

## RESEARCH ARTICLE

# Dolphin Shows and Interaction Programs: Benefits for Conservation Education?

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Dolphin shows and dolphin interaction programs are two types of education programs within zoological institutions used to educate visitors about dolphins and the marine environment. The current study examined the short- and long-term effects of these programs on visitors' conservation-related knowledge, attitude, and behavior. Participants of both dolphin shows and interaction programs demonstrated a significant short-term increase in knowledge, attitudes, and behavioral intentions. Three months following the experience, participants of both dolphin shows and interaction programs retained the knowledge learned during their experience and reported engaging in more conservation-related behaviors. Additionally, the number of dolphin shows attended in the past was a significant predictor of recent conservation-related behavior suggesting that repetition of these types of experiences may be important in inspiring people to conservation action. These results suggest that both dolphin shows and dolphin interaction programs can be an important part of a conservation education program for visitors of zoological facilities. *Zoo Biol* 32:45–53, 2013. © 2012 Wiley Periodicals, Inc.

**Keywords:** conservation education; bottlenose dolphins; swim-with programs; interaction programs; dolphin shows

## INTRODUCTION

Atlantic bottlenose dolphins (*Tursiops truncatus*) are found throughout coastal and offshore waters. Many of the threats to these animals are anthropogenic factors including interactions with boats [Miller et al., 2008], pollution or chemical runoff [Fair et al., 2007], and overfishing [Politi et al., 2000]. Educating the public about these threats and how they can change their behavior to alleviate these threats could be a key component in management plans to help conserve dolphins and many other marine species. Although there are many different ways to educate the public (e.g., books, movies, television shows) about threats to dolphins and the environment in which they live, zoos and aquariums offer an opportunity to educate large audiences throughout the world. It is estimated that over 175 million people visited an accredited zoological institution in the United States during 2008 [AZA, 2011].

Although research on the impact of visits to zoos and aquariums has recently increased in frequency [Ogden and Heimlich, 2009], there is a lack of information on the effectiveness of zoos and aquariums in educating the public [Dierking et al., 2002]. While some believe dolphin shows

and interaction programs (swim-with programs) can benefit wild dolphins by educating visitors and inspiring them to conservation action, some question the conservation value of these types of programs [Rose et al., 2006]. Currently, there is little information available on the effects of dolphin shows and interaction programs on visitors' conservation-related knowledge, attitude, and behavior to support either claim. Roper Starch [1998] reported that visitors to facilities of the Alliance of Marine Mammal Parks and Aquariums indicated their experience had some degree of impact on their knowledge and appreciation of animals. Visitors who had a chance to interact with marine mammals reported a greater impact on their knowledge and appreciation of the animals. However, little is known about the effects of individual pro-

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grams or exhibits at these institutions. Moreover, reporting that an experience is educational does not demonstrate retention of knowledge gained from the experience.

Studies examining dolphin shows and interaction programs have been limited in scope and small sample sizes make generalization across institutions difficult. For example, Curtin [2006] found that people who participated in interaction programs both in zoological facilities and in the wild enjoyed the overall experience. However, interviews were only conducted with 14 participants and questions were open-ended with potential for observer bias. Similarly, a survey conducted by the New York Wildlife Conservation Society examined the experiences of 48 spectators of dolphin shows [Sickler et al., 2006]. Participants reported having an overall positive attitude towards dolphins. However, participants reported remembering “tricks”, training and physical ability following their experience rather than the cognitive abilities of the animals. While this study provides some insight into the perceptions of dolphins and the effects of some programs, more information is clearly needed.

The process of learning within a zoo or aquarium is referred to as informal learning. Because of this, zoological institutions are in a situation of free choice where visitors are free to choose which information they pay attention to and which of the staff members they engage in conversation. This is significant because any information that is learned results from their choices. The manner in which information is presented to the audience could be one of the primary influences on attention to specific information. Increased animal activity and animal shows can hold audience attention longer than graphic displays [Altman, 1998; Bitgood et al., 1986; Jackson, 1994; Swanagan, 2000]. Because of this, dolphin shows and interaction programs might be important tools for zoological institutions to educate a large number of visitors.

