Using Metaphor in Science Communication

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Abstract

Invasive species are non-native flora and fauna brought to an area, either accidentally or intentionally. The term was first coined in 1958 and since then, the militaristic 'invasive' has been the dominant term when talking about these species. This study tests four different frames for describing invasive species: invaders, transients, piggy-backers and providers. Each participant watched one video using one of the four frames and answered a short questionnaire about their reactions to the video and perceptions of the situation. This study tested the effect metaphors have on individuals' perception of invasive species. Significant differences were shown between participants on only certain survey questions.

Introduction

Invasive species are plants or animals that have been introduced to a new area by intentional or unintentional means, usually by humans. Since they are not native to the new habitat, they often disrupt an ecosystem by crowding out native species. The term “invasive” has been the central phrase used to describe these plants and animals, but there are many other seemingly less controversial ways of discussing these species.

Metaphors are a type of framing. They are the expression of an understanding of one concept in terms of another concept. There is a similarity or correlation between the two, which makes the first concept easier to understand. Metaphors use heuristics, or cognitive shortcuts, to help explain a complicated topic to the public. In science communication, metaphors are common throughout many disciplines, and help bridge the gap between science and society.

The term “invasive” species has been the principal term in describing non-native plants and animals that are brought to a new area. The militaristic imagery of the term “invasive” may have an effect on perceptions of these species.

Journalists use metaphor in regards to science as a way to simplify the topic and put it in familiar terms for their audience. They also use metaphor as a dramatic way to keep their readers interested. In 1999, the United States declared war on invasive species, and described them as “alien” species and invaders from outer space (*The Independent*, April 25, 1999). The militaristic imagery used for invasive species often includes words such as invasion and border control, battle, combat, competition, attack,

defense, casualties, and victims. This language makes the topic seem more interesting and newsworthy to a lay public.

In Brendan Larson's 2007 article, he identifies a total of 13 ways of framing invasive species. I chose four of these 13 to use in this experiment. One of the frames is piggy-backers; this is when the human element of a species being physically transplanted is emphasized. Another frame is the provider, when the benefits of a species inhabiting an area are promoted. The last is the transient, when the idea that nature is characterized by changing landscapes and fluid ecosystem barriers is highlighted. This paper aims to discover if and how framing impacts an individual's attitude toward invasive species.

The question this study will address is: do frames influence individual's perceptions of invasive species? Do metaphors change the level of concern an individual has for a species? Do they change how much money someone will donate to remove the invasive species? These questions have important implications for how to communicate to a lay public about pressing environmental issues. Journalists and advocacy organizations can learn from these results to more effectively communicate to the public.

Literature Review

There is a large body of literature studying framing of scientific concepts including genetics, SARS, foot and mouth disease, evolution, cancer, astronomy, and invasive species.

In regards to genetics, the human genome project used the Book of Life metaphor and draft metaphor to convey the importance and unfinished nature of the work. The interaction theory of metaphor is at work in this instance because the metaphor is not merely a comparison but an interaction between the target and source terms. The target of a metaphor in science is an object of research that is unknown, in this case it is the human genome project, which is characterized by applying a term from a secondary system. The secondary system helps generates new understanding of the target. The meaning of the metaphor depends on the understanding and assumptions of the secondary system.

The purpose of using metaphors in communicating about the human genome is to help a broad public audience understand the research. The biblical connotations of a Book of Life were used to evoke the idea of a shared humanity, and how the research would lead to new understandings of human life. However, this metaphor has been criticized by scholars because it oversimplifies the human genome and conjures the image of an instructional manual for human life. The draft metaphor made the project seem unfinished, just needing polishing, just like a written text. Metaphors in science communication, while trying to make it easier for the public to understand an area of research unknown to them, could oversimplify the topic or misrepresent the information. (Bostanci, 2010)

In a 2005 study, Larson, Nerlich, and Wallis examine media coverage of invasive species, SARS, and foot and mouth disease regarding militaristic metaphors. They expected to find war language being used in ways that reflected the changes in meaning

and perception of war, but instead found that the metaphors referred to an archetypal and constant idea of war. The three subjects studied were portrayed as killers and their management is a physical struggle. They found, though, that warlike language is a useful device when trying to garner media attention and social action. The discipline is now called “invasion biology,” so it may be difficult to shift the frame from one of foreigners and killers. (Larson, Nerlich, & Wallis, 2005)

