Reassessing public opinion of captive cetacean attractions with a photo elicitation survey (#25794)

First submission

Editor guidance

Please submit by **6 Jun 2018** for the benefit of the authors (and your $200 publishing discount).

Structure and Criteria
Please read the 'Structure and Criteria' page for general guidance.

Custom checks
Make sure you include the custom checks shown below, in your review.

Raw data check
Review the raw data. Download from the materials page.

Image check
Check that figures and images have not been inappropriately manipulated.

Privacy reminder: If uploading an annotated PDF, remove identifiable information to remain anonymous.

Files
Download and review all files from the materials page.

3 Figure file(s)
5 Table file(s)
1 Raw data file(s)

Custom checks

Human participant/human tissue checks

- Have you checked the authors ethical approval statement?
- Does the study meet our article requirements?
- Has identifiable info been removed from all files?
- Were the experiments necessary and ethical?

Structure and Criteria

2

Structure your review

The review form is divided into 5 sections.
Please consider these when composing your review:

1. **BASIC REPORTING**
2. **EXPERIMENTAL DESIGN**
3. **VALIDITY OF THE FINDINGS**
4. General comments
5. Confidential notes to the editor

You can also annotate this PDF and upload it as part of your review

When ready submit online.

Editorial Criteria

Use these criteria points to structure your review. The full detailed editorial criteria is on your guidance page.

BASIC REPORTING

- Clear, unambiguous, professional English language used throughout.
- Intro & background to show context. Literature well referenced & relevant.
- Structure conforms to PeerJ standards, discipline norm, or improved for clarity.
- Figures are relevant, high quality, well labelled & described.
- Raw data supplied (see PeerJ policy).

EXPERIMENTAL DESIGN

- Original primary research within Scope of the journal.
- Research question well defined, relevant & meaningful. It is stated how the research fills an identified knowledge gap.
- Rigorous investigation performed to a high technical & ethical standard.
- Methods described with sufficient detail & information to replicate.

VALIDITY OF THE FINDINGS

- Impact and novelty not assessed. Negative/inconclusive results accepted. *Meaningful* replication encouraged where rationale & benefit to literature is clearly stated.
- Data is robust, statistically sound, & controlled.
- Conclusions are well stated, linked to original research question & limited to supporting results.
- Speculation is welcome, but should be identified as such.

Standout reviewing tips

The best reviewers use these techniques

Tip	*Example*
Support criticisms with evidence from the text or from other sources	*Smith et al (J of Methodology, 2005, V3, pp 123) have shown that the analysis you use in Lines 241-250 is not the most appropriate for this situation. Please explain why you used this method.*
Give specific suggestions on how to improve the manuscript	*Your introduction needs more detail. I suggest that you improve the description at lines 57- 86 to provide more justification for your study (specifically, you should expand upon the knowledge gap being filled).*
Comment on language and grammar issues	*The English language should be improved to ensure that an international audience can clearly understand your text. Some examples where the language could be improved include lines 23, 77, 121, 128 – the current phrasing makes comprehension difficult.*
Organize by importance of the issues, and number your points	*1. Your most important issue* *2. The next most important item* *3. …* *4. The least important points*
Please provide constructive criticism, and avoid personal opinions	*I thank you for providing the raw data, however your supplemental files need more descriptive metadata identifiers to be useful to future readers. Although your results are compelling, the data analysis should be improved in the following ways: AA, BB, CC*
Comment on strengths (as well as weaknesses) of the manuscript	*I commend the authors for their extensive data set, compiled over many years of detailed fieldwork. In addition, the manuscript is clearly written in professional, unambiguous language. If there is a weakness, it is in the statistical analysis (as I have noted above) which should be improved upon before Acceptance.*

Reassessing public opinion of captive cetacean attractions with a photo elicitation survey

Sophia N Wassermann Corresp., [1, 2] , **Edward J Hind-Ozan** [2, 3] , **Julia Seaman** [4]

[1] Ryan Institute, National University of Ireland, Galway, Galway, Ireland

[2] Center for Marine Resource Studies, The School for Field Studies, South Caicos, Turks and Caicos Islands

[3] Sustainable Places Research Institute, Cardiff University, Cardiff, Wales, United Kingdom

[4] Babson Survey Research Group, Babson College, Babson Park, Massachusetts, United States

Corresponding Author: Sophia N Wassermann
Email address: s.wassermann1@nuigalway.ie

Background.

Captive cetacean attractions are growing in number globally, their operators citing disputed benefits of entertainment, education, and conservation. Both those for and against developing such facilities claim public support for their positions. Previous public opinion research, however, shows little public consensus, suggested to be partly due to the introduction of biases in study design that influence participants' responses. Those involved in, or concerned with, the development and licensing of captive cetacean attractions need to better understand what drives the lack of consensus in public opinion research on cetacean captivity to take socially-acceptable decisions.

Methods.

We reviewed previous research into public opinion on cetacean captivity, noting sources of bias introduced during the research so they could be mitigated in our study. Introduced bias seemed primarily to result from wording choice for survey questions, so a photo elicitation approach was used. We showed respondents (N=292) photographs of a marine mammal park (MMP) killer whale show and a swim-with-the-dolphins (SWTD) attraction and asked for their thoughts on the potential development of each. They indicated on Likert scales how likely they would be to visit each attraction, if developed.

Results.

Respondents were against visiting MMP killer whale shows, with 60.9% not likely to visit such an attraction. SWTD attractions were more popular, with 60.3% likely to visit. Qualitative responses, however, suggested these attractions could become less popular in the future. For SWTD attractions, residents of the USA were more likely to visit; older respondents and those staying in all-inclusive accommodation were less likely to visit. Those staying in all-inclusive accommodation were less likely to visit MMP killer whale shows. The great majority of qualitative comments centred on either entertainment value or issues concerning animal welfare. Very few, if any, comments related to the education or conservation values of captive cetacean attractions.

