



DESIGN AFFECTS SHORT-TERM KNOWLEDGE AND ATTITUDE OUTCOMES IN SEA LION SHOW AUDIENCES

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INTRODUCTION

Zoological parks traditionally have had one or more primary missions: conservation, education, science, and/or recreation (Association of Zoos and Aquariums, 2009). Effective education in zoos is perhaps the highest priority mission (Clayton, 2009; European Association of Zoos and Aquaria, 2008) and is based on the notion that environmental knowledge both increases awareness and encourages more responsible, positive environmental actions (Hungerford & Volk, 1990). While it has been shown that achieving a conservation objective depends upon effectively inspiring people to care about animals, zoos have increasingly linked conservation success with effective education (Clayton, 2009).



Keeping animals in controlled environments is a complex issue. Zoos continuously adapt to public demands by increasing visitor-animal interactions and emphasizing entertainment value, while maintaining education as a priority (Fernandez, Tamborski, Pickens, & Timberlake., 2009; Hyson, 2004). Special attractions,

such as animal shows, are becoming more common as a means to satisfy these demands while delivering educational messages. Some animal rights activists have voiced opposition to animal shows in particular, exclaiming that they exploit animals for monetary gain (Yerke & Burns, 1991). By definition, a show is "an event... involving the public display or exhibition of animals" (Show, 2010). Facilities that promote animal shows justify their programs by claiming educational benefits.

Various types of animal shows do share similar educational and conservation objectives, however, implementation of these objectives varies considerably between different facility types. Zoological venues have designed shows (FIGURE 1) based on the belief that impacting a visitor's conservation knowledge and attitudes was necessary in order to evoke environmentally responsible behavior (Penn, 2009). This reflects what is

known as the Knowledge-Attitude-Behavior (KAB) model concept. This model describes a linear relationship between knowledge, attitude, and behavior. It asserts that increased knowledge leads to more positive attitudes, in turn leading to increased responsible environmental behavior (Hungerford & Volk, 1990). Like zoological park animal shows, theme park shows (FIGURE 2) were designed to change visitors' conservation attitudes and behavior, though show content was not commonly designed around the KAB model. Often, emphasis was not placed on species biology and natural history information, but on stimulating emotion while continuing to provide an entertaining experience (Beardsworth & Bryman, 2001).



Hungerford and Volk (1990) criticized the KAB model and stated that environmental behavior research had not extensively supported linear models for changing human behavior. In contrast, zoo historian Hyson (2004) later criticized any institution that strayed from the basic KAB model premise, and stated that zoos, "consistently undermined their educational-conservationist image with attractions and amenities more suited to theme parks" (p.249).

Animal shows and various show scenarios have emerged in animal facilities as educational tools. Examination of these shows' impacts on visitor knowledge, attitude, and behavior has been minimal (Yerke & Burns, 1991). More specifically, a comparison has not yet been made between the conservation education achievements of KAB model inspired shows versus non-KAB model show designs.

This study attempted to answer the basic question; Do species conservation message impacts differ between animal shows of varying designs? The goal was to 1) evaluate show effectiveness through inspiring an audience's curiosity and appreciation for animal conservation, and 2) compare and contrast the effectiveness between two different show designs. A research plan was developed using one zoological park (KAB model inspired design) and one theme park (non-KAB model design), both of which used the California sea lion (*Zalophus californianus*, Lesson) in their shows.

Specific research objectives were to compare and contrast the following outcomes between audiences of each show type:

1. level of change between show educational/entertainment value expectations and observations,
2. sea lion show attendance motivation,
3. level of species understanding and conservation knowledge change, and
4. level of attitude change toward sea lions, trainer-sea lion relationships/interactions, and the human individual's role in sea lion conservation.

The hypothesis was that species conservation impacts differ between animal shows of varying designs.

METHODS

For this study, data were obtained using retrospective pretest-posttest surveys (Falk et al., 2007). The retrospective pretest-posttest design was utilized to reduce response shift bias. Participants gain understanding as they experience an event, resulting in a discrepancy between pre/post event responses, threatening a study's internal validity. Therefore, response shift bias often can occur when traditional pretest-posttest survey designs are utilized, because survey participants answer questions both before and after a particular event under investigation.

Retrospective pretest-posttest surveys are completed immediately after the event. Participants simultaneously indicate their current responses and what they perceived would have been their responses before the event. Response shift bias is reduced and a more accurate estimate of the treatment effect is made because participants respond to each question within the same reference frame (Drennan & Hyde, 2008; Howard et al., 1979).

