

Climate Literacy Zoo Education Network (CliZEN)

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Abstract

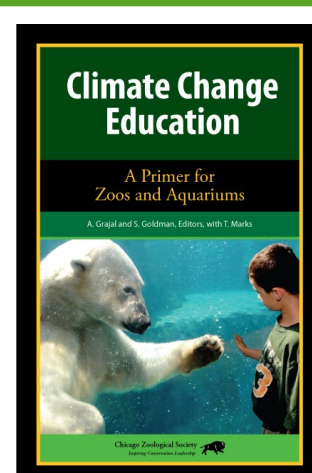
Climate change education has been largely didactic: Experts relay information to the public through various media channels. Psychology research also indicates that the public relies on more associative and affect-driven processes to assess the risk of climate change rather than the traditional reliance on the scientific evidence that is common to scientists (APA, 2010). The Climate Literacy Zoo Education Network (CliZEN), a NSF-funded Climate Change Education Partnership, therefore, aims to develop a new approach to climate change education that circumvents traditional climate change communications that rely on mechanistic explanations of climate processes. The partnership synthesized a multi-disciplinary review of climate change in an eBook "Climate Change Education: A Primer for Zoos and Aquariums" distributed for free on major e-reader platforms. CliZEN prototyped two major education interventions: (a) Youth-led interpretation in which participating teens showed an increase of their self efficacy, knowledge, skills and STEM indicators, particularly stronger confidence as science content interpreters and (b) A Mile in my Paws, a high-tech videogame-style first-person simulation that invites visitors to be a polar bear hunting for a seal. The game is a useful teaching tool in helping visitors develop personal comparisons of future climate projections and the role of the human system on the climate system. CliZEN's large national survey of zoo and aquarium visitors explored how visitors perceive climate change, their current actions, and barriers in contributing to environmental efforts. The survey took place during 2011 at 15 United States zoos and aquariums with two independent survey forms: (a) a survey primarily focused on attitudes [using segmentation procedures of Global Warming's Six Americas] (N=3,594) and (b) a survey primarily focused on behaviors (N=3,588). Our key findings show that zoo and aquarium audiences: (1) Are very favorable audiences for climate change education. (2) Want to do more to address climate change, yet perceive barriers to doing so, particularly ignorance about what behaviors will be effective. (3) Use these venues as socially supportive contexts for discussions about animals and connections to nature. (4) Have access to and experience with virtual social networks and other Internet technology platforms. Further analysis shows that a sense of connectedness to animals is strongly correlated with engagement in climate change mitigation behaviors. But zoo visitors perceive barriers that include low efficacy, lack of understanding of costs and benefits, and pessimism as to whether other people will do what is needed to address climate change. Our analyses show the need to retool education interventions so that they provide opportunities for visitors to (a) actively construct their own understanding of climate change sources, processes, and amelioration strategies, (b) confront climate change along a trajectory that begins from a personalized perspective and moves outwards to a more global perspective, and (c) address behavioral barriers toward amelioration strategies. With over 130 million national visitors annually, zoos and aquariums can harness visitors' inherent concern for animals and nature and channel it toward constructive climate literacy.

Introduction



CliZEN reached its goals of conducting research to understand zoo audiences' climate change preconceptions and attitudes and identifying candidate climate change education intervention designs while building our partnership. Goals were reached through activities including (1) a literature review that was disseminated via an eBook, (2) a national survey of zoo and aquarium visitors, and (3) prototyping of two interventions: youth-led interpretation and an interactive technology-based activity.

Literature Review and eBook



We synthesized a multi-disciplinary review regarding climate change. The results are presented in an eBook titled "Climate Change Education: A Primer for Zoos and Aquariums" (Grajal & Goldman, 2012). Aimed at non-technical audiences, particularly zoo and aquarium education professionals, it is available for free at www.clizen.org.