With the challenges facing dolphins and other marine organisms throughout the world, it is important to gain a better understanding of dolphin shows and interaction programs as tools for educating the public. The goal of the current study was to examine the effects of dolphin shows and interaction programs on visitors' conservation-related knowledge, attitude, and behavior. Little information is currently available on the effects of these programs and the information that is available has mostly been through studies that are difficult to generalize across facilities. The current study is the first quantitative multi-institutional study examining the effects of these programs. Determining the types of experiences that will have beneficial long-term effects is critical to ensuring the conservation of dolphins and the marine environment.

## METHODS

The current study was comprised of three separate experiments; (1) examining the effects of dolphin shows, (2) examining the effects of interaction programs, and (3) examining the effects of viewing dolphins in an aquarium-type display. Additionally, information collected from partici-

pants of dolphin shows and interaction programs was used to examine the effects of demographics and previous experiences on entry levels of conservation-related knowledge, attitude, and behavior.

## Participants

The participants of the study included adult visitors, over the age of 18, at six zoological institutions throughout the United States. The six institutions included the Minnesota Zoo (Apple Valley, MN), Brookfield Zoo (Brookfield, IL), Indianapolis Zoo (Indianapolis, IN), Texas State Aquarium (Corpus Christi, TX), Disney's The Seas (Lake Buena Vista, FL), and Dolphin Connection (Duck Key, FL). Four of the six facilities offered dolphin shows, and five of the six facilities offered dolphin interaction programs. The resulting sample sizes included 462 participants attending dolphin shows and 331 participants attending interaction programs. A subset of the sample from dolphin shows ( $n = 164$ ) and interaction programs ( $n = 128$ ) also participated in a follow-up survey approximately 3 months after the initial experience ( $M = 109.5$  days; range 90–159). Additionally, adult visitors at Disney's The Seas were selected for visitors who had seen dolphins within the aquarium ( $n = 100$ ) and a comparison group who did not view dolphins ( $n = 100$ ).

## Data Collection

All data were collected between September 2007 and July 2008. Visitors attending dolphin shows were selected to participate in a survey using a continual ask approach by choosing every  $n$ th visitor. Counting of visitors for selection discontinued while discussing the survey with a potential survey respondent and resumed after handing the clipboard with a survey to the respondent. Due to smaller attendance figures, all visitors participating in interaction programs were asked to participate in the survey. All participants that declined to take the survey were recorded with the reason for declining to determine a success rate and ensure adequate unbiased sampling.

The survey consisted of a repeated measures design where participants were surveyed before (entry), directly after (exit) and approximately 3 months following (follow-up) their experience. The entry questionnaire consisted of 48 Likert-type scale items related to conservation of dolphins and the marine environment [Adelman et al., 2000; Dierking et al., 2004; Dunlap & Van Liere, 1978; Dunlap et al., 2000; Likert, 1932]. These items consisted of 10 questions to examine conservation-related knowledge (Table 1), 17 questions to examine conservation-related attitude (Table 2), and 21 questions to examine interest in conservation-related behaviors (Table 3). It is important to note that the knowledge questions utilized in the current survey explore a person's level of perceptual knowledge and allows for exploring the degree to which people were aware of the correct response. The choice for using this format of question potentially allowed for more variability in response to explore changes

**TABLE 1. Knowledge-Based Questions Utilized for the Survey**

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**Questions**  
 Dolphins are an intelligent and complex species  
 Feeding and/or interacting with a dolphin in the wild could be harmful for the animal  
 People that live near the coast (for example Florida, Georgia or South Carolina) can affect the waters where dolphins live  
 Humans and dolphins depend on some of the same resources  
 People that live away from the coast (for example Illinois, Arizona, or North Dakota) can affect the waters where dolphins live  
 It is illegal to feed a dolphin in the wild  
 Marine debris in the ocean is not a serious problem  
 Humans are severely abusing the oceans  
 Overfishing is a serious problem that can affect dolphins  
 Swimming with a dolphin in the wild is safe for you and the dolphin

