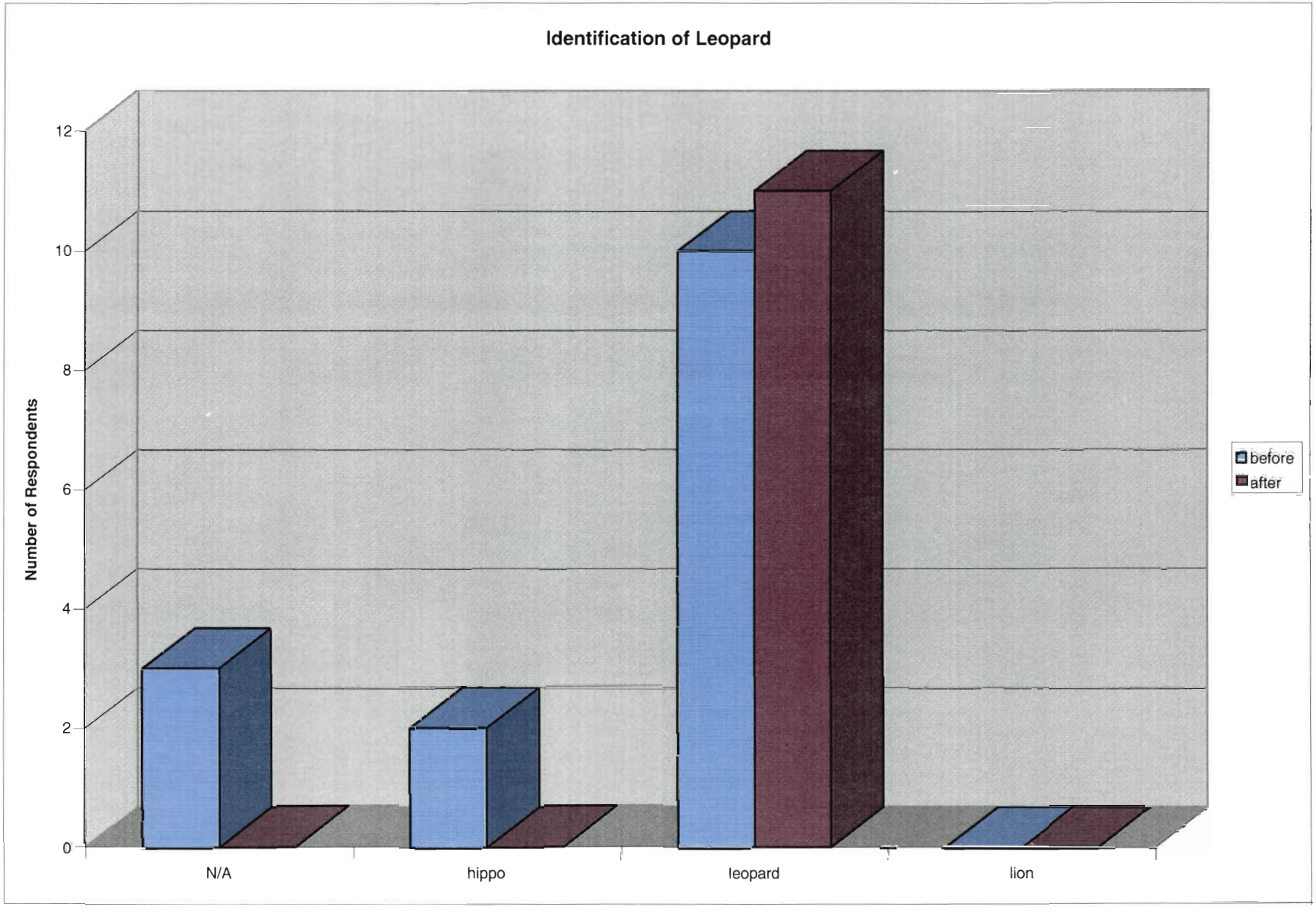


Figure 10--ID of Sea Anemone

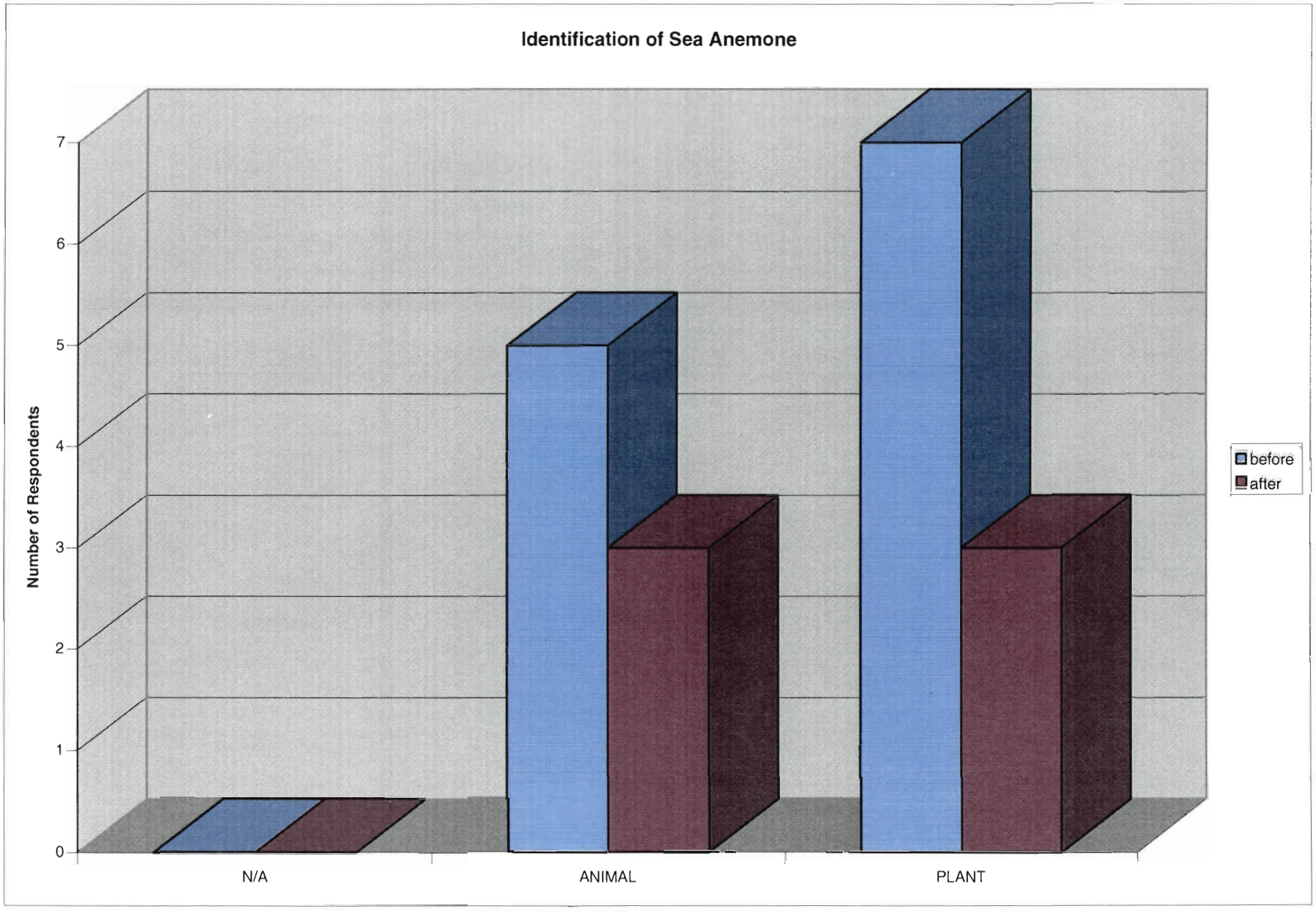