Discussion.

Our findings contradict several previous studies into public opinion of captive cetacean attractions that did not use photo elicitation. The support shown for MMP killer whale shows in this survey was well below that claimed by studies conducted on behalf of captive cetacean attraction operators. Opposition to

SWTD attractions is also noticeable lower than that found in surveys conducted with respondents viewing wild cetaceans. While some of this variance can be attributed to the different settings of the surveys, much seems attributable to bias introduced through methodology choice. These conclusions, among others made in this study, suggest that development decisions for captive cetacean attractions are being made on misleading data. Going forward, data collected via bias-minimising approaches like photo elicitation should be that which informs such decisions.

Reassessing public opinion of captive cetacean attractions with a photo elicitation survey

Sophia N Wassermann[Corresp., 1,2], Edward J Hind-Ozan[2,3], Julia Seaman[4]

[1]Ryan Institute, National University of Ireland, Galway, Galway, Ireland
[2]Center for Marine Resource Studies, The School for Field Studies, South Caicos, Turks and Caicos Islands.
[3]Sustainable Places Research Institute, Cardiff University, Cardiff, Wales, United Kingdom
[4]Babson Survey Research Group, Babson College, Babson Park, Massachusetts, United States

Corresponding Author: Sophia N Wassermann
Email address: so@sowasser.com

Abstract

Background.
Captive cetacean attractions are growing in number globally, their operators citing disputed benefits of entertainment, education, and conservation. Both those for and against developing such facilities claim public support for their positions. Previous public opinion research, however, shows little public consensus, suggested to be partly due to the introduction of biases in study design that influence participants' responses. Those involved in, or concerned with, the development and licensing of captive cetacean attractions need to better understand what drives the lack of consensus in public opinion research on cetacean captivity to take socially-acceptable decisions.

Methods.
We reviewed previous research into public opinion on cetacean captivity, noting sources of bias introduced during the research so they could be mitigated in our study. Introduced bias seemed primarily to result from wording choice for survey questions, so a photo elicitation approach was used. We showed respondents (N=292) photographs of a marine mammal park (MMP) killer whale show and a swim-with-the-dolphins (SWTD) attraction and asked for their thoughts on the potential development of each. They indicated on Likert scales how likely they would be to visit each attraction, if developed.

Results.
Respondents were against visiting MMP killer whale shows, with 60.9% not likely to visit such an attraction. SWTD attractions were more popular, with 60.3% likely to visit. Qualitative responses, however, suggested these attractions could become less popular in the future. For SWTD attractions, residents of the USA were more likely to visit; older respondents and those staying in all-inclusive accommodation were less likely to visit. Those staying in all-inclusive accommodation were less likely to visit MMP killer whale shows. The great majority of qualitative comments centred on either entertainment value or issues concerning animal welfare. Very few, if any, comments related to the education or conservation values of captive cetacean attractions.

Discussion.
Our findings contradict several previous studies into public opinion of captive cetacean attractions that did not use photo elicitation. The support shown for MMP killer whale shows in this survey was well below that claimed by studies conducted on behalf of captive cetacean attraction operators. Opposition to SWTD attractions is also noticeable lower than that found in surveys conducted with respondents viewing wild cetaceans. While some of this variance can be attributed to the different settings of the surveys, much seems attributable to bias introduced through methodology choice. These conclusions, among others made in this study, suggest that development decisions for captive cetacean attractions are being made on misleading data. Going

forward, data collected via bias-minimising approaches like photo elicitation should be that which informs such decisions.

Introduction

Since the 1960s, thousands of cetaceans have been held captive in a globally-increasing number of marine mammal parks (MMPs), aquariums, and captive swim-with-the-dolphins (SWTD) attractions (Jiang, Lück, & Parsons, 2007). In 2018, these included 60 killer whales or orcas (*Orcinus orca*) (Orca Home, 2018) and near 2000 dolphins in upward of 300 facilities (Born Free Foundation [BFF], 2016; Change for Animals Foundation, 2018). Approximately 20 SWTD attractions were in the United States (US), 25 in the Caribbean, and numerous others in China, Japan and other Asian countries (BFF, 2016; Frohoff, 2003; Rose, Parsons, & Farinato, 2009). The existence of such attractions has become increasingly controversial, with researchers, tourism industry actors, non-governmental organisations (NGOs), and segments of the public expressing strong pro- and anti-captivity viewpoints. How these viewpoints influence policy-makers and the general public will likely determine whether further development of captive cetacean attractions occurs.

Those in support of cetacean captivity cite benefits such as increased conservation through public education, entertainment value, and improvements to the physical and psychological health of visitors (Friend, 2006; Parsons, Bauer, McCafferty, Simmonds & Wright, 2013; Reeves, Smith, Crespo & Motarbartolo di Sciara, 2003; Morisaka, Kohshima, Yoshioka, Suzuki, & Nakahara, 2010; Tizzi, Accorsi, & Azzali, 2010; Williams et al., 2011). Close encounters with captive cetaceans are said to be educational, increasing visitors' awareness of conservation issues and their likelihood to advocate for the protection of wild cetaceans (Alliance of Marine Mammal Parks and Aquariums [AMMPA], 1999; Ballantyne, Packer, Hughes, & Dierking, 2007; Harley, Fellner, & Stamper 2010; Miller et al., 2013; Shani & Pizam, 2009). Yet, some contest this idea, stating the removal of animals from the wild for use in attractions puts local populations at risk (Fisher & Reeves, 2005; Parsons, de Calventi, Whaley, Rose, & Sherwin, 2010). The transformative aspect of MMP and SWTD human-cetacean encounters is also questioned; studies show that visitors to captive cetacean facilities learn little about conservation (Barney, Mintzes, & Yen, 2005; Curtin and Wilkes, 2007; Dougherty, 2013; Jiang et al., 2007; Rechberg, 2011; Rose et al., 2009).