A study by Jose Julian Lopez in 2007 explores communication on the human genome project: the nucleotide-as-musical-note metaphor that provides the “music of life.” This metaphor was used in a traveling science exhibition whose aim was to educate and rouse debate in Canada. Lopez finds that the metaphor lacks the heuristic, shortcut ability for explaining the human genome, but it does frame the issue of life as a spectacle which makes it easier to talk about contentious biotechnology issues in a less controversial manner. (Lopez, 2007)

When talking about evolution, metaphors of competition and progress are ubiquitous. Larson conducted a survey of evolutionary biologists, evolutionary psychologists, biology teachers, and members of a Teilhardian spiritual organization; they were asked to evaluate the scientific and social dimensions of 18 evolutionary statements with metaphorical components. The results showed that the competition metaphor of evolution remains popular even though respondents indicated they have a negative social tone. The survey shows that scientific metaphors have connections to public understanding, which has implications for teaching of biology. (Larson, 2006)

In a 2005 study, Larson argues that militaristic metaphors dealing with invasive species are problematic because they lead to an inaccurate perception of invasive species, they contribute to social misunderstanding, xenophobia, loss of scientific credibility, and they are counterproductive for conservation. The militaristic metaphors effectively motivate conservation actions in the short term, they could be ineffective in the long term. Larson suggests that alternatives to militarism will better promote realistic management and conservation of invasive species. (Larson, 2005)

In a 2001 article, Dorothy Nelkin examines how metaphors in genetics translate very technical scientific information to a lay public. She argues, though, that more than just educated the public about science, metaphors shape how we act and think about science. Scientists use metaphor when talking about genetics to convey the importance and value to society, while journalists often use metaphor to show concerns about the problematic implications of genetics. Nelkin found that messages about genetics often centered around four metaphors: essentialist metaphors (genes are personal identity), religious metaphors (genes are sacred entities), fatalistic metaphors (genes are destiny), and commercial metaphors (genes are commodities). Her conclusion was that scientists use metaphors to explain their complex subject, attract attention to their fields, and try to win public funds. (Nelkin, 2001)

In a 2008 study, Iina Hellsten considers the discrepancies of science metaphors in relation to time. An example she uses to illustrate her meaning is a car engine's "horsepower." People do not need to have any direct experience with horse-drawn carriages to understand the sense of the metaphor. The phrase relies on a shared

cultural memory that bridges the divide between time periods and cultural and societal groups.

Hellsten argues that these temporal discrepancies in scientific messaging can provide important cultural experiences over time, but may hinder people's creativity for innovative solutions. The two main metaphors she discusses are science is framed as sensational breakthroughs or science is written about in terms of creating new Frankensteins and crossing moral lines. Both of these frames assume that science and technological progress is a journey; Hellsten argues that this is a positive metaphor because it helps the public see the truth about science, that scientific study is a process and ever-changing. The source of knowledge for a "journey" metaphor of science is not based on current experiences on an airplane journey, but on an older stereotypical image of explorers and colonization. In this case, an often used metaphor of science functions by bridging people's shared cultural ideas of the past to their preferred views of the present. (Hellsten, 2008)

In a 2009 study, Julia Williams Camus analyzes 37 articles from the British newspaper, *The Guardian*, about cancer and cancer research. She found that on average, 2.9 metaphors were included in each text, with a total of 15 frames used. The most frequently used metaphor was the militaristic "cancer is war." Others included "cancer is a riddle," "cancer is dirt," "cancer is the enigma in a detective story." Cancer research metaphors included "cancer research is a quest for the holy grail" and "cancer research is a source of light." The findings suggest that no one metaphor can convey the complexity of cancer and cancer research. Metaphors were used in tandem with each

other to attract readers, explain scientific concepts, and organize the story into a narrative. (Willams Camus, 2009)