Figure 11--ID of Jellyfish

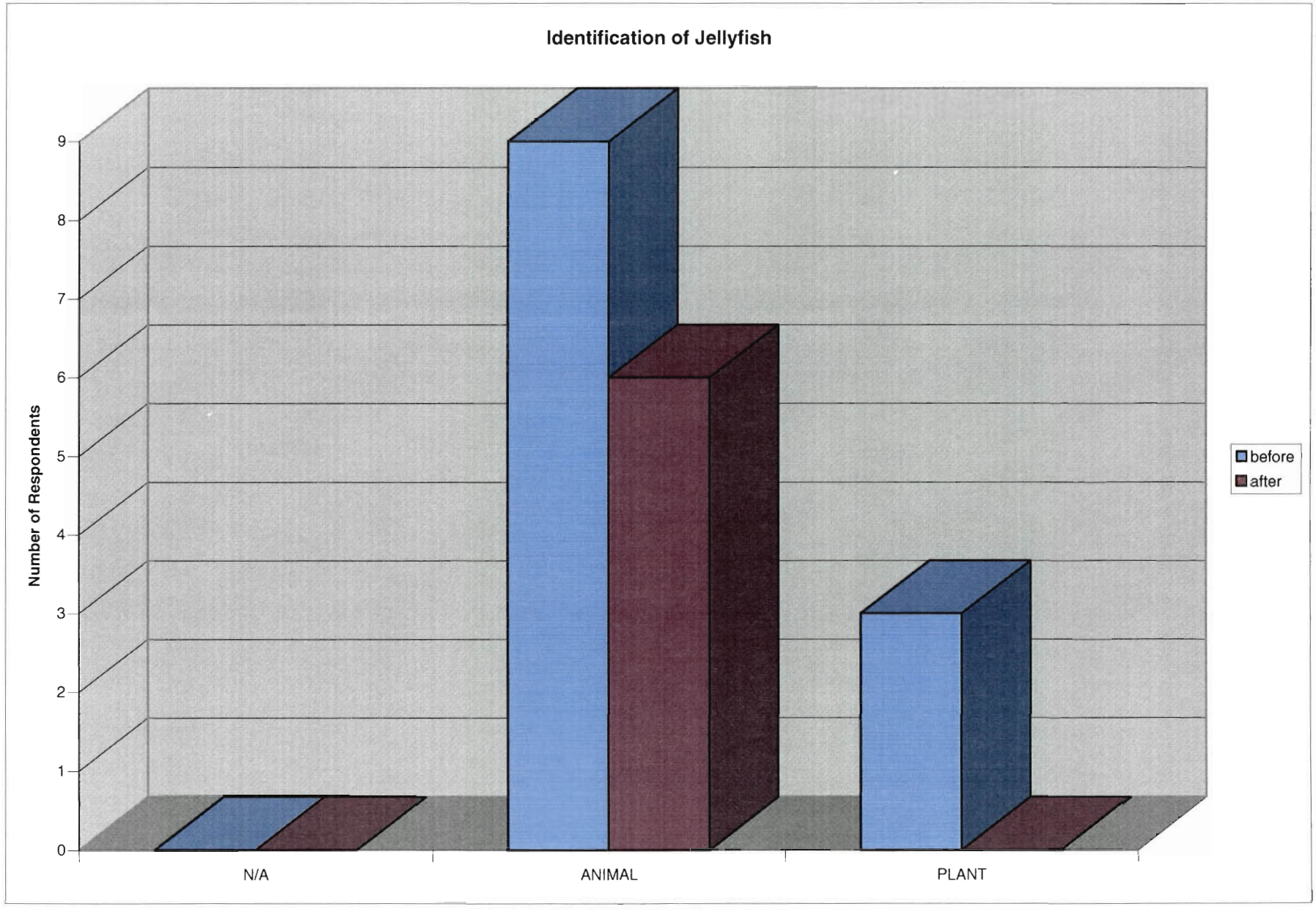


Figure 12--ID of Sponge