Partners



Zoo and Aquarium Audience Survey

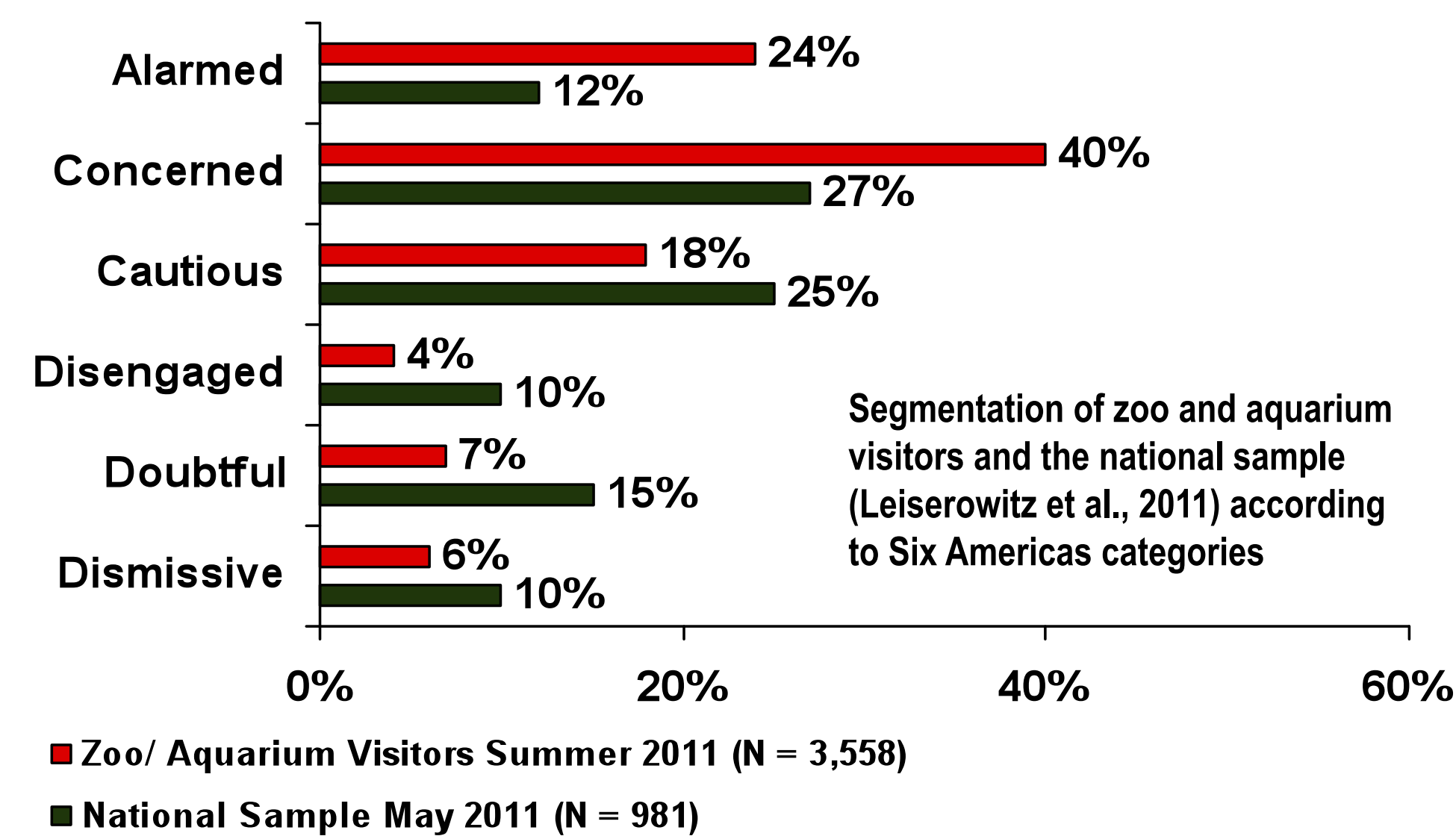
We conducted a large national survey of zoo and aquarium visitors to explore how visitors perceive the issue of climate change, their current actions, and barriers in contributing to environmental efforts. The survey took place during 2011 at 15 United States zoos and aquariums with two independent survey forms: (a) a survey primarily focused on attitudes [using segmentation procedures of Global Warming's Six Americas (Maibach et al., 2011)] (N=3,594) and (b) survey primarily focused on behaviors (N=3,588).