Metaphors can paint a picture of a complex issue, but can also create or support existing stereotypes. The popular “war on cancer” metaphor conveys that patients need to have a fighting spirit. The metaphor gives the physician and patient a common language and shared understanding, which will simplify the nuts and bolts of the disease and treatment. The use of the military cancer metaphor has been criticized, however, because it reinforces the male domination and authoritarian relationships within the medical field. It conveys that the patient is passive and uninvolved and the doctor as active and in control. (Penson, Schapira, Daniels, Chabner, & Lynch, 2004)

In a 1999 study, Celeste Condit exposed 137 college students to sample genetics news articles and asked for their feelings on the “blueprint” metaphor of genetics. A plurality offered deterministic interpretations of the material, a small group offered discriminatory opinions, and a plurality offered non-discriminatory opinions. The range of responses, Condit argues, shows that readers bring their own values and interpretations to the information they are receiving. This shows that metaphors in mass media messages are not the “hypodermic needle” that will uniformly impact every reader. (Condit, 1999)

In a 2006 article, Ouzounis and Mazière discuss how metaphors are a tool for scientific exploration and a medium for public communication of complex scientific topics, like molecular biology. The authors give as an example – the human species is a grid of super computers. They argue that this analogy is not accurate because systems

biology is impossible with current technology, though it does form a useful connection to the computer science field. (Ouzounis & Mazière, 2006)

Jacobsen and Marshman analyze metaphor in sociology by analyzing Zygmunt Bauman's writings. They argue that even though literature conventionally is fiction and science is fact, language can help break down the barrier to science for the public. Bauman blurs the line between science and literature. Metaphors and other literary devices do have their downfalls, but the heuristic aspect helps guide the reader to understanding the big picture. Metaphor can be used to spark the imagination and interest in science for the lay pubic. (Jacobsen & Marshman, 2008)

When talking about a scientific area or research surrounded by controversy, scientific communication is not homogeneous among outlets. Metaphors and diaphors are ways to channel meanings to different audiences about a scientific issue. A metaphor can be used to make a translation by focusing on a similarity between the target and secondary system, a diaphor highlights a difference between the two. Mass media, such as newspapers, use storylines, which could include both metaphors and diaphors, to reduce uncertainty of a lay audience about a scientific issue. (Leydesdorff & Hellsten, 2005)

In a study that examined 2,303 scientific articles published in four Greek daily newspapers and two popular science magazines, the authors looked at the representations of four disciplines: space science and astronomy, genetics and biotechnology, natural sciences, and engineering and informatics. They found that all the metaphors used to describe these fields fit into one or more of these four

categories: a construct, a supernatural process, an activity extending the frontiers of knowledge, and a dipole of promise and/or scare. Most examples found used a combination of these metaphors. However, the authors found that the metaphor most often used was that science extends the frontiers of knowledge, and that the evolution of the four fields is portrayed as a violent process. (Christidou, Dimopoulos, & Koulaidis, 2004)

Some scholars argue the pros and cons of using metaphor to describe science. Metaphors could lead to ambiguity; scientific theory should be literal and precise. Metaphors add excess baggage and surplus meaning to an already complicated idea, so readers now need to decipher the metaphor and the facts. Some metaphors can be nonliteral and can hide the truth. For example, "a cell can *feel* the toxin." This suggests a cause and effect relationship which can give a false sense of understanding. The tension theory of metaphor says that metaphors are anomalous, and recognition of the anomaly induces a tension that needs to be resolved through interpretation. This makes more cognitive work for the reader before they can understand the science. Using metaphor can also filter or select certain characteristics which might make it more difficult for the reader to understand the big picture. Other scholars say that using metaphor in science is a positive influence. They can be used as a shorthand for remembering or explaining ideas, however, they are not valid for making inferences. (Hoffman, 1979)

It is easiest to use metaphors in scientific communication that are well known in society. By introducing an unfamiliar analogy or metaphor when talking about science,

readers will not understand the concept and both the metaphor and the concept challenge and may change each other. (Maasen & Weingart, 1995)

After people finish their formal schooling, informal science learning through the media is a responsible for adults' science education. Analogies and metaphors can be valuable tools in teaching scientific concepts. (Duit, 1991)