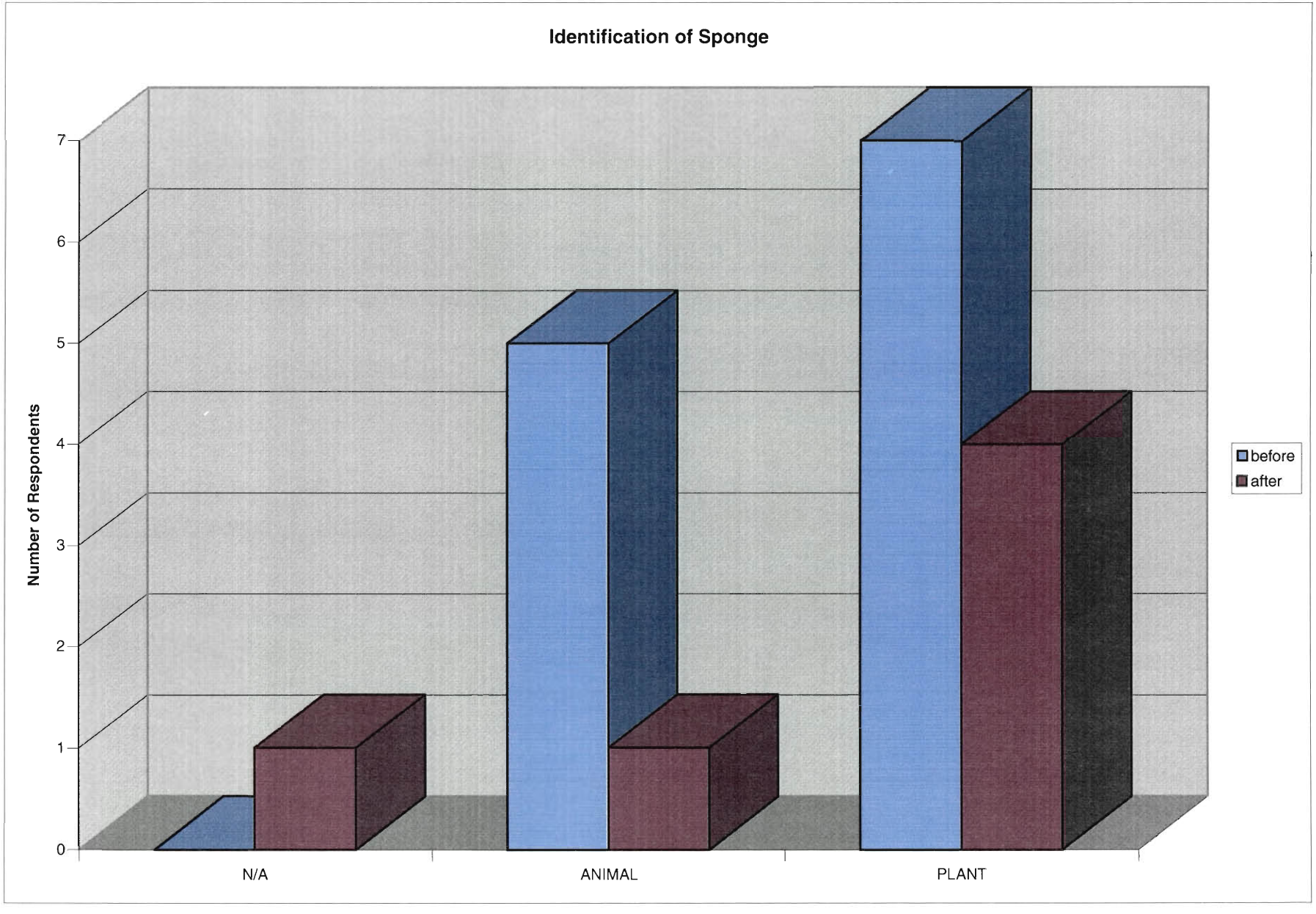


Figure 13--ID of Sea Star

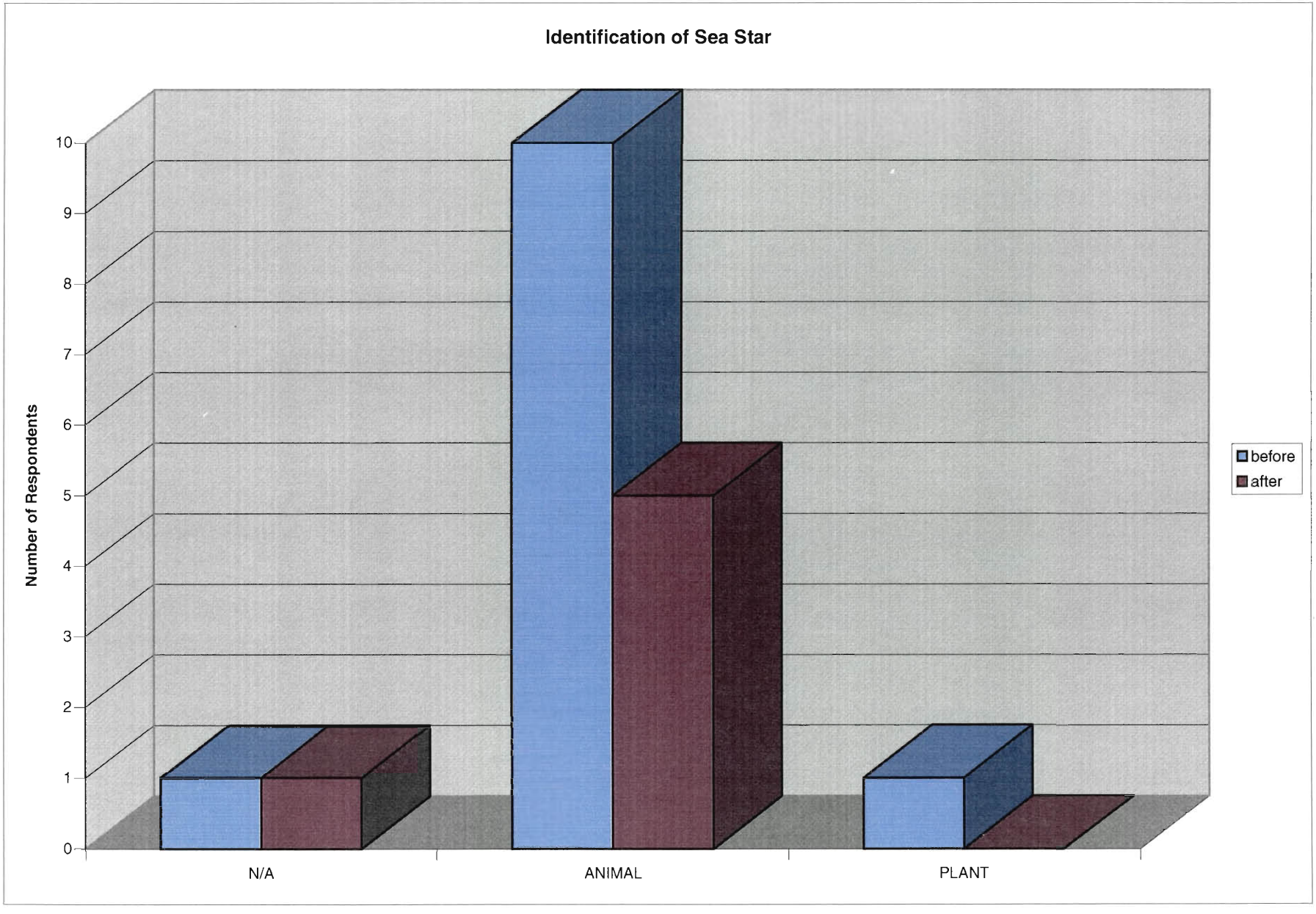