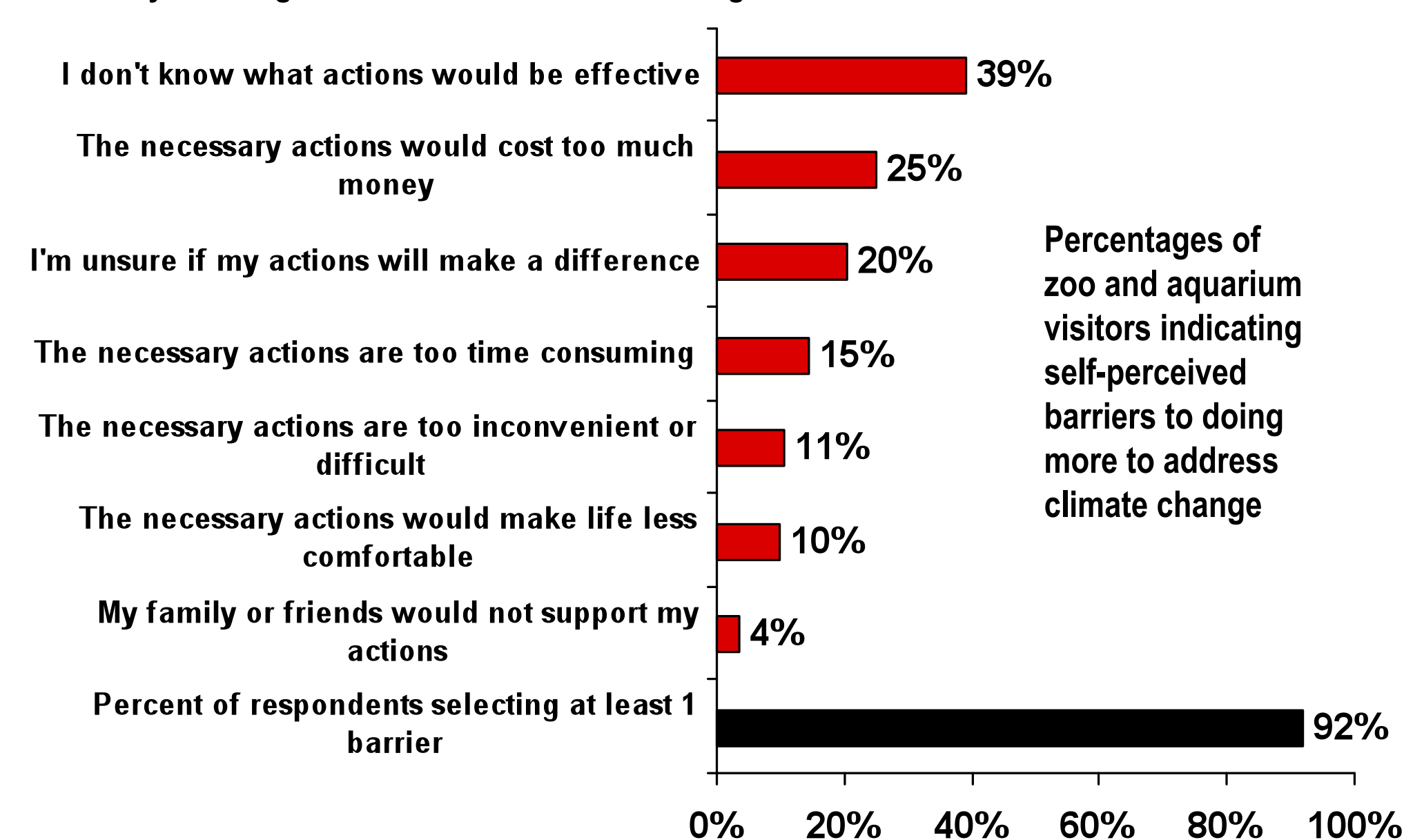
Survey Findings

Key findings (Luebke et al., 2012):

1. Zoo and aquarium visitors are receptive audiences for climate change education
2. Zoo and aquarium visitors want to do more to address climate change, yet perceive barriers to doing so, particularly ignorance about what behaviors will be effective
3. Zoos and aquariums provide visitors with socially supportive contexts for discussions about animal exhibits and connections to nature
4. Zoo and aquarium visitors have access to and experience with virtual social networks and other Internet technology platforms
5. Zoo and aquarium visitors' concern about climate change and participation in behaviors to address climate change systematically vary with their sense of connection with animals



Sixty-nine percent of zoo and aquarium visitors would like to do more to address climate change. Of those, respondents were asked to select which barriers (if any) were standing in their way of doing more to address climate change.