Likewise, research into the human benefits of visiting these attractions, such as entertainment value (Shani & Pizam, 2009) and improved physical and psychological health (Brensing & Linke, 2003; Webb & Drummond, 2001; Williamson, 2008), show that any benefits are mediated by discomfort by the captive state of the animals and visitors finding the human-animal encounters too staged (Curtin, 2006; Curtin & Wilkes, 2007; Jiang et al., 2007). Additionally, perceived therapeutic benefits have been discredited by professional clinicians. Research shows that physical harm and disease contraction from dolphins is possible during SWTD encounters. Any benefits from contact, if they exist, are said to be short-lived (Fiksdal,

Houlihan, & Barnes, 2012; Frohoff & Packard, 1995; Hunt et al., 2008; Williams, 2001; Marino & Lilienfeld, 2007; Mazet, Hunt, & Ricardi, 2004).

Many believe that any benefits of cetacean captivity are outweighed by animal welfare concerns. While research by those working at captive cetacean attractions has concluded that animal behaviour can be normal and welfare high (Perelberg, Veit, van der Woude, Donio, & Shashar, 2010; Tizzi et al., 2010), other research has found that initial capture comes with a high risk of mortality (Small & Demaster, 1995) and that subsequent captivity subjects the animals to increased stress levels, poor diet, and a higher chance of injury (Kyngdon, Minot, & Stafford, 2003; Ugaz, Valdez, Romano, & Galindo, 2013; Whale and Dolphin Conservation Society [WDCS] & The Humane Society of the United States [HSUS], 2003). Additionally, while dolphins are often perceived to enjoy interacting with humans at SWTD attractions, this may be due to habituation or a response to ostracism from a dolphin social group, rather than instigated as a typical and enjoyed behaviour (Orams, 1997; Kyngdon et al., 2003). Indeed, wild dolphins ordinarily avoid human contact (Constantine, 2001; Constantine, Brunton, & Dennis, 2004).

The pro- and anti- arguments for keeping cetaceans in captivity have peaked in the last decade, with high-profile public debate over the ethical and conservation implications of the practice (Jiang et al., 2007; Shani & Pizam, 2008). Traditional and online/social media have questioned the continued existence of captive cetacean attractions (Coldwell, 2014; Kuo & Savidge, 2014; Lerer, 2014; Zimmermann, 2014). Most notably, the documentaries *The Cove* (Pesman, Stevens, & Psihoyos, 2009) and *Blackfish* (Cowperthwaite & Oteyza, 2013), which together raised questions about cetacean conservation, captive cetacean welfare, and killer whale trainer safety, have fuelled public animosity toward captive cetacean attractions (Parsons, 2012; Pernetta, 2014; Rechberg, 2011). In response, captive cetacean attraction operators have rallied to rebut criticism (AMMPA, 2013; SeaWorld, 2013).

There is varying public opinion toward captive cetacean tourism. Industry polls in 1992 and 2005 found respectively that 89% and 97% of the general public thought aquaria (including MMPs and SWTD attractions) were important educational venues. However, the 1992 survey also found that 37% of respondents believed captivity to be detrimental to animal life spans (AMMPA, 2005; Jiang et al., 2007; Williams, 2001). A 2003 Canadian poll and a 2014 United States (US) one showed public opposition to killer whale captivity at 68% and 50%, respectively (Edge Research, 2014; Jiang et al., 2007). Whale-watching tourists in Belize identified 96% opposition to the capture of dolphins, 78% opposition to keeping them in closed tanks, and 67% opposition to keeping them in open-sea pens (Patterson, 2010). A study in Aruba identified that only 35% of tourists would be as comfortable seeing dolphins in captivity as in the wild (Luksenburg & Parsons, 2014). Of tourists surveyed in the Dominican Republic, 70% had no plans to visit a captive dolphin facility (Draheim, Bonnelly, Bloom, Rose, & Parsons, 2010). In a 2004 survey of Canadian residents, the most common reasons given for not visiting captive cetacean attractions were lack of interest, high admission costs, and animal welfare issues. Respondents who visited these attractions cited the performances and educational opportunities, rather than human-animal

contact, as their motives. Half of the visitors were knowledgeable of associated animal welfare issues, but few were aware of conservation concerns (Jiang et al., 2007).

With such variable snapshots of public opinion on cetacean captivity, further studies are needed to more clearly inform attraction developers, cetacean conservationists, animal welfare advocates, and marine policy-makers. It has been suggested that these studies need to particularly address the introduction of bias in public opinion research on cetacean captivity, as previous research has often been seen as expending little or ineffective effort on the issue (Marino, Lilienfeld, Malamud, Nobis, & Broglio, 2010).We used a photo elicitation approach to research opinions of tourists in the Turks and Caicos Islands (TCI) toward developing and visiting captive cetacean attractions. By using a methodological approach known for reducing the introduction of some forms of bias, we aimed to contribute to a new baseline of public opinion on cetacean captivity. We also sought to gain insight on the lack of consensus in previous research on public opinion of cetacean captivity.