Figure 14--What is Tasmania?

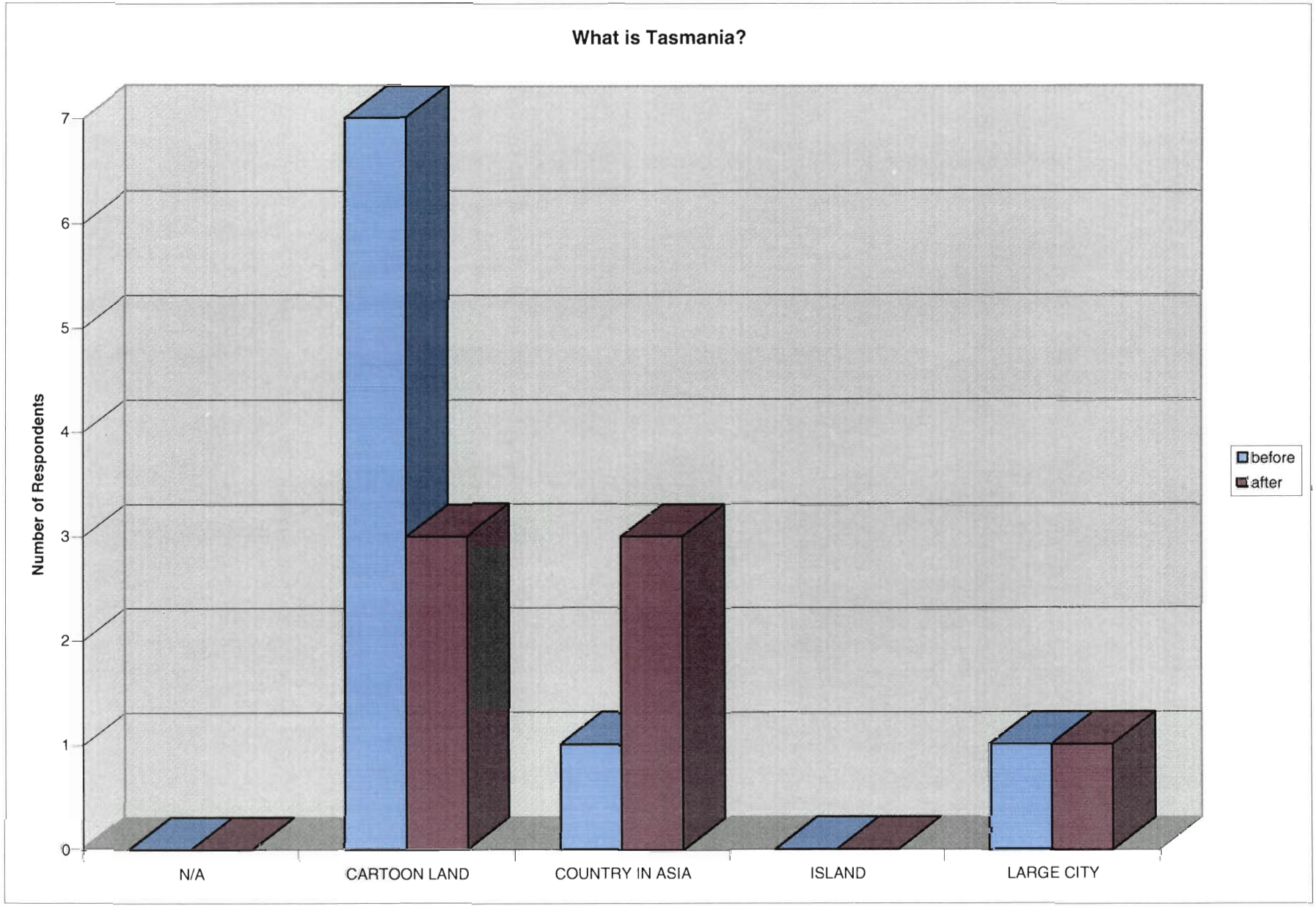


Figure 15--Where is the Great Barrier Reef?