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in knowledge within these programs. The exit and follow-up questionnaires consisted of the original 48 Likert-type scale items with five additional Likert-type scale items (Table 4). Items were chosen to be representative of the geographic locations represented by the institutions and the issues related to marine conservation in each of those areas. Knowledge and attitude scale items were based on a five-point scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Behavioral scale items were also based on a five-point scale ranging from 1 (not interested) to 5 (planning on doing). Dichotomous responses were also indicated by visitors as to which of the behaviors they had engaged in within the previous 3 months (recent behavior) and anytime in the past (anytime behavior). Additionally, the entry question-

**TABLE 2. Attitude-Based Questions Utilized for the Survey**

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**Questions**  
 I care about the well-being of dolphins in a zoo or aquarium  
 Dolphins do not need to be protected from humans  
 Humans have the right to modify the oceans to suit their needs  
 I would be willing to decrease my standard of living to protect the oceans  
 Human ingenuity will ensure that we do not make the oceans unlivable  
 I would be willing to pay much higher prices for common household items to protect the oceans  
 I have an emotional connection to dolphins in the wild  
 Humans were meant to rule over the oceans  
 Dolphins are just another animal  
 I have an emotional connection to dolphins in a zoo or aquarium  
 Dolphins have as much right as humans to exist  
 Humans will eventually learn enough about the ocean to be able to control it  
 I care about the well-being of dolphins in the wild  
 It is too difficult for someone like me to help protect the oceans  
 I would be willing to pay much higher taxes to protect the oceans  
 When humans interfere with the ocean it often has disastrous consequences  
 There is no point in doing what I can for the oceans unless others do the same

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**TABLE 3. Behaviors/Activities Utilized for the Survey**

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**Questions**  
 Become a member of a marine environmental organization  
 Buy or check out a book from the library about dolphins  
 Buy or check out a book from the library about the oceans  
 Contact a state or government agency to get information about the oceans  
 Donate money to a marine conservation organization  
 Donate money to help conserve wild dolphins  
 Point out behavior to friends that could harm the marine environment  
 Feed a dolphin in the wild  
 Recycle plastic grocery bags  
 Purchase products that are marine environmentally friendly  
 Spend time in nature viewing wild dolphins  
 Sort glass or aluminum cans for recycling  
 Use chemical insecticides or pesticides  
 Talk with friends about marine environmental problems  
 Visit a zoo or aquarium  
 Use fertilizers in the yard  
 Vote for political candidates based on marine environmental issues  
 Volunteer for a marine conservation organization  
 Watch a television show about the oceans  
 Watch a television show about dolphins  
 Write a letter to politicians about marine environmental issues

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naire examined previous participation in 21 conservation-related behaviors (Table 3) during the previous 3 months and anytime in the past. The follow-up questionnaire examined participation in 21 conservation-related behaviors during the 3 months between the exit and follow-up questionnaires.

Demographic information including sex, age, number of people with the participant, race/ethnicity, and educational background was collected from all participants. Additionally, information on the reason for attending or participating in the current show or program and past experiences with dolphin tours in the wild, dolphin shows, and dolphin interaction programs were recorded. The name, email address, phone number, and information on the best time to contact the participant were collected to conduct follow-up surveys for all participants who provided consent. Follow-up surveys occurred approximately 3 months after participation either through a website or phone interviews depending on visitor preference.

In addition to examining the effects of dolphin shows and interaction programs on conservation-related knowledge, attitude, and behavior, a selection of visitors at one facility

**TABLE 4. Additional Questions Utilized on the Exit and Follow-Up Surveys**

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**Questions**  
 This experience was entertaining  
 This experience was educational  
 This experience increased my interest in learning more about dolphins and the ocean  
 This experience increased my caring for dolphins and the ocean  
 This was one of the best experiences of my life

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were selected to examine effects of viewing dolphins vs. a comparison group (did not see a dolphin) using only the entry survey questions. Participants were selected by using a continual ask approach choosing the  $n$ th visitor entering a queue line at one of the attractions at Disney's The Seas. Participants were grouped based on viewing or not viewing dolphins before completion of the survey. Information on previous experiences and reasons for visiting were also collected.