Study Site

The TCI are an archipelago nation of approximately 40 islands (see Figure 1) in the Caribbean region. With a growing population of 31,458 in 2012 (Turks and Caicos Islands Government [TCIG], 2012a), the tourism sector was responsible for at least 41.8% of Gross Domestic Product (GDP) in 2011 (TCIG, 2012b). Of the 1,315,268 tourists who visited the TCI in 2015, 70.7% visited the island of Grand Turk on cruise ships and most of the remaining 385,531 based their stopover[1] vacations on Providenciales (Turks and Caicos Tourist Board [TCTB], 2015). Tourism has grown near year-on-year since at least the 1990s, a trend likely to continue (TCIG, 2012b; TCTB & Department of Economic Planning and Statistics [DEPS], 2009). The TCI Government (TCIG) encourages development of attractions that will encourage further tourism (TCIG, 2012b), but states that any industries supporting economic expansion should be "economically, culturally, socially and environmentally sustainable" (Ministry of Finance Trade and Investment, 2013).

Cetacean captivity was prohibited in the TCI until a 2012 legal amendment to the *Fisheries Protection Ordinance* (1998), made to accommodate the development application for two proposed SWTD attractions ('Protests in TCI', 2014). This amendment was protested by environmental NGOs and the nation's Department of Environment and Marine Affairs (DEMA), highlighting conservation and animal welfare concerns (House of Commons Environmental Audit Committee, 2014; 'Protests in TCI' 2014; Tyson, 2013). However, TCI policy-makers continued to back development, based on support from TCI citizens who hoped the facility would bring employment, as well as on developer guarantees that the attractions would be especially popular with tourists from the US ('Dolphin Cove development', 2014; 'More jobs', 2014; 'Protests in TCI' 2014; Tyson, 2014). Most cruise ship passengers and 81.7% of stopover guests in 2015 were US citizens in (TCTB, 2015).

[1] A 'stopover' tourist is defined as one who spends 24 hours or more at their resort destination.

At the time of data-collection, the TCI SWTD attractions remained proposed but not constructed. The only recreational tourism associated with cetaceans was small-scale whale-watching tours run from Salt Cay. These tours did not ordinarily involve cruise ship tourists or Providenciales stopover guests.

Materials & Methods

Due to the nature of surveys, several types of bias can be present in public opinion surveys (see Table 1). Many of the previous studies of public opinion on cetacean attractions were conducted by researchers with their own opinions on cetacean captivity. While personal interest is a valid reason to conduct research (Bennett, Ekinsmyth, & Shurmer-Smith, 2002), certain methods are inherently prone to introducing bias, even when the researcher is careful to avoid it. It was important for us, who ourselves identified as anti-captivity, to design a study that was as free of researcher bias as possible.

To avoid sample bias, tourists, rather than TCI residents, were chosen as respondents. Tourists had not uniformly been exposed to the intense local debate surrounding the development of the two SWTD attractions and were subsequently less likely to have partisan opinions on the values of such attractions. In addition, the opinions of tourists are perhaps the most important when considering the justification for developing an SWTD attraction, as they will provide the attendance (or otherwise) that make it viable. Motivated, ingratiation, and social desirability bias were minimised by designing a survey instrument that initially concealed the primary focus of the research from the respondent. Open-ended response options were favoured to minimise the chance introduction of various researcher biases during survey design. This preference was also shown to help nullify the collection of inaccurate information when respondents are forced to choose one option when they would rather choose multiple (Zaller & Feldman, 1992).

First, our survey team showed a grid of six photographs (Fig. S1) to respondents. These depicted six tourist attractions not present in the TCI, but that were popular elsewhere in the Caribbean region, according to feedback on the review website *TripAdvisor*. When shown the photographs, respondents were asked: “What are your opinions on any of these six attractions being introduced in the Turks and Caicos Islands?” No closed options were provided and respondents were not forced to comment on each photograph. Showing the six photographs simultaneously substantially reduced bias associated with presentation order (Gibson et al., 2014). Surveyors took notes on the qualitative comments volunteered by respondents.

Photo elicitation has an excellent track record for accessing the true worldview of respondents (Harper, 2002), as it hands the role of dialogue construction, or the “voice of the research” to the research participant (Frith et al., 2005). Rather than taking verbal cues from the language used in researcher-designed questions, participants can reflect on what an image means to them in their own words. They may pick up on entirely different themes in a photograph than those that a researcher might expect (Epstein et al., 2006). Yet, photo elicitation can still introduce

bias, potentially motivated, when researchers do not theoretically account for variables between photographs (Gaber & Gaber, 2004). We justified its selection because it removed many further opportunities for insertion of researcher-induced bias. Also, we took a theoretical approach to photograph selection to minimise introduction of our personal biases. Rather than choosing photographs that had no variables, a step that, in turn, could have influenced results by removing focus from the attractions (e.g., a close-up of a spectator at a marine mammal show would not have allowed good capture of the show itself), we chose photographs from our personal collections and Creative Commons sources that best represented the perspectives, scenes, and human behaviour evident in a standard *Google Images* search for each attraction. For example, the top 100 results returned for "swim-with-the-dolphins" included 81 close-ups of individuals swimming with captive dolphins with 73 of those individuals facing the camera and clearly smiling. To further ensure internal validity, attractions were also named orally by our survey team when shown to the respondents, ensuring that focus was more likely to remain on the attraction.

Second, our surveyors asked respondents on a 4-point Likert scale whether they would be "very unlikely", "unlikely", "likely" or "very likely" to visit such an attraction in the TCI. Inclusion of a neutral option between "unlikely" and "likely" was considered but rejected, as we wanted to avoid the situation where social desirability bias causes respondents to choose uncontroversial options (Garland, 1991). Finally, respondents were asked demographic questions about their age, gender, country of residence, accommodation, and experience with and interest in cruise tourism.

We used a consecutive sampling approach (see Lunsford & Lunsford, 1995) to complete a total of 292 surveys with stopover tourists on Grace Bay Beach, Providenciales on 18 March 2014. With a large survey team, we could approach every visible tourist on the beach, with the exception of those engaged in activities that impeded their participation (e.g., swimming, sleeping). This approach eliminated the potential sample bias that has crept into previous surveys of public opinion on cetacean captivity, where less strict formats of convenience sampling have been employed (Marino et al., 2010). Surveying in Grand Turk was not logistically possible, but we asked Providenciales visitors about their preference for cruise tourism, to account for the likely attitudes of cruise ship passengers. It was indicated to tourists before they took the survey that their participation was optional.