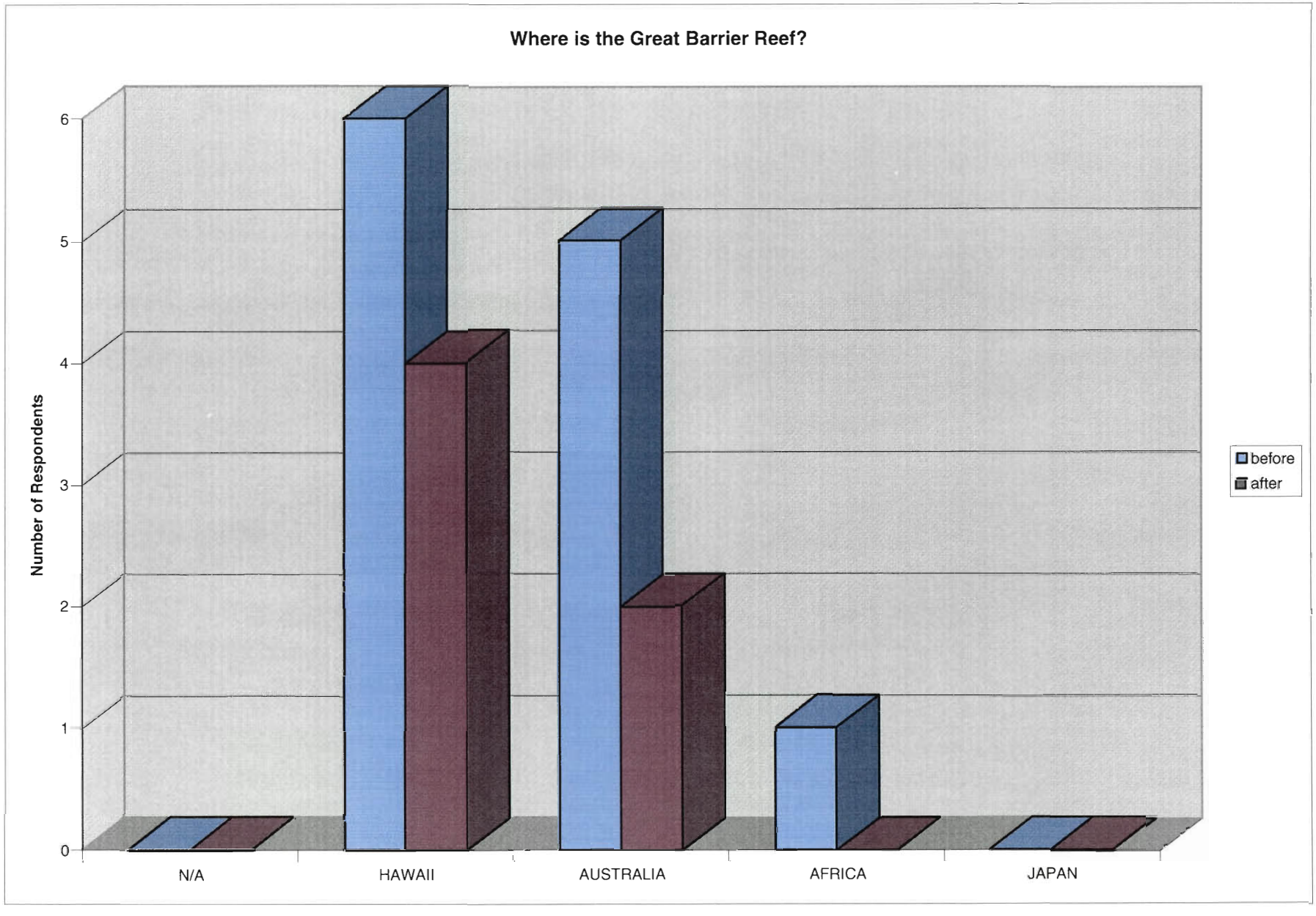


Figure 16--Where is the tropical forest located?