Learning science in school and continuing science education after formal schooling is like learning a new language. Some language in science, like work, energy, and power, have very specific meanings in science than in everyday use. When students, journalists, or any person uses scientific words, it does not automatically mean that they understand the concepts. The authors argue that this doesn't mean all scientific language should be replaced with vernacular language and metaphors. Learning the language of science is a principal aspect of learning science. The authors also argue that there is more to teaching science than just words. Images, charts, animations, etc. all convey meaning in different ways, and they should be put to use when discussing complex scientific topics. It is the responsibility of the teacher, journalist or anyone disseminating scientific information to employ metaphor and any other communication of science in an accurate fashion. (Osbourne & Wellington, 2001)

In these studies, the authors found that when metaphor is used in science communication, there are many effects. The metaphor could oversimplify a topic, misrepresent it, talk about the issue in a less controversial light, contribute to a loss of scientific credibility, and create or support existing stereotypes. All of these are applicable to the study of invasive species metaphors.

My hypothesis is that these four metaphors, militaristic, providers, piggy-backers, and transients will metaphors impact participants' perception of kudzu and of invasive species as a whole.

Method

After reading Larson's 2007 article, "Invasive plants: Inventories, strategies and action," on 13 ways of framing invasive species, I chose to focus on four of these metaphors to experiment with. The 13 frames include invaders, terrorists, piggy-backers, opportunists, spawn, mirrors, providers, hybrids, tricksters, matrices, transients, founts, and teachers. I chose invaders because it is the most commonly used metaphor used for non-native species. I chose piggy-backers, providers, and transients because they are the most divergent frames while simple to explain in a one-minute video. I then found a news story on youtube.com describing kudzu, an invasive species in the American southeast. I used GarageBand and iMovie software to change the audio to my own narration. I did this four times, one video for each frame. Each narration uses one of the metaphors while still giving the same basic information about the species. (See appendix for narration scripts). I set a sample size of 20 participants per video. I asked students from American University to watch one video each and complete a short questionnaire about their reactions to the video and perceptions of kudzu and invasive species generally. I went to public study areas on American University's campus to recruit volunteers to take the survey. After 80 students had completed the experiment, I inputted my results into SPSS and analyzed the data with one-way ANOVA tests. I used 0.05 as the cutoff point for significance.

Results

I ran a fixed-effects model of analysis of variance (ANOVA) to discover if the treatments changed the responses from the participants. This is used when one or more treatments are applied to the participants of an experiment to see if the responses change. A one-way ANOVA is an omnibus statistic and is unable to tell which specific groups are significantly different from one another; it can only tell that at least two groups were significantly different. To discover which groups were different, I used a post-hoc test called a Turkey HSD.

I ran an ANOVA post-hoc test for each question on the survey. Only a few questions saw significant results between some of the frames.

Question 2 reads: "How strongly do you agree or disagree with this statement: Kudzu needs to be removed from the American southeast ecosystem." Participants circled a number on a seven-point scale to illustrate how strong they disagree or agree with the statement. The mean responses for participants who watched the invader video was 4.9 (*SD* = .92), piggy-backer video 4.25 (*SD* = 1.2), provider 3.9 (*SD* = 1.0), and transient 4.95 (*SD* = 1.2). There was a significant result effect on the participants responses to this question [$F(3, 76) = 4.4$, $p = 0.007$]. The results of the ANOVA post-hoc test, Turkey HSD, show a significant difference between the invader frame and provider frame ($p = 0.025$), and between the provider and transient frames ($p = 0.016$).

Question 7 reads: "How strongly do you agree or disagree with this statement? Kudzu is a problem for the American southeast" Participants circled a number on a seven-point scale to illustrate how strong they disagree or agree with the statement.

The mean responses for participants who watched the invader video was 4.95 (*SD* = 1.1), piggy-backer: 3.85 (*SD* =1.6), provider: 3.65 (*SD* =1.2), and transients: 4.85 (*SD* = 1.3). The ANOVA test showed that there was a significant difference between some groups' responses [F (3, 76) = 5.1, p = 0.003]. The results of the ANOVA post-hoc test show a significant difference between the invader frame and piggy-backer frame (p = 0.049), between the invaders and providers (p = 0.014), and between providers and transients (p = 0.027).