Statistical analyses were conducted using R (R Core Team, 2015) and Prism. As the Likert scale used did not assign numerical values, we used non-parametric Chi-Square tests to assess hypotheses of difference. For testing the summary responses for each attraction, we used all four Likert variables. For testing on demographic variables, we condensed the responses to two groups, "likely" ("very likely" and "likely" responses) and "unlikely" ("very unlikely" and "unlikely" responses), to facilitate significance testing. We performed tests on a variable if there were large enough groups of individuals for detecting significance, defined here as greater than five individuals. We used Bonferroni corrections within the demographic subgroups (2-7 categories) and significance level is reported for the corrected p-value.

We used structural coding, as described by Saldaña (2013), to code surveyors' notes of respondents' qualitative responses. These were coded as either "NEGATIVE OPINIONS OF

MMPs" and "NEGATIVE OPINIONS OF SWTD ATTRACTIONS", or "POSITIVE OPINIONS OF MARINE MAMMAL PARKS" and "POSITIVE OPINIONS OF SWTD ATTRACTIONS". We also conducted subcoding of the reasons for opinions where possible. We recorded the number of respondents expressing each opinion.

We followed all legal and ethical guidelines for conducting research in the TCI. We did not ask for personal identifiers during surveys, nor were they recorded if given. No individuals from vulnerable populations were enrolled. Verbal consent was acquired. Although the focus of research was initially concealed during survey administration to avoid introducing motivated, ingratiation, and social desirability biases, the true focus of the research (i.e. to measure public opinion of captive cetacean attractions) was revealed to respondents following their participation. No respondents subsequently withdrew their participation when the option was again offered.

Results

Sample demographics

There were a total of 292 respondents and all responses were voluntary. Respondents were 61.1% female and 38.9% male (n = 280). By age, 15.2% of respondents were 18-29, with 10.5% being 30-39, 31.0% being 40-49, 23.1% being 50-59, and 22.2% being 60 or older (n = 277). Most respondents resided in North America, with 71.5% living in the US and 25.8% in Canada. The remaining 2.8% were from Europe, South America, and Egypt (n = 291). Where $n < 292$ it is due to non-responses, all of which are reported in table 2.

In terms of tourists' preferences, those who would consider a future cruise vacation comprised 37.8%, with the remainder uninterested (n = 288). Of the tourists surveyed, 39.8% were staying in all-inclusive resorts, which provided activity programmes as part of the package, with the remainder staying in other accommodation (n = 289). Across the sample, 47.4% had vacationed in the TCI more than once (n = 289).

Qualitative responses: rate and nature

Very few respondents offered qualitative responses for all six photographs. For the photograph of the SWTD attraction, 26.4% of respondents provided open-ended responses, with this reduced to 18.2% for the MMP killer whale show (n = 292). While a small number of respondents responded in greater detail, most answers were between one and three sentences long. All qualitative responses were about the featured attractions, rather than comments that could only be attributed to the images themselves; no respondent remarked on the child in the SWTD image (Fig. S3).

Overall perceptions of tourists

Respondents favoured the possibility of visiting a potential SWTD attraction over an MMP killer whale show, with an overall median description of "likely" to visit the SWTD attraction compared to "unlikely" for the MMP killer whale show. There was a significant difference ($p < 0.001$) between the responses for the MMP killer whale show and the SWTD attraction. The preferred favourability rankings are SWTD attraction, aquarium, botanical gardens, craft market, MMP killer whale show, and maritime museum. The SWTD attraction, aquarium, and botanical gardens all had median descriptors of "likely" to be visited, with the MMP killer whale show and maritime museum having median descriptors of "unlikely". The craft market falls into its own significant group between "likely" and "unlikely". There was no significant difference in the responses for the three "likely" attractions, and minimal significance between them and the craft market. The MMP killer whale show is significantly less attractive than the three "likely" attractions ($p < 0.001$) and the maritime museum ($p < 0.05$), but not significantly less than the craft market. The full range or Likert responses for each attraction are reported in table 3, with significant groupings shown in (Fig. 2).

Only five respondents who were "likely" or "very likely" to visit an MMP killer whale show gave qualitative feedback, all stating "entertainment" as their reason for wanting to visit such an attraction. For those "unlikely" or "very unlikely" to visit, and offering qualitative comments ($n = 48$), the most frequently given reasons for their decisions were animal welfare concerns (72.9%), perceived over commercialisation of the attraction (14.6%), and lack of entertainment (10.4%). Their qualitative justifications for their decision-making included the belief that animals were being "abused" in such parks, that "animals [did not] belong in an environment like this", that they did not like the nature of performances, and that they objected to animals being "caged up". Respondents noted that there "was a lot of bad press" about killer whale shows and that *Blackfish* was "really sad". The documentary was cited by 14.6% as their reasoning for non-visitation. One respondent noted that their young daughter had told them the documentary showed abuse of killer whales. While only 4.2% explicitly mentioned the human welfare threat to animal trainers as a reason for non-visitation, is possible that some of the greater number who cited the content of *Blackfish* would also have had the same reasoning. Sections of the documentary focus on the deaths of three killer whale trainers caused by captive killer whales (Cowperthwaite & Oteyza, 2013). A proportion of 4.2% said they would visit an MMP killer whale show despite their objections, because it was still entertaining for children, if not for themselves.