For the study presented here, two different surveys were constructed; one instrument was used to measure knowledge and the other, attitude. In addition to knowledge and attitude assessment statements, both surveys included questions addressing show educational and entertainment value and attendance motivation. Location-specific demographic questions concluded each survey. Each survey consisted of 21 total questions. Pilot testing occurred May 2010 with a small group of adults aged 20-58 with varying educational backgrounds, to ensure content clarity and appropriate survey length. The final products were further refined so that they could reliably assess sea lion show survey participant knowledge and any attitude change towards species conservation.

Surveys were distributed to Oceans of Fun Milwaukee (FIGURE 3) and Oceans of Fun Hersheypark sea lion show audiences (FIGURE 4) during June-August 2010. Restricted by time, travel, and resource restraints, surveys were distributed and collected on Fridays, Saturdays, and Sundays. A microphone announcement to show audiences five minutes prior to



each show's commencement explained the study's purpose and procedure; all audience members 18 years and older were invited to complete surveys at the show's conclusion. Adults were the chosen demographic because they comprise 55-70%

of zoo visiting populations and are considered society's decision makers whose actions would have the most direct institutional effects (e.g., monetary, political) (Conway, 1982; Heimlich, 1996).

At each show's conclusion, surveys were handed out on a voluntary basis, distributed only to those that expressed interest in completing a questionnaire (convenience sampling). The surveys (knowledge or attitude) were handed out in an alternating fashion so that each consecutive participant



received a different assessment. Completed surveys were returned to a labeled box or handed directly back to the investigator. The investigator was always present to ensure each participant only completed one survey. Convenience sampling was used to increase response rate. There were some limitations to this method, including the fact that data collected were only representative of the sample population. The established methodology was designed for individual facility modification and utilization. Therefore, to more accurately determine the causality between show observation and knowledge/attitude change, a high priority was given to increasing internal validity. In addition, convenience sampling may be a more cost effective option for future primary survey investigators. The Michigan State University Institutional Review Board approved all methods (IRB Approval #: i035770).

THE SURVEY

Educational and Entertainment Value

Participants were asked to indicate their opinions of overall show purpose (education and/or entertainment) based on their pre-show expectations and post-show observations. A single question provided a numeric scale for each participant to circle the integer that best represented his or her perspective of the viewed show's educational/entertainment value. The scale began at one (purely educational) and included all integers up to ten (purely for entertainment). The difference between expected and observed values was calculated by subtracting each subject's total before-show value score from his/her total after-show value score.

Motivation

Surveys included one question addressing the visitor's motivation to attend animal shows because of its influence on experiential message reception (Falk et al., 2007). Motivation statements were adapted from Falk et al. (2007). Given four different motivations: (1) complete facility experience, (2) watch animals perform tricks, (3) learn about species, and (4) learn about species conservation), participants were asked to identify and rank their top three reasons for sea lion show attendance, with a '1' indicating the primary reason for attendance followed by a '2' and a '3'. In addition, participants were provided with an 'other' option to report attendance motivations outside those specified.

Knowledge

To assess knowledge, nine different statements were derived from show script material addressing basic California sea lion biology and natural history, training, and conservation. Participants were asked to indicate if each statement was true or false based upon their knowledge before and after the show. A 'don't know' option was also provided to prevent forced true/false guesses from skewing results (Weisberg, 2005). Scoring was based upon right or wrong responses, with a '1' indicating a correct response and '0' indicating an incorrect or 'don't know' response. Change in knowledge was calculated by subtracting each subject's total before-show knowledge score from his/her total after-show knowledge score. Scores were calculated for subjects that responded to all knowledge statement questions.

Attitude

Nine different statements were generated to reflect subjects' overall appreciation of California sea lions and sea lion conservation. 'Appreciation' was defined by attitude measurements in three major categories: (1) sea lions, (2) trainer-sea lion relationships/interactions, and (3) the individual human's role in sea lion conservation. Based upon their opinions before and after the show, participants were asked to indicate their agreement level with each statement using the following five-point Likert-type scale: '1' – strongly disagree, '2' – disagree, '3' – neither agree nor disagree, '4' – agree, '5' – strongly agree. This attitude measuring system was used because scales containing five to seven points are the most reliable and valid (Krosnick & Fabrigar, 1997). A five-point scale was used to score how positive (in relation to each measured attitude category) each response was, with '5' as the most positive answer, down to '1', the least positive. Change in attitude was calculated by subtracting each subject's total before-show attitude score from his/her total after-show attitude score. Attitude change was also calculated for each individual attitude statement. Scores were calculated for subjects that responded to all attitude statement questions.