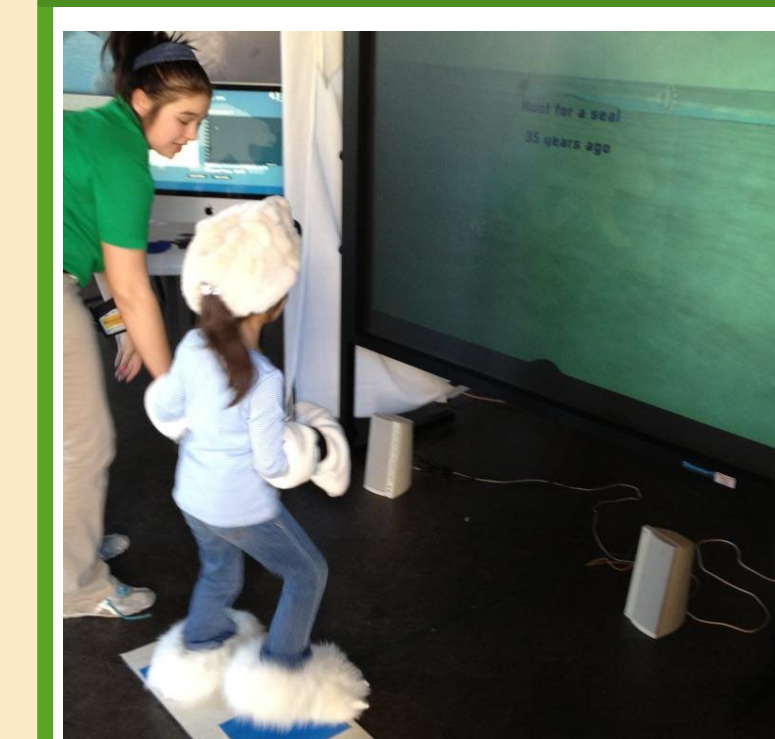
Prototype Education Interventions



Youth-led interpretation

In summer 2011, Woodland Park Zoo youth volunteers engaged visitors in conversations about climate change at an activity cart located near the zoo's tiger exhibit. At Brookfield Zoo, youth volunteers facilitated either an inquiry activity or a conversation about an animal specimen with zoo guests at two exhibits: Humboldt penguins and polar bears. Effects of these activities on the visitors and on the youth volunteers were measured.

- Key findings:**
1. Youth volunteers can be effective facilitators of learning about climate change in zoo settings.
 2. Providing an inquiry activity focused on climate change may help visitors reflect on the issue of climate change and consider taking action.
 3. Youth volunteers experienced gains in self perception, confidence, and knowledge.
 4. Youth volunteers agree that climate change is happening and over the summer increased in the strength of their convictions.



A Mile in my Paws

A Mile in my Paws is a high-tech videogame-style embodied interaction experience that invites visitors to be a polar bear hunting for a seal in the shortest time and with the lowest metabolic expenditure (Lyons et al., 2012). The game presents past (1970), present (2010) and future (2050) projections of sea ice cover. Visitors stand in front of a large projection screen showing a first-person view of the arctic Beaufort Sea region, wear gloves with motion actuators and step on

a pressure pad, simulating with their movements bears walking across ice floes and swimming between them. The display of the virtual environment is supplemented by two running counters that reflect (a) the elapsed time, and (b) the calorie equivalents burned by the bear since the beginning of the activity. Even for visitors who only watch or who do not complete all three decade options, the display reflects increased difficulty (longer elapsed time, higher caloric consumption) of the task as an increasing function of lower sea ice spatial densities. The game is a useful teaching tool in helping visitors develop personal connections with polar bears that can be leveraged to motivate changes in climate change attitudes and knowledge. Pilot testing at Brookfield Zoo is ongoing.

Conclusions

Survey findings suggest zoo visitors' climate change learning needs may be addressed via education resources that build upon their sense of connection with animals and provide opportunities for visitors to (a) confront climate change along a trajectory that begins from a personalized perspective and moves outwards to a more global perspective, (b) develop a social conversation about human involvement in climate change, and (c) address self-perceived barriers toward amelioration strategies. An embodied interactive experience such as *A Mile in My Paws* is one example of an education resource that leverages zoo visitors' sense of connection with animals. In addition, pilot testing results of **youth-led interpretation** suggest the involvement of youth volunteers as climate change education facilitators has potential for building capacity of both the volunteers and zoo visitors to address climate change.

Acknowledgments

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