For tourists offering qualitative appraisals that they would be "likely" or "very likely" to visit an SWTD attraction ($n = 26$) the only reasons they gave were entertainment value (96.2%) and/or that it would be especially enjoyable for children (34.6%). They made comments such as that their daughter would love it because she was going to a marine biology camp, and that they had done it before in the Bahamas and would love to do it again. However, 15.4% of this group identified that they knew about the related animal welfare concerns. The only respondent to mention *Blackfish* when commenting on the SWTD attraction stated the attraction remained "awesome" despite what he had seen in the documentary.

Among survey respondents "unlikely" or "very unlikely" to attend an SWTD attraction (n = 51) the three reasons that stood out for their choice were animal welfare concerns (56.9%), lack of entertainment value (21.6%), and human welfare concerns (9.8%). Qualitative feedback included statements that they would only swim with wild dolphins, that "dolphins should be free", that their daughter had experienced a skin infection after her human-dolphin interaction at another SWTD attraction, that they were worried about male dolphins "getting frisky", and that they would rather go to the beach. Despite their own opposition to the attraction, 11.8% said they would visit with children, as it was more entertaining for that age group. One tourist said she was "unlikely" to visit this type of attraction again, but she "loved it" when she did it before. No respondents mentioned *The Cove* in the unprompted qualitative feedback. A summary of all qualitative responses is detailed in table 4.

By accommodation type

Tourists staying in all-inclusive resorts were significantly less interested in a potential SWTD attraction, "unlikely" to visit compared to "likely" for respondents in other accommodations ($p < 0.0001$). Those staying in all-inclusive resorts were also significantly less interested in visiting MMP killer whale shows ($p = 0.0007$). For this variable, and those that follow, a more detailed summary of tourist visitation likelihood is found in table 5.

By age

Interest in SWTD attractions decreased with age, with older participants more "unlikely" ($p = 0.004$) to visit. There were no significant differences for MMP killer whale shows on this criterion.

By country of residence

Significant groupings ($p = 0.001$) were reported for preference toward visiting an SWTD attraction. Respondents from the US were the most positive and were "likely" to visit, compared to Canadians who fell between "likely" and "unlikely", and those from other countries who were generally "unlikely" to visit. After the Bonferroni correction, no significant differences were found between tourists from different countries for visiting the MMP killer whale show.

By gender, parental status, preference for cruise tourism, and trip frequency to TCI

There were no significant differences in interest in SWTD attractions or MMP killer whale shows by gender, parental status, preference for cruise tourism, or frequency of visitation to the TCI.

Discussion

Public opinion of SWTD attractions

Based almost exclusively on reasoning that such an attraction would be entertaining, especially for children, a majority of tourists to the TCI supported the introduction of a SWTD attraction. The figure of 60.3% support was below the 70.2% found in an earlier industry survey, which potentially introduced motivated bias by asking respondents to agree or disagree with the statement: "I would be interested in swimming with dolphins in a safe, legal and permitted environment at a marine life park, aquarium or zoo" (AAMPA, 2005). The figure found in this study was also above the percentage found in several previous public opinion studies where majorities of respondents reported not favouring visiting captive dolphin attractions (Draheim et al., 2010; Luksenburg & Parsons, 2014). The sample demographics of the study were similar to Luksenburg & Parsons (2014), where 59% of tourists surveyed in Aruba were from the USA. It is possible that, despite these researchers' best efforts to avoid bias, their use of extensive closed-questioning introduced motivated, ingratiation, and/or social desirability bias. Alternatively, tourists in different locations may have different attitudes towards captive cetaceans, as seen with tourist perceptions of the natural environment, which differ by island in the Caribbean region (Uyarra et al., 2005). The results of this study do not at first seem an obstacle to the development of SWTD attractions in a region like the Caribbean.

Those promoting the education, conservation, and welfare benefits of SWTD attractions should, however, take note of the considerable contradictions between this research and that done previously where public opinion has been interpreted to be supportive of captive cetacean attractions for those reasons. The only motivation mentioned by respondents for visiting SWTD attractions was their entertainment value. This belies the polls finding that at least 80% of respondents saw educational and conservation values in captive cetacean attractions (*e.g.* AMMPA, 2005; Miller et al., 2013). This difference may be due to potential ingratiation bias in the survey by Miller et al. (2013), where statements like "this experience was educational" were put to respondents while they were visiting the attraction. It would be uncomfortable for a respondent to respond negatively to this statement while talking to a surveyor they might suspect has a working relationship with the attraction. Jiang et al. (2007) similarly found that conservation value was not greatly attached to captive cetacean attractions by visitors, but even their paper, openly sceptical of the educational value of such attractions, still found that visitors offered education as a reason for their attendance. Jiang et al. (2007) also specifically asked questions about education value, further suggesting that a researcher may introduce motivated bias through the survey questions, leading respondents to assign more weight to an issue than they might have initially. Similarly, the benefits to human health claimed in some research may not be a valid reason for maintaining and developing SWTD attractions, as respondents in our research identified only threats to human well-being associated with such attractions.

Furthermore, 39.7% of tourists surveyed here were not in favour of visiting SWTD attractions, primarily citing dolphin welfare concerns. These viewpoints cast doubt on the conclusions of an earlier survey, which stated that the general public believed animal welfare was high at such attractions. In that survey, 95% agreed that "the people who care for the animals at marine life parks, aquariums and zoos are committed to the welfare of the animals" (AMMPA, 2005), a question more focused on the capability of the trainers, rather than the condition of captive animals. The wording likely introduced the motivated bias of the researchers. Our results are closer to those made by Jiang et al. (2007) in Canada, where a major reason for non-visitation was animal welfare concerns.