Demographics

Nine demographic questions concluded all surveys. Question topics included subject gender, age, location of residence, education level, show attendance frequency, varying show attendance, park and zoo membership statuses, as well as show cost. These questions were included to account for possible demographic factors influencing survey participants' calculated species conservation knowledge and attitude change.

STATISTICAL ANALYSES

Non-parametric tests were used for analysis because samples were non-random and normality tests confirmed data were not normally distributed (Vaske, 2008). Wilcoxon rank sum tests were performed to compare and contrast education/entertainment value, knowledge, and attitude change levels between theme and zoological park sea lion show research subjects (Conover, 1980). Chi square tests for independence explored specific demographic variable effects on knowledge and attitude change. Fisher's exact tests were utilized for all demographic variable analyses that resulted in a two-by-two contingency table and/or a sample size that was not large enough for valid chi square test results (Conover, 1980; Daniel, 1990). An alpha level of 0.05 was used in all statistical analyses (Conover, 1980). All statistical analyses were performed in Windows SAS 9.2.

RESULTS & DISCUSSION

Anderson, Kelling, Pressley-Keough, Bloomsmith, and Maple (2003) found that public animal training with interpretation provided visitors with a more positive zoo experience. The study presented here attempted to better define the term 'positive' by specifically measuring knowledge and attitude impacts. Falk et al. (2007) was criticized for not accounting for individual zoo visit components (e.g., specific exhibits, shows, etc.) and consequently, those components' specific effects on visit outcomes (Marino Lilienfeld, Malamud, Nobis, & Broglio, 2010). The study presented here focused on a single captive animal facility component (animal shows), enabling a more reliable showing of causality between an experience and its outcomes.

This study's results show that audiences' preconceived educational/entertainment value expectations and attendance motivations may affect overall show conservation impacts. Zoological park research subjects were pleasantly surprised by the extent of show information, while theme park subjects expressed a desire for more educational content. Measured knowledge change levels corresponded with subject perceptions of the

extent of show information presented (FIGURES 5). In addition, theme park visitors that had seen a sea lion show at a different institution were more likely to have nonexistent or negative species conservation knowledge or attitude change after show observation ($p = 0.0013$). These results provide evidence of expectation effects (e.g., disappointment, elements of surprise, number of novel experiences) on animal show impacts. Positive knowledge and attitude change occurred despite 'learning' not being identified as a primary show attendance motivation; though, changes in both variables (knowledge and attitude) were significantly less when show educational value expectations were not met, as shown in FIGURE 6. Heimlich (1996) said that knowledge gained by adults after a zoo visit did not depend on whether they came to learn or to socialize. However, Falk et al. (2007) found that attendance motivations impacted visitor outcomes directly.

Attendance motivations' influences on show conservation impacts remain unclear; additional research is needed. It is evident that facilities should consider visitor expectations and motivations when designing animal shows, and if desired outcomes are not being achieved, look to audience expectations and motivations as possible show impact barriers.

It is evident that both study sites achieved their shared objective of inspiring curiosity and appreciation for sea lion conservation; after a sea lion show experience, both zoological and theme park research subjects reported increased species understanding and conservation knowledge and positive attitudes. However, results support the hypothesis that species conservation impacts differ between animal shows of varying designs.

Presenting species conservation information may be linked to an increase in positive environmental attitudes. Both species conservation knowledge and attitude change was significantly higher in zoological versus theme park research subjects (FIGURES 5 & 6). The zoological park sea lion show had a greater effect on subject perceptions of sea lions as unique individuals with large behavioral repertoires. Even more importantly, the zoological park sea lion show convinced a greater number of subjects that sea lion shows do in fact inspire conservation action ($p = .0086$). Behavior change was not measured directly, though KAB model principles predict positive behavioral outcomes in research subjects as both knowledge and positive attitudes increased (FIGURES 5 & 6). In the future, behavioral outcomes could be specifically measured, though this study identifies knowledge and attitude as practical show success evaluation criteria. Indicators of success should measure progress and provide needed information, but should also account for available skills and resources (Flora et al., 1998). Measuring knowledge and attitude may be more feasible and cost effective than directly measuring behavior.