Question 8 reads: "In your opinion, how urgent is the problem of invasive species?" Participants circled a number on a seven-point scale from not urgent at all to extremely urgent. The mean responses for participants who watched the invader video was 3.7 (*SD* = 1.6), piggy-backer: 3.98 (*SD* = 1.4), provider: 3.1 (*SD* =1.2), and transient: 4.65 (*SD* =1.4). The ANOVA test results showed a significant difference between some groups' responses [F (3, 76) = 4.2, p = 0.008]. The results of the ANOVA post-hoc test show a significant difference between the provider and transient frame at p = 0.004.

Question 9 reads: "Imagine that someone just gave you $50 to spend however you wanted. How much money would you be willing to donate to organizations working to address the negative effects of kudzu?" It then lists dollar amounts from $0 to $50 in increments of 10 and participants were asked to circle one amount. The mean responses for participants who watched the invader video was $11 (*SD* = 7.2), piggy-backer: $7.50 (*SD* =6.4), provider: $4 (*SD* =5.0), and transient: $12 (*SD* = 10.6). The ANOVA test results showed a significant difference between some of the groups'

responses [F (3, 76) = 4.6, p = 0.005]. The results of the ANOVA post-hoc test show a significant difference between the invader and provider frame (p = 0.023) and between the providers and transients (p = 0.007).

Question 10 reads: “Overall, how concerned are you about invasive species in the southeast US?” Participants circled a number on a seven-point scale from not concerned at all to extremely concerned. The mean responses for participants who watched the invader video was 3.35 (*SD* = 1.5), piggy-backer: 3.6 (*SD* =1.6), provider: 2.7 (*SD* =0.9), and transient: 4.5 (*SD* =1.2). The ANOVA test results showed a significant difference between groups [F (3, 76) = 6.2, p = 0.001]. The results of the ANOVA post-hoc test show a significant difference between the invader and transient frames (p = 0.04) and between providers and transients (p = 0.00).

Question 15 reads: “How understandable was the video you just watched?” Participants circled a number on a seven-point scale from not at all understandable to extremely understandable. The mean responses for participants who watched the invader video was 6.8 (*SD* = 0.4), piggy-backer: 6.05 (*SD* = 0.9), provider: 6.15 (*SD* =0.7), and transient: 5.8 (*SD* =0.9). The ANOVA test results showed a significant difference between the responses of the groups [F (3, 76) = 6.3, p = 0.001]. The results of the ANOVA post-hoc test show a significant difference between the invader and piggy-backer frame (p = 0.013), between invaders and providers (p = 0.041), and between invaders and transients (p = 0.00).

Discussion

Question 2, “kudzu needs to be removed from the American Southeast ecosystem,” showed significant results between the participants who watched the invader and provider videos. The invader video emphasizes how kudzu crowds out native species, wrecks power poles, and how the US government designated it a noxious weed. All of these things would lead a participant to believe kudzu needs to be removed. And with thirteen of twenty participants never having heard of the plant before watching the video, warlike imagery impacted their perception of the plant. The provider video emphasized the benefits of the plant, citing its uses as an aid for the common cold and an herbal supplement for alcoholics. Fifteen of twenty participants had not heard of kudzu before watching the video. There was also a significant difference between the provider and transient frames for this question. The transient frame video emphasizes that nature changes of its own accord and kudzu can take its course in the American southeast. This significant result is surprising between these two frames because they both do not suggest the need to remove the plant from the landscape. While this does not support my hypothesis that different metaphors impact perceptions of kudzu, it does show that frames can oversimplify a topic, showing or emphasizing just one side of an issue.

The significance test for question 7 (kudzu is a problem for the American southeast) showed a difference between the invader and piggy backer frame, between invaders and providers, and providers and transients. This similar question yielded the same results as question 2, but added the difference between the invader and piggy-backer frame. The piggy-backer video highlights the role of humans in the invasive

species story. Humans (in this case) intentionally took kudzu from its natural habitat in Japan and brought it to the US. The blame associated with this metaphor may be the reason participants who watched this video said kudzu is a problem than those who watched the invader frame video.