### Questionnaire Validation

Reliability analysis ( $n = 118$ ) was conducted to examine properties of the measurement scales, and identify problem items to be removed from the questionnaire. The final version of the questionnaire resulted in an alpha level of 0.701 (knowledge), 0.823 (attitude), and 0.874 (behavioral intentions). Survey questions from the final version were analyzed for document reading level and analysis resulted in a Flesch–Kincaid Grade level of 7.52 with a Flesch Reading Ease level of 58.12.

### Data Analysis

All information collected was analyzed to examine the distribution of the data and ensure assumptions were met for any parametric statistics including regression analysis. Due to a skew in the distribution of data on the number of dolphin shows previously attended by visitors, the data were divided into six categories with approximately an equal number of responses in each category. The resulting categories included zero dolphin shows in the past, one dolphin show in the past, two to four dolphin shows in the past, five to nine dolphin shows in the past, and 10 or more dolphin shows in the past. Additionally, education level was also coded to create a dichotomous variable based on those who had or had not received a college degree. Demographic information was analyzed to determine the characteristics of the sample.  $\chi^2$  tests of significance were used to examine differences between dolphin show/interaction program participants and dolphin viewing/comparison groups. Standardized residuals were used to determine where significant differences existed for any significant result.

Any negative Likert-type scale items (e.g., "Swimming with a dolphin in the wild is safe for you and the dolphin") were recoded to match positive responses by reversing the scale. A paired samples  $t$ -test was used to examine short-term changes in knowledge, attitude, and intended behavior between the entry survey and exit surveys for participants of both dolphin shows and interaction programs. A paired samples  $t$ -test was also used to examine long-term changes in knowledge, attitude, reported behavior and intended behavior between the entry survey and follow-up surveys for participants of both dolphin shows and interaction programs. For all results examining differences between conditions, effect scores (Cohen's  $d$ ) were calculated to determine magnitude of the difference. Information collected from participants viewing dolphins on conservation-related knowledge, attitude, and behavior was

compared to participants of the comparison group who did not view dolphins using an independent samples  $t$ -test.

Multiple regression analysis was used to examine the effect of demographics (sex and education level), previous experiences and participant type (dolphin show or interaction program) on knowledge, attitude, recent behavior, behavior anytime in the past, and behavioral intentions recorded from the entry survey.

### RESULTS

A summary of the demographic information collected from participants of dolphin shows and interaction programs is presented in Table 5. Participants of both types of programs were more likely to be female (DS:  $z = 7.51$ ,  $P < 0.01$ ; IP:  $z = 6.16$ ,  $P < 0.01$ ), were more likely to be Caucasian (DS:  $z = 32.35$ ,  $P < 0.01$ ; IP:  $z = 32.76$ ,  $P < 0.05$ ), were more likely to have attended at least some college (DS:  $z = 15.03$ ,  $P < 0.01$ ; IP:  $z = 11.98$ ,  $P < 0.01$ ), and were more likely from the United States (DS:  $z = 20.05$ ,  $P < 0.01$ ; IP:  $z = 14.61$ ,  $P < 0.01$ ).

The differences between participants of dolphin shows and interaction programs included age ( $\chi^2 = 30.03$ ,  $P < 0.01$ ), race ( $\chi^2 = 24.28$ ,  $P < 0.01$ ), visit reason ( $\chi^2 = 334.81$ ,  $P < 0.01$ ) and location ( $\chi^2 = 17.33$ ,  $P < 0.01$ ). Participants of dolphin shows had a higher percentage of participants between the ages of 25 and 34 ( $z = 2.46$ ,  $P < 0.01$ ), a higher percentage of people of Hispanic origin ( $z = 2.56$ ,  $P < 0.01$ ), a higher percentage were visiting for social or family reasons ( $z = 8.00$ ,  $P < 0.01$ ), and a lower percentage of international visitors ( $z = -2.54$ ,  $P < 0.01$ ). Participants of interaction programs had a higher percentage of participants between the ages of 45 and 54 ( $z = 2.46$ ,  $P < 0.01$ ), were visiting for a new or unique experience ( $z = 9.77$ ,  $P < 0.01$ ), and had a higher percentage of international visitors compared to participants of dolphin shows ( $z = 2.94$ ,  $P < 0.01$ ). Table 6 includes the demographic information for participants that had viewed dolphins and the comparison group (had not viewed dolphins). There were no significant differences in demographic information between these two samples.