Overall opposition to an SWTD attraction was noted for those staying in all-inclusive accommodation, tourists residing outside of the US and Canada, and older adults. The lack of appropriate qualitative data offered by most respondents makes it hard to fully explain their opposition. Whatever their reasoning, the opinions of these demographic groups have implications in the TCI and similar vacation destinations. All-inclusive tourism models are particularly popular in the Caribbean (Brida & Zapata, 2010), with just above 50% of its tourists not from the US (Caribbean Tourism Organization, 2014), and the average age of visitors from the US being over 40 (International Trade Administration, 2014). All-inclusive resorts provide entertainment for their guests, and for countries like the TCI, where these resorts are among the biggest individual employers (Allen, 2013), there are limits to the market for SWTD attractions.

Perhaps worrying for researchers and advocates opposing dolphin captivity is the general willingness of TCI tourists to visit an SWTD attraction, even when aware of the associated animal welfare concerns. Jiang et al. (2007) also found this to be the case among the Canadian public. These researchers and advocates may still see an opportunity, however, in the relatively low level of human welfare and dolphin conservation concerns recorded in this study. Draheim et al. (2010) noted that tourists in the Dominican Republic were similarly unaware of welfare and safety concerns, with 75% of their sample not seeing swimming with dolphins as dangerous. Their study also found that, when required to provide a closed answer, over 80% of tourists placed weight on dolphin conservation issues. Dolphin conservation was barely identified as an issue by TCI tourists, but if this was due to a lack of awareness rather than apathy, then there is potential to increase public knowledge of both conservation and welfare issues.

Low public opinion of MMP killer whale shows

TCI tourists' overall attitude toward MMP killer whale shows was largely negative. The 60.9% who identified as not keen to visit such attractions roughly correlates to a recent survey where closed-ended questions found 50% of respondents reporting opposition to killer whale captivity (Edge Research, 2014). It is possible that, because of its use of telephone interviews conducted by professional surveyors, the survey managed to reduce some ingratiation and social desirability bias (Rossiter, 2009). There is also the possibility that motivated bias introduced through question design had a lesser impact as public opinion was already strongly formed.

Tourists not staying in all-inclusive resorts were the only respondent demographic to clearly identify as positive towards visiting an MMP killer whale show, but there were not enough qualitative responses to explain why. Of the qualitative reasons given, the strongest concern was for animal welfare. Education, conservation, and human welfare benefits were not cited as reasons for wanting to visit. Conservation concerns were not mentioned as a deterrent. Again, this contrasts with previous surveys that may have introduced pro- or anti-captivity researcher-motivated bias through their use of close-ended questions, such as those that have found a wide range of respondent agreement (56-97%) that visiting such attractions is educational (*e.g.* AMMPA, 2005; Edge Research, 2014).

Media influence had noticeably more impact on respondents' opinions of MMP killer whale shows than SWTD attractions, with several citing *Blackfish* in their response. This influence is supported in the results of a recent survey, which showed that 73% of the US public learned about killer whales via the media (Edge Research, 2014). It is also reflected in the dramatic fall in the stock market value of North America's primary provider of killer whale attractions, which has been blamed on negative publicity and resultant decreasing visitor numbers (Huggan, 2017; Peterson, 2014). In 2016, the same provider announced the end of their captive breeding program and therefore the eventual end of captive killer whale shows at their attractions (Hacket, 2016). While TCI tourists' qualitative responses rarely explicitly identified the human welfare issues associated with training killer whales, their more common references to a documentary that extensively covered such issues suggests they had concerns that further explained their negativity toward visiting an MMP killer whale show.

Shifting public opinion of SWTD attractions and MMP killer whale shows

The issues concerning dolphin and killer whale captivity are similar, yet the respondents here were more likely to visit SWTD attractions than MMP killer whale shows. In the qualitative responses, media influence was cited less frequently for SWTD attractions as a factor in potential visitation. The showing of *Blackfish* on well-watched television outlets is credited for broadening the media profile of the negative issues associated with MMP killer whale shows, especially given the deaths of trainers highlighted in the film (Huggan, 2017).

A similar shift in public opinion could be expected if a member of the public were seriously harmed at an SWTD attraction (Hunt et al., 2008; Rose et al., 2009). Indeed, shifts in public opinion have already been credited for the closures of the last United Kingdom captive dolphin attractions in the 1990s (Hughes, 2001) and a facility in the Bahamas in 2014 (Lowe, 2014). Pushback against a plan to construct a SWTD attraction in Arizona, USA led to a petition with over 170,000 signatures (Milman, 2016; Dee, n.d.). In these cases, dolphin welfare has primarily driven public opinion, though recent opposition has cited bites from dolphins and "incidents that resemble sexual assault" (Milman, 2016). Nevertheless, the captive cetacean industry continues to invest in infrastructure and propose new attractions. Approximately 25 additional SWTD attractions have been proposed for the Caribbean region (Rose et al., 2009), including the two in

the TCI. Policy-makers, governments, and tourist attraction developers need to be aware of potential negative shifts in public opinion of SWTD attractions, as they would likely cause the same drop in visitation as for MMPs.

Alternatives to captive cetacean attractions

Aquariums and botanical gardens, rated by TCI tourists as significantly more desirable than MMP killer whale shows and similarly desirable to SWTD attractions, have been shown to provide the educational and conservation value (Falk & Adelman, 2003; He & Chen, 2012; Parsons & Muhs, 1994) claimed for captive cetacean attractions. Where possible, wild whale and dolphin-watching tours may also be better attractions to endorse as they have fewer negative conservation and animal welfare issues (Jiang et al., 2007) and are safer than direct contact between dolphins and swimmers. Research in Aruba (Luksenburg & Parsons, 2014), the Dominican Republic (Draheim et al., 2010), and Belize (Patterson, 2010) has shown that visitors would prefer wild cetacean encounters to captive ones.