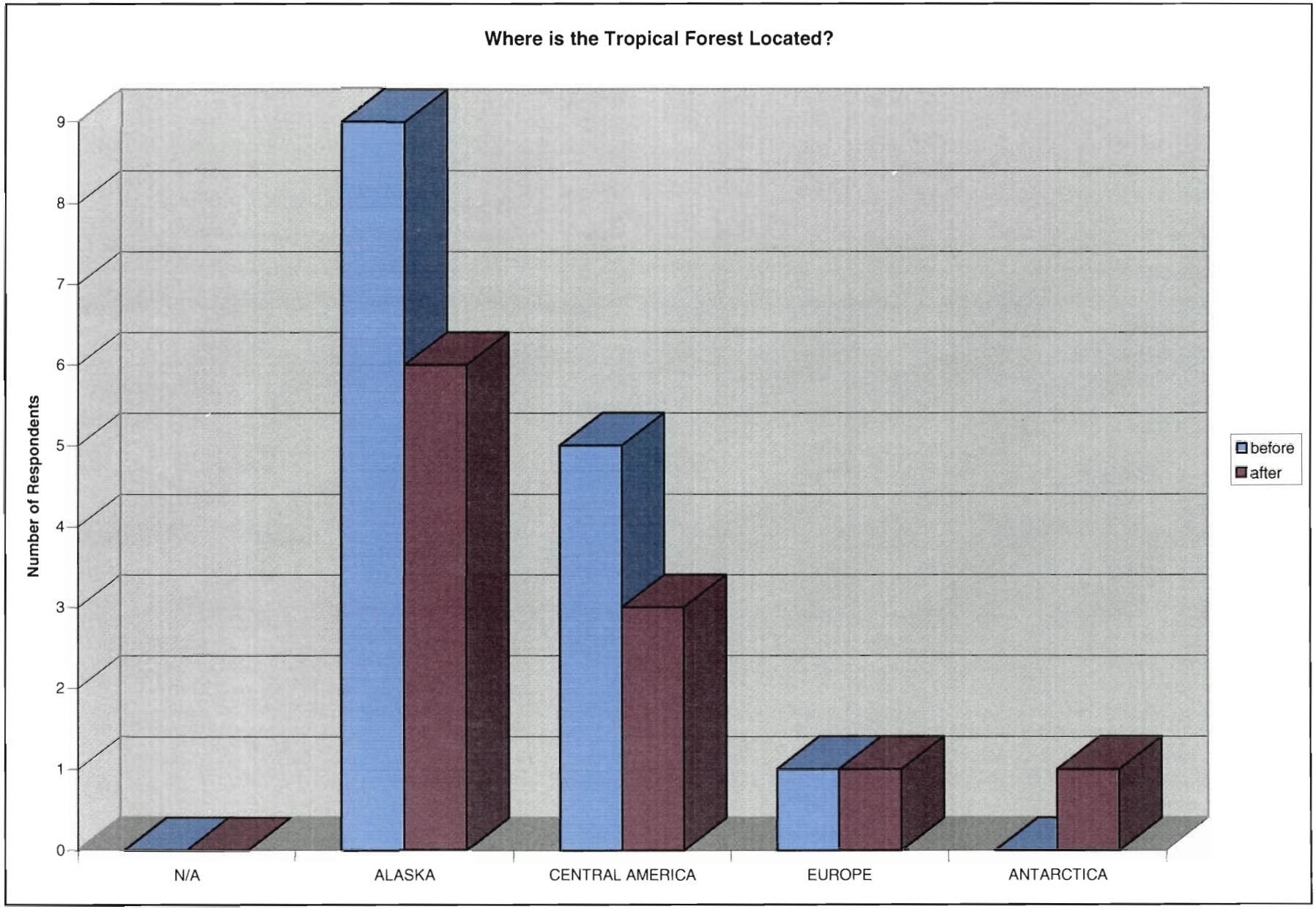


Figure 17--Correct Responses for G02

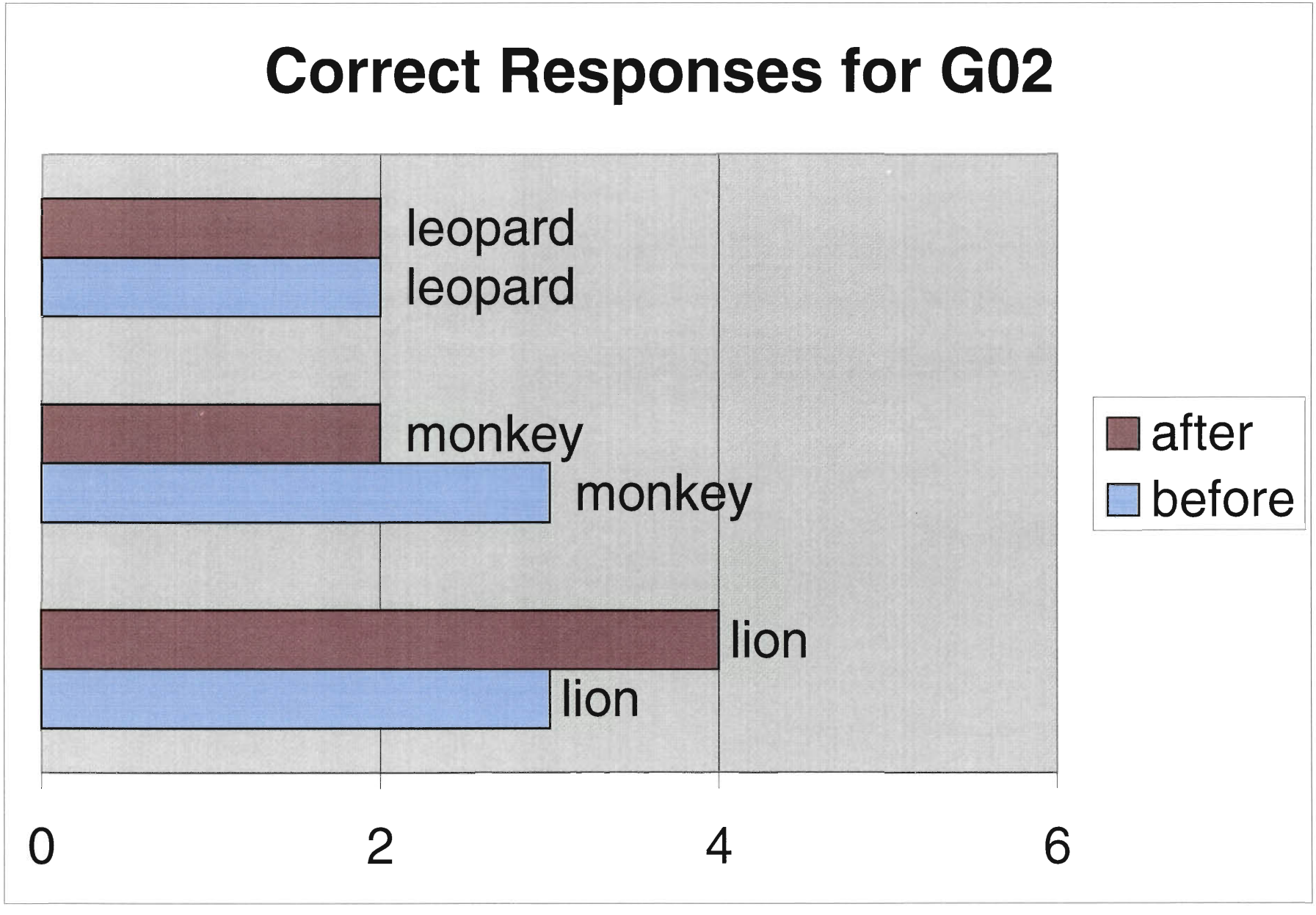