Table 7 presents the results examining short- and long-term changes in knowledge, attitude, behavioral intentions, and reported behavior for participants of dolphin shows and interaction programs. There were significant short-term increases in conservation-related knowledge (DS:  $t = -2.73$ ,  $P < 0.01$ ; IP:  $t = -12.12$ ,  $P < 0.01$ ), attitude (DS:  $t = -2.05$ ,  $P < 0.05$ ; IP:  $t = -12.33$ ,  $P < 0.01$ ), and behavioral intentions (DS:  $t = -11.23$ ,  $P < 0.01$ ; IP:  $t = -13.84$ ,  $P < 0.01$ ) in the short-term. Three months following their experiences, knowledge was significantly higher than what was reported during the entry survey for participants of both types of programs (DS:  $t = -2.56$ ,  $P < 0.05$ ; IP:  $t = -8.10$ ,  $P < 0.01$ ). Participants of interaction programs also showed significantly higher levels of attitudes ( $t = -2.10$ ,  $P < 0.05$ ) and behavioral intentions ( $t = -3.13$ ,  $P < 0.01$ ) during the follow-up when compared to entry survey levels. Additionally, reported

TABLE 5. Demographic Information for Participants of Dolphin Shows and Interaction Programs

Demographic	Category	Dolphin show		Interaction program		$\chi^2$
		Percentage	N	Percentage	N	
Sex	Male	32%	149	33%	109	0.02
	Female	68%	311	67%	222	
Age	18–24	14%	65	12%	41	30.03*
	25–34	34%	153	19%	63	
	35–44	27%	125	28%	92	
	45–54	14%	63	24%	78	
	55–64	8%	38	13%	42	
	65+	3%	12	4%	13	
Race	White	81%	368	92%	304	24.28*
	Asian	2%	10	2%	7	
	African American	2%	11	1%	3	
	Hispanic	13%	57	4%	13	
	Other	2%	10	1%	2	
Education	Grade school	0%	1	1%	3	8.48
	Some high school	2%	10	4%	13	
	High school graduate	12%	57	12%	39	
	Some college	29%	132	24%	80	
	College graduate	31%	144	37%	122	
	Technology school graduate	6%	26	5%	15	
	Some graduate school	4%	19	3%	10	
	Graduate degree	15%	70	14%	46	
Visit Reason	New experience	12%	55	67%	221	334.81*
	Social experience	77%	354	14%	46	
	Learning experience	6%	27	15%	51	
	Other	5%	23	4%	14	
Location	United States	97%	447	90%	308	17.33*
	International	3%	15	10%	36	

Note. \* $P < 0.01$ .

TABLE 6. Demographic Information for Participants who had Viewed Dolphins and the Comparison Group (who had not Viewed Dolphins)

Demographic	Category	Dolphin View		Comparison		$\chi^2$
		%	N	%	N	
Sex	Male	42%	42	40%	40	1.13
	Female	58%	57	60%	60	
Age	18–24	5%	5	6%	6	0.93
	25–34	28%	28	26%	26	
	35–44	43%	43	46%	46	
	45–54	11%	11	13%	13	
	55–64	11%	11	8%	8	
	65+	1%	1	1%	1	
Race	White	87%	87	90%	90	3.05
	Asian	4%	4	2%	2	
	African American	1%	1	0%	0	
	Hispanic	5%	5	7%	7	
	Other	3%	3	1%	1	
Education	Grade school	0%	0	0%	0	10.02
	Some high school	0%	0	2%	2	
	High school graduate	6%	6	6%	6	
	Some college	21%	20	15%	15	
	College graduate	43%	42	38%	38	
	Tech. School Graduate	1%	1	6%	6	
	Some graduate school	7%	7	7%	7	
	Graduate degree	22%	21	26%	26	
Visit Reason	New experience	11%	11	13%	13	0.85
	Social experience	83%	81	81%	80	
	Learning experience	4%	4	3%	3	
	Other	2%	2	3%	3	
Location	United States	95%	92	90%	89	0.52
	International	5%	5	10%	10	