Overall, this study provides support for KAB model application in animal show design and highlights a desire for increased information presentation in theme park shows, supporting the integration of educational elements into non-KAB model show designs. Milman (1991) even reported elevated adult interest in visiting local theme parks if a learning experience was involved. However, it is important to note that educationally based zoological park shows may appeal more to adults, whereas theme park shows may appeal more to children. Future studies researching show impact on children are necessary, though the importance of reaching adults should not be underestimated. Adults have the capacity to be proactive and opportunity to reinforce conservation messages to their children (Heinrich & Birney, 1992). In addition, other show designs, e.g., zoo theater, that attempt to achieve greater balance between show educational and entertainment content and reach a more diverse audience should be further explored (Penn, 2009).

Animal facilities continually work hard to better convey conservation messages to their visitors. Although constructing future conservation education objectives is important, initial evaluation of facilities' current conservation impacts is invaluable; these assessments provide the

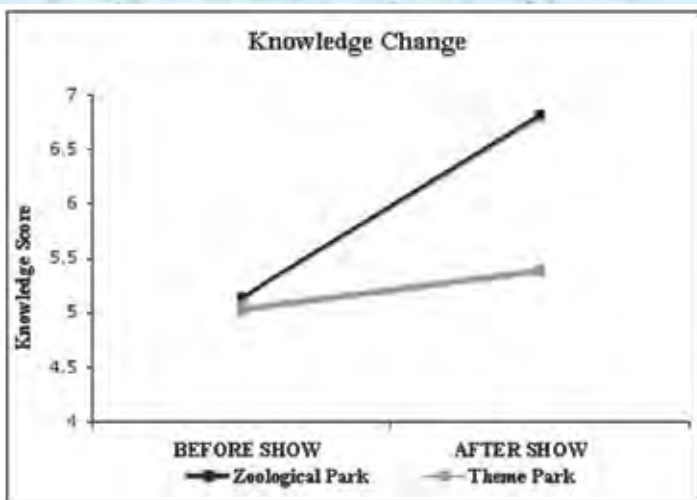


FIG 5 Mean knowledge change significantly more positive in zoological park (1.62) versus theme park (0.34) research subjects ($p < 0.001$). Total scores based upon correct answers given (Correct=1, Incorrect=0)

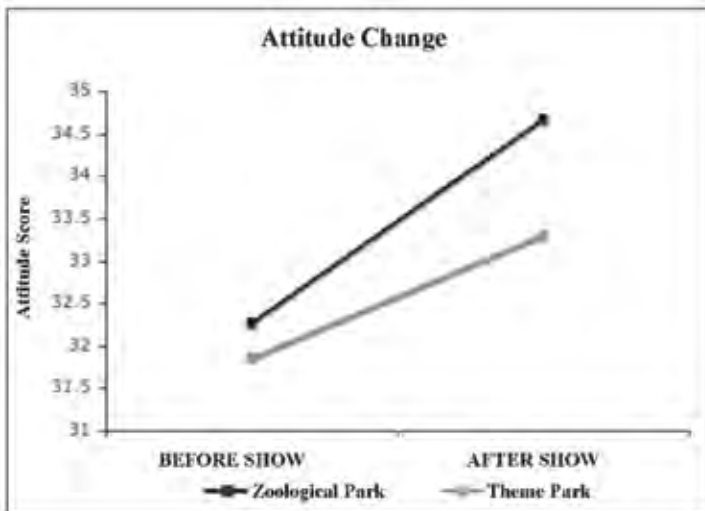


FIG 6 Mean attitude change significantly more positive in zoological park (2.40) versus theme park (1.43) research subjects ($p = 0.0484$). Total scores based upon five-point Likert –type scale (Least Positive=1 to Most Positive=5)

information necessary to maximize future conservation education success and support animal facilities as sustainable tourism industry members (Smith, Broad, & Weiler, 2008).

This study evaluated show effectiveness through inspiring audience animal conservation curiosity and appreciation while it compared and contrasted effectiveness between two different show designs. Based upon the results, it is apparent that show design affects overall audience impact – not all animal shows are created equal. This finding emphasizes the importance of evaluation. Continually increasing controversy has made it a necessity for animal facilities to defend their existence with supportive evidence. This study's established methodology can be used to evaluate various animal shows' effectiveness in a broad range of facilities. Critics' claims of animal exploitation with minimal gain (Yerke & Burns, 1991) stress the need to change from output to outcome-based evaluation. Evidence of educational effectiveness now needs to be quantitative.

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