Figure 18--Correct Responses for G04

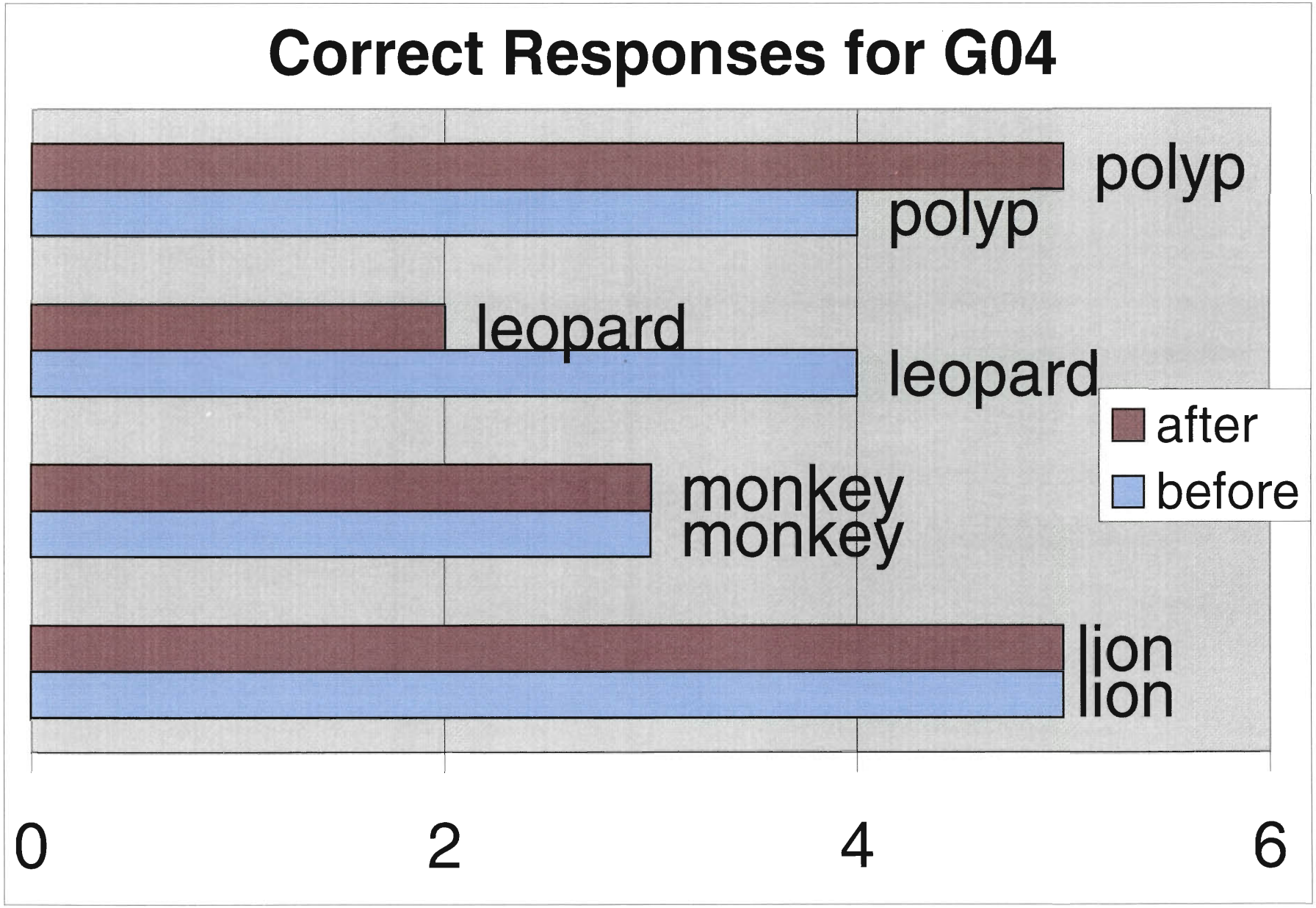


Figure 19--Correct Responses for G09

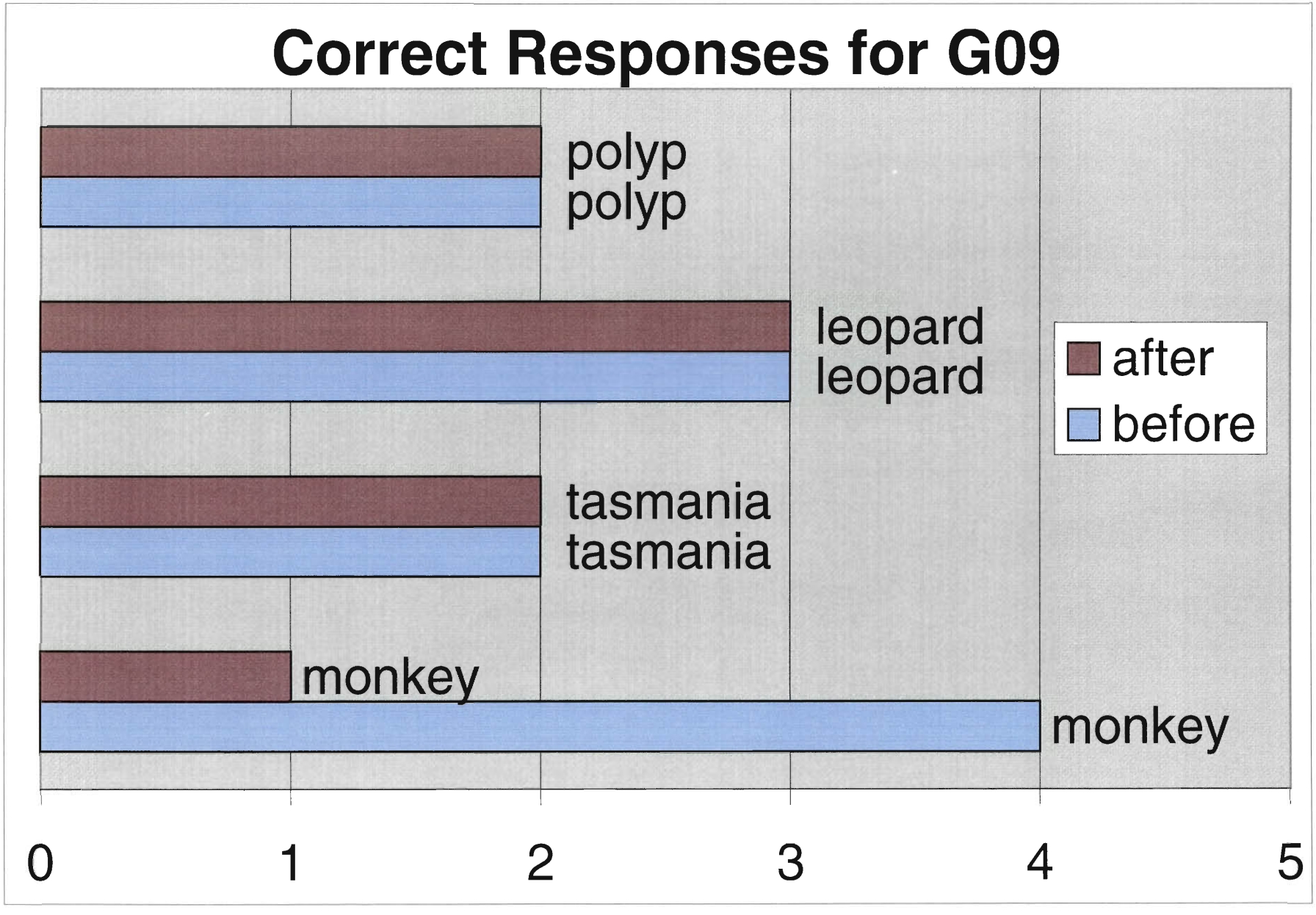