TABLE 7. Short and Long-Term Effects of Dolphin Shows and Interaction Programs on Conservation-Related Knowledge, Attitude, and Behavior

	Dolphin Show						Interaction Program					
	Entry			Exit/ Follow-up			Entry			Exit/ Follow-up		
	M	SE	d	M	SE	d	M	SE	d	M	SE	d
Short-term												
Knowledge	4.19	0.02	0.128	4.23	0.02	0.128	4.28	0.02	0.128	4.52	0.02	0.684
Attitude	3.79	0.02	0.097	3.81	0.03	0.097	3.93	0.03	0.097	4.11	0.03	0.708
Behavioral intentions	3.08	0.03	0.522	3.29	0.04	0.522	3.29	0.04	0.522	3.65	0.04	0.832
Long-term												
Knowledge	4.29	0.04	0.217	4.38	0.04	0.217	4.29	0.03	0.217	4.58	0.03	0.726
Attitude	3.91	0.04	-	3.89	0.04	-	4.01	0.04	-	4.07	0.04	0.187
Reported behavior	0.37	0.01	0.187	0.4	0.01	0.187	0.33	0.02	0.187	0.4	0.02	0.396
Behavioral intentions	3.34	0.06	-	3.4	0.06	-	3.35	0.05	-	3.52	0.05	0.293

Note. \* $P < 0.05$ ; \*\* $P < 0.01$ .

conservation-related behavior was also significantly higher during the follow-up survey when compared to entry levels for participants of both dolphin shows and interaction programs (DS:  $t = -2.37, P < 0.05$ ; IP:  $t = -4.44, P < 0.01$ ). However, a comparison of people who had viewed dolphins with those who had not viewed dolphins revealed no significant differences in conservation-related knowledge ( $t = -0.28, P = \text{n.s.}$ ), attitude ( $t = 0.20, P = \text{n.s.}$ ), reported behavior ( $t = 0.09, P = \text{n.s.}$ ), or behavioral intentions ( $t = -0.39, P = \text{n.s.}$ ).

A majority of participants of both dolphin shows and interaction programs agreed or strongly agreed both types of programs were entertaining (DS:  $z = 24.76, P < 0.01$ ; IP:  $z = 21.66, P < 0.01$ ) and educational (DS:  $z = 22.09, P < 0.01$ ; IP:  $z = 21.32, P < 0.01$ ). Table 8 is a summary of the percent agreement and average scores with standard deviations for each of the questions about the participants' overall experience. A majority of participants for both types of programs also indicated that these programs increased their interest in learning more about (DS:  $z = 12.38, P < 0.01$ ; IP:  $z = 19.84, P < 0.01$ ) and caring for (DS:  $z = 13.29, P < 0.01$ ; IP:  $z = 20.06, P < 0.01$ ) dolphins and the marine environment. However, only participants of interaction programs agreed that the program was one of the best experiences of their life (DS:  $z = -1.88, P < 0.05$ ; IP:  $z = 17.33, P < 0.01$ ).