Question 8, in your opinion, how urgent is the problem of invasive species, asks about invasive species as a whole instead of just the specific instance of kudzu. The only two frames that resulted in a significant difference were provider and transient. The provider frame may have given the participants the impression that all invasive plants have some beneficial uses, and therefore are not a problem for ecosystems. The transients frame talks about how nature constantly changes, also allowing for complacency among those who are not educated about invasives. Since both of these frames illustrate how invasives are not a problem, it is surprising that there is a significant difference between the two.

Question 10 asks a similar question: “Overall, how concerned are you about invasive species in the southeast US?” There was a significant difference between the invader and transient frames and between providers and transients.

Question 9 asks participants if they had $50 to spend however they wanted, how much money they would be willing to donate to organizations working to address the negative effects of kudzu. The ANOVA test showed significant results between invader and provider and provider and transient. The mean amount of money participants in the invader group said they would give was $11, in the provider group, $4 and the transient group, $12. Donating money to a cause is a way many people partake in social action.

This data supports Larson, Nelich, and Wallis' point that warlike imagery garners social action. Their point that warlike imagery also garners media attention cannot be shown in this data, but we can extrapolate that journalists would react in a similar fashion to this messaging, and instead of giving money, might write a news story about the issue.

Even though war metaphors shed a negative light on ecology, using the frame does impact people to believe it is a problem in the US. The ethical question of framing an issue as war is something that can be further explored in more studies. Other studies should look at different frames on an invasive animal species. An animal may earn more emotional reactions from participants than plants.

The results show that frames do impact the participants' perspective on invasives, but to get the whole picture about a topic, a mix of frames should be used so as not to slant the audience's opinion. Scientific issues are complex, and though language breaks down a barrier between scientists and the public, science should not be oversimplified by using one frame only.

Appendix

Video narrations:

Invaders

Don't let these big beautiful leaves fool you, this renegade foliage smothers anything in its path, and it's even banned in 4 states. This plant's problem? It can grow at a rate of 1 foot per day, meaning it doesn't take long for this one leaf to become a big problem. It's kudzu. This unwanted vine has claimed the American southeast, but oddly enough, kudzu is not a native southerner. Kudzu was originally introduced into the US from Japan in 1876. Kudzu spread incredibly quickly and began taking over land, killing native plants and wrecking power poles. The government declared it a weed in the early 1970s and then a noxious weed in 1998. Now kudzu infests 38 states – however, it does have some uses as food for livestock and an herbal supplement for recovering alcoholics.

Since its invasion into the US, kudzu has been waging war against rare, native species such as pipevine and passionflower. Kudzu now covers 7 million acres in the southeast and some call it the "vine that ate the south." It is difficult to eradicate or even contain this trespasser because of its rapid growth rate and its ability to thrive in hard to reach places.

Piggy-backers

This fast-growing vine, kudzu, was originally brought to the US during the 1876 Centennial Exposition in Philadelphia, Pennsylvania. Countries were invited to build exhibits to celebrate the 100th birthday of the US. The expo featured a Japanese garden

that used kudzu as an ornamental plant. The large leaves and sweet-smelling blossoms of kudzu captured the imagination of American gardeners who began planting and spreading kudzu.

During the Great Depression, the Soil Conservation Service promoted kudzu for erosion control. Hundreds of young men were given work planting kudzu through the Civilian Conservation Corps. As an incentive, farmers were paid as much as eight dollars an acre to plant fields of the vines in the 1940s.

Since its arrival, kudzu's most vocal advocate was Channing Cope of Georgia who promoted use of the vine to control erosion. During the 1940s, he traveled across the southeast starting Kudzu Clubs to honor what he called "the miracle vine." Cope was disappointed when the U.S. government stopped advocating the use of kudzu in 1953. The vine grew too well, and crowds out native species such as pipevine and passionflower. It is difficult to eradicate or even contain this trespasser because of its rapid growth rate and its ability to thrive in hard to reach places. Kudzu now inhabits 38 states.

Providers

This fast-growing vine, kudzu, was brought to the US during the 1876 Centennial Exposition in Philadelphia, Pennsylvania. Originally used as an ornamental plant in Japan, Americans have found many beneficial uses for it. In the years following its

introduction, the US government encouraged kudzu's use for feeding livestock and for erosion control.