Figure 20--Correct Responses for G12

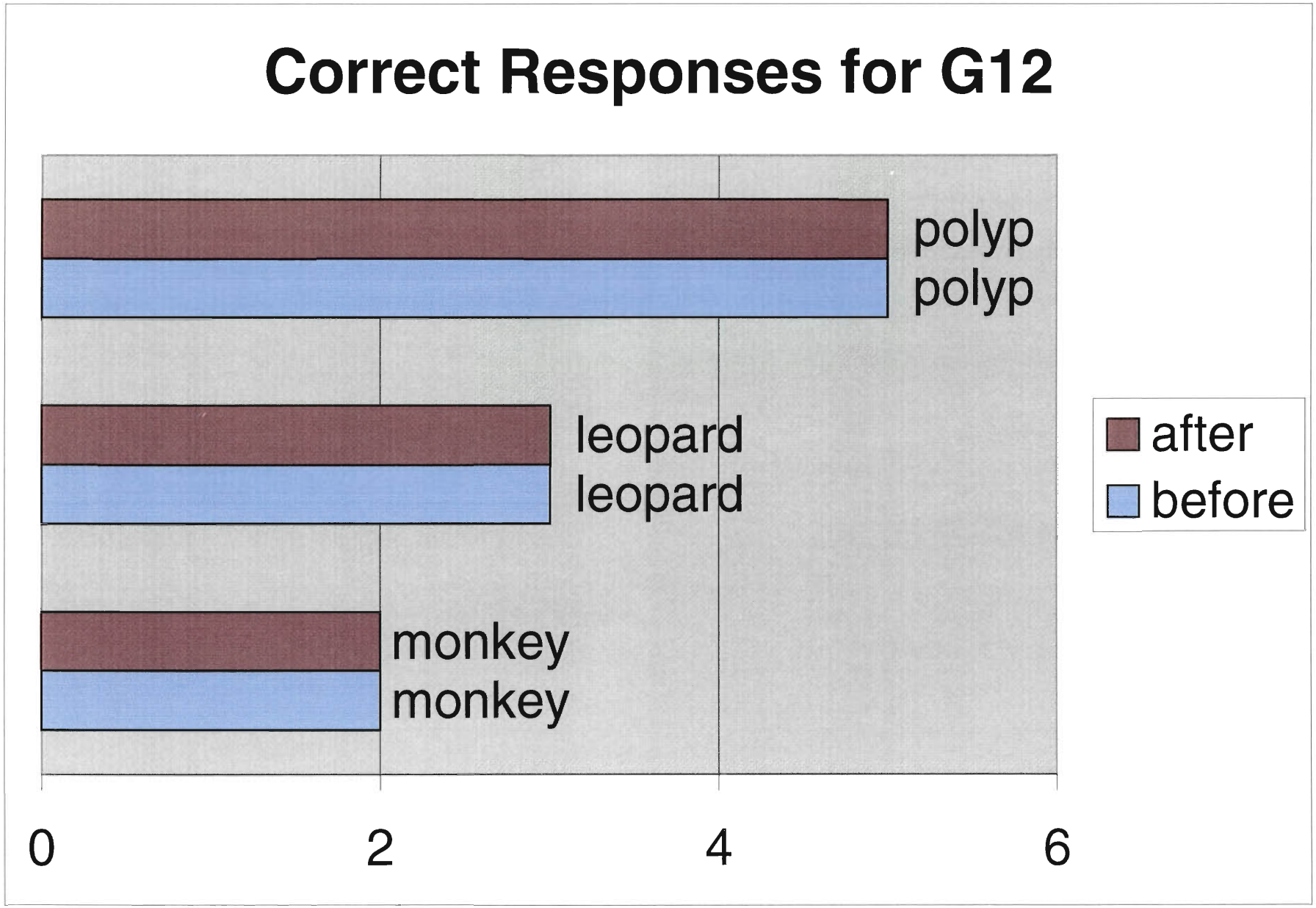


Figure 21--Correct Responses for B05