Table 9 presents the descriptive statistics and correlations for entry levels of knowledge, attitude, behavior, and behavioral intentions and predictor variables including education level, number of dolphin shows attended in the past, and participation in an interaction program in the past. Entry and predictor variables are based on the entire sample ( $n = 777$ ). Follow-up variables are based on that portion of the sample ( $n = 292$ ). The relationship between entry scores and previous experiences was examined using multiple regression analysis. In earlier models, previous experiences at institutions or on dolphin watching boat trips were included. However, there were no significant relationships observed and these variables were removed from further analyses to create a simpler model. The results from the regression analysis are presented in Table 10. The model examined was a significant predictor for entry levels of knowledge ( $R^2 = 0.08, P < 0.01$ ), attitude ( $R^2 = 0.11, P < 0.01$ ), recent behavior ( $R^2 = 0.03, P < 0.01$ ), anytime behavior ( $R^2 = 0.12, P < 0.01$ ), and behavioral intentions ( $R^2 = 0.06, P < 0.01$ ). Number of dolphin shows attended in the past was a significant predictor for all variables. In addition, attending an interaction program in the past was a significant predictor for all variables, except for recent conservation-related behavior.

## DISCUSSION

Participants of dolphin shows demonstrated a short-term increase in conservation-related knowledge, attitudes, and intended behavior. Follow-up results suggest that atti-

**TABLE 8. Percent Agreement and Mean Rankings of Participants' Experiences with Dolphin Shows and Interaction Programs**

Statement	Dolphin Show			Interaction Program		
	%	M	SE	%	M	SE
This experience was entertaining	96.7%	4.59	0.03	99.4%	4.89	0.02
This experience was educational	90.6%	4.44	0.03	98.4%	4.87	0.02
This experience increased my interest in learning more about dolphins and the ocean	68.4%	3.99	0.04	94.4%	4.65	0.04
This experience increased my caring for dolphins and the ocean	70.5%	4.01	0.04	95.0%	4.65	0.03
This was one of the best experiences of my life	35.6%	3.19	0.05	87.5%	4.39	0.04

**TABLE 9. Descriptive Statistics and Correlation Coefficients for Dependent and Predictor Variables**

Variable	1	2	3	4	5	6	7	8
1. Entry knowledge	-							
2. Entry attitude	0.57**	-						
3. Entry recent behavior	0.14**	0.18**	-					
4. Entry anytime behavior	0.24**	0.30**	0.56**	-				
5. Entry behavioral intentions	0.32**	0.52**	0.24**	0.35**	-			
6. Education level completed	0.14**	0.00	0.07	0.19**	0.05	-		
7. Number of dolphin shows	0.12**	0.09**	0.16**	0.28**	0.11**	0.09**	-	
8. Interaction program	0.12**	0.12**	0.04	0.14**	0.07	0.00	0.10**	-
M	4.22	3.84	0.35	0.55	3.16	0.57	1.81	0.09
SD	0.42	0.47	0.17	0.20	0.72	0.50	1.24	0.29

Note. \* $P < 0.05$ ; \*\* $P < 0.01$ .

tudes and behavioral intentions for these participants return to baseline levels 3 months following the show. These results are similar to other studies examining specific exhibits or programs within zoological institutions in that interest in participating in conservation-related activities often returns to baseline levels 2 or 3 months after the visit [Adelman et al., 2000; Dierking et al., 2004; Dotzour et al., 2002]. However, the participants of dolphin shows retained the conservation-related knowledge gained during the shows when surveyed 3 months following their experience and reported engaging in more conservation-related behaviors 3 months following the show compared to the 3 months before the show.

Participants of interaction programs also had a short-term increase in conservation-related knowledge, attitude, and intended behavior. Moreover, all three of these attributes were significantly higher 3 months following the programs when compared to entry levels. Similar to participants of

dolphin shows, participants also reported engaging in more conservation-related behaviors 3 months following the program compared to the 3 months before the program. These results suggest that both dolphin shows and interaction programs can be an important part of a conservation education program at a zoo or aquarium.