Kudzu's root, flower, and leaf can be used to provide medicine. Kudzu is used for heart and circulatory problems, including high blood pressure and chest pain. Some use it to aid symptoms of the common cold.

Kudzu blossoms are used in teas, leaves can be eaten like turnip greens, and livestock still love it. Vines can be used for making artwork, and it is even an herbal supplement for recovering alcoholics.

Kudzu grows very well in the US. However, it can crowd out native plants such as pipevine and passionflower. It is difficult to eradicate or even contain this trespasser because of its rapid growth rate and its ability to thrive in hard to reach places. Kudzu now inhabits 38 states.

Transients

This fast-growing vine, kudzu, was brought to the US during the 1876 Centennial Exposition in Philadelphia, Pennsylvania. Kudzu was originally used in Japan as an ornamental plant, but in the US kudzu is seen as an invasive, non-native plant. In the years following its introduction, the government encouraged kudzu's use for feeding livestock and for erosion control. Unfortunately kudzu grew too well and now some call it the "foot-a-night vine."

Nativity is characterized by change – some do not welcome the kudzu because it has changed the American southeast landscape. It was originally promoted as a

beneficial “miracle vine” but now, it is viewed as an invader. Kudzu is a hearty plant that can thrive in even the most unfavorable conditions and can crowd out native plants such as pipevine and passionflower. It is very difficult to control its spread, and some have given up the effort, and want to let nature take its course.

Questionnaire

1. When you think about Kudzu, what is the first word that comes to mind? (write in space below).

2. How strongly do you agree or disagree with this statement:

Kudzu needs to be removed from the American southeast ecosystem.

Strongly Disagree						**Strongly Agree**
1	**2**	**3**	**4**	**5**	**6**	**7**

3. Please tell us how much you agree or disagree with each of the following statements. Please read each statement carefully.

Statement	**Strongly Disagree 1**	**2**	**3**	**4**	**5**	**6**	**Strongly Agree 7**
a. After reading the story I felt **anxious.**							
b. After reading the story I felt **upset.**							
c. After reading the story I felt **worried.**							
d. After reading the story I felt **angry.**							
e. After reading the story I felt **frustrated.**							
f. After reading the story I felt **happy.**							

4. How likely is it that you will talk to a friend or family member about the video you just watched?

Not At All Likely						**Extremely Likely**
1	**2**	**3**	**4**	**5**	**6**	**7**

5. How strongly do you agree or disagree with this statement?

Illegal immigrants should be deported to their country of origin.

Strongly Disagree						**Strongly Agree**
1	**2**	**3**	**4**	**5**	**6**	**7**

6. How strongly do you agree or disagree with this statement?

War is a necessity in today's world.

Strongly Disagree						**Strongly Agree**
1	**2**	**3**	**4**	**5**	**6**	**7**

7. How strongly do you agree or disagree with this statement?

Kudzu is a problem for the American southeast

Strongly Disagree						**Strongly Agree**
1	**2**	**3**	**4**	**5**	**6**	**7**

8. In your opinion, how urgent is the problem of invasive species?

Not Urgent All						**Extremely Urgent**
1	**2**	**3**	**4**	**5**	**6**	**7**

9. Imagine that someone just gave you $50 to spend however you wanted. How much money would you be willing to donate to organizations working to address the negative effects of kudzu? (Circle one amount)

$0 **$10** **$20** **$30** **$40** **$50**

10. Overall, how concerned are you about invasive species in the southeast US?

Not Concerned At All						**Extremely Concerned**
1	**2**	**3**	**4**	**5**	**6**	**7**

11. Have you heard the term “invasive species” before watching this video? (circle answer)

Yes No

12. Were you aware of a species called kudzu before watching this video?

Yes No

13. How trustworthy do you think the video you watched was?

Not At All Trustworthy **Very Trustworthy**

1	2	3	4	5	6	7

14. How credible do you think the video you watched was?

Not At All Credible **Very Credible**

1	2	3	4	5	6	7

15. How understandable was the video you just watched?

Not At All Understandable **Extremely Understandable**

1	2	3	4	5	6	7

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