Similar to previous studies examining educational effectiveness of zoo exhibits [e.g., Swanagan, 1993], dolphin shows and interaction programs have the ability to increase knowledge, attitudes, and behavioral intentions in the short term. Additionally, there was a long-term sustained increase in conservation-related knowledge with reported changes in conservation-related behavior for participants of dolphin shows and long-term increases in knowledge, attitudes, behavioral intentions, and reported behavior for participants of interaction programs. The differences in the results for dolphin shows and interaction

**TABLE 10. Regression Analysis Examining Previous Experiences with Dolphin Shows and Interaction Programs on Conservation-Related Knowledge, Attitude, Behavioral Intentions and Reported Behavior**

Predictor variables	Knowledge $\beta$	Attitude $\beta$	Recent behavior $\beta$	Anytime behavior $\beta$	Behavioral intentions $\beta$
Sex	-0.14**	-0.20**	-0.01	0.00	-0.14**
Education level	0.12**	0.00	0.07	0.17**	0.02
Number dolphin shows	0.10*	0.08*	0.14**	0.26**	0.11**
Interaction program	0.10*	0.14**	0.03	0.11**	0.09*
Participant type	0.14**	0.18**	-0.05	0.05	0.15**
	$R^2 = 0.08**$	$R^2 = 0.11**$	$R^2 = 0.03**$	$R^2 = 0.12**$	$R^2 = 0.06**$

Note. \* $P < 0.05$ ; \*\* $P < 0.01$ .

programs compared to results from other zoological exhibits could be attributed to the duration of dolphin shows and interaction programs, or the entertaining value of these programs.

Previous research has shown that duration of time spent at exhibits positively correlates with learning [Falk, 1983]. It is possible that the approximate 20-min duration of dolphin shows or hour and a half duration of interaction programs is the difference between the current results and results from studies examining the effects of other types of programs. Alternatively, information being presented in the form of an entertaining show or interaction program could be the reason for the sustained increases and reported change in behavior. Ninety-seven percent of the participants of dolphin shows and 99% of the participants of interaction programs agreed or strongly agreed that the experience was entertaining. This was consistent with previous results that interactive exhibits, increased animal activity, and animal shows can hold audiences longer than graphic displays [Altman, 1998; Bitgood et al., 1986; Jackson, 1994; Swanagan, 2000], likely due to the entertaining value of those experiences. While the exact reason for the differences in the short- and long-term changes observed for participants of dolphin shows and interaction programs compared to results from previous studies on many different zoo exhibits cannot be identified, the results from the present study suggest that dolphin shows and interaction programs can be an important part of a conservation education program within a zoo or aquarium. Visitors who viewed dolphins compared to visitors who had not viewed dolphins did not demonstrate significant differences in knowledge, attitude, or behavioral intentions. Consequently, it is unlikely that just having the ability to see dolphins during a show or interaction program is the reason for increases in conservation-related knowledge, attitudes, and behavior.

Combining the results from the participant's current dolphin show or interaction program with the results from the regression analysis on entry levels of knowledge, attitude, reported behavior, and behavioral intentions, strengthens the idea that dolphin shows and interaction programs can be an important component of conservation education within zoos and aquariums. Both the number of dolphin shows attended in the past and participation in interaction programs were significant predictors of knowledge, attitudes, behavioral intentions, and reported conservation behavior anytime in the past. However, the number of dolphin shows attended in the past was also a significant predictor for recent conservation-related behavior which suggests that repeat visits to these types of programs may be important in creating long-term sustainable behavior. Since attitudes and behavioral intentions both returned to baseline levels during the 3-month follow-up surveys, having repeat experiences with these types of programs may produce long-term change.

Participants of dolphin shows and interaction programs consistently scored their experiences as entertaining

and educational, and a majority of the participants agreed the experiences increased their interest in learning more about and caring for dolphins and the marine environment. A majority of participants of interaction programs even considered the experience as one of the best experiences of their life. These results suggest that participants enjoy these types of programs, and that shows and/or interactive experiences may be important tools for inspiring visitors of zoological institutions to get involved in conservation. With the many anthropogenic threats that dolphins experience, educating the public about conservation issues surrounding dolphins and the marine environment could be a key component in management plans to help conserve dolphins and many other species. Determining ways to increase repeat visitorship may also be an important key in the conservation of wildlife and the environments in which they live. Only through continued systematic evaluation of education programs within zoos and aquariums will we be able to determine the best ways to inspire visitors to conservation action.

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