Advantages and limitations of the photo elicitation methodology

The relatively low qualitative response rate impeded our full understanding of some of the quantitative findings in this study, due to a lack of explanatory data. All the other public opinion studies of captive cetacean attractions reviewed here did draw specific conclusions about whether entertainment, educational or conservation value, or human or animal wellbeing were reasons for visitation or non-visitation. The results of this study, for instance, do not reveal whether TCI tourists believed a SWTD attraction would be educational or improve their wellbeing. It is possible, however, that this open-ended photo elicitation approach is just as valuable because of its ambiguous findings. The lack of sufficient detail on potential educational, conservation, and human wellbeing benefits of SWTD attractions, as well as of animal welfare issues, may be because the respondents guided this research. Many of the issues previously highlighted by researchers were simply not at the forefront of TCI tourists' minds. Conclusions drawn elsewhere, therefore, may have been more the result of researcher-introduced bias than a true snapshot of public opinion. While the lack of qualitative responses limits the explanatory power of our quantitative findings, the responses that were elicited, especially on the entertainment value of SWTD attractions, do begin to explain our data. Follow-up research, attempts at replication, and comparative case studies should look to elicit more extensive open-ended responses from participants.

One success of this methodology was not initially revealing the full research aims to respondents, reducing bias. The substantial contrasts between the opinions of TCI tourists on cetacean captivity and those found in several similar surveys is likely down to our accounting for the biases listed in table 3. Many of the other surveys did not describe attempts to reduce these biases. Yet, our selection of photographs may have remained an issue. The photographs used in

this approach, though carefully selected with a theoretically-grounded approach, could have inherently influenced respondents. The image used for the SWTD attraction (Fig. S1), for instance, is a close up of a child smiling while swimming with a dolphin, while the image for the MMP killer whale show (Fig. S1) is a more distant photograph with the faces of spectators out of focus. As photographs with smiling subjects tend to indicate positive experiences (Miles & Johnston, 2007), The SWTD attraction image is more likely to have attracted additional positive responses, irrespective of general opinions of the attraction. No respondents made comments indicating that variables in the images (Fig. S1) influenced their responses, suggesting this was likely not a major issue, but bias introduction through photograph selection cannot be ruled out. Further photo elicitation studies on the influence of photographs of subjects with varying expressions, or photographs where facial expressions were not shown, would give further context to the value of the quantitative results presented here. Overall, the TCI tourists' preference for visiting a SWTD attraction generally fell between that of studies conducted by pro-captivity groups (e.g. AAMPA) and d[illegible]rs. As the photograph of a smiling child may have over-inflated the tourists' preference to visit a SWTD attraction, 60.3% should be seen as toward the upper bound of that preference.

Conclusions

Even taking different setti[illegible] into account, there is no consensus on public opinion of captive cetacean attractions. Underestimation of the unintentional biases researchers can introduce in study design and of probable attempts to deliberately guide respondent answers toward the outlooks of those conducting or commissioning research, has led to a spectrum of contrasting opinion being reported. For this study, we took care to account for all forms of bias, selecting the most appropriate methodology. Our findings suggest that previous claims of public support for MMP killer whale shows have likely been overstated, as have assertions of both opposition to and support for SWTD attractions. While the photo elicitation approach employed here has its own limitations, the method avoids the insertion of researcher-driven bias that could have led opposition to captive cetacean attractions to being over recorded. Policy-makers and developers should not base their decisions on licensing and building captive cetacean attractions on the outcomes of public opinion studies without scrutinising the validity of how public opinion was surveyed.

Researcher-introduced bias seems to have been a particular issue in over assigning the value of captive cetacean attractions to the public. The lack of respondent mentions of either the educational or conservation value of captive cetacean attractions suggests previous studies have erroneously introduced these as major issues of public focus through inserting survey questions on these issues. With some of these values disputed by researchers, they should be de-prioritised, if considered at all, as factors in decision-making on the development of captive cetacean attractions. That would leave only an entertainment value, which is seen here as already diminished for MMP killer whale shows, and with the potential to diminish for SWTD attractions if the public becomes more aware of the documented conservation, animal welfare, and human welfare issues with such

facilities. There would seem little long-term public value to captive cetacean facilities and their further development should maybe reconsidered.

Ultimately, all involved in proposing or opposing cetacean captivity require a better baseline of public opinion toward MMP killer whales shows and SWTD attractions. Future research must involve a greater effort to address methodological bias. This can be achieved through mixed-methods approaches that still allow researchers to quantitatively assess the elements of public opinion they are interested in, but which first permit respondents to provide qualitative feedback using their own voice. The photo elicitation approach used here was partially successful in doing this, but was limited by the number of qualitative response it fostered. Best practice might be to follow a similar approach, but ask additional, neutral open-ended questions at the start of the survey, or to compliment it with other qualitative approaches (e.g. interviewing) that allow a more in depth investigation of quantitative findings.

Acknowledgements

We gratefully acknowledge the key logistical support provided by The School for Field Studies (SFS) Center for Marine Resource Studies. We are also thankful to Dr. Chris Parsons, Dr. Naomi Rose, and Peter Craig for their extremely helpful comments on previous drafts of this transcript, as well as to a number of anonymous reviewers. We thank Morag Taite for her ArcGIS expertise in constructing Figure 1. Finally, we are indebted to the students of The SFS Center for Marine Resources Studies Spring '14 Program who did an excellent job conducting the surveys. This research project would not have been possible without their participation, diligence, professionalism, and dedication.

References

Allen, D. (2013, March 17). Beaches resort a key element of Turks and Caicos economy. *Jamaica Observer*. Retrieved from http://www.jamaicaobserver.com/news/Beaches-resort-a-key-element-of-Turks-and-Caicos-economy--says-governor_13877632

Alliance of Marine Mammal Parks and Aquariums. (1999). *Fact book on marine mammals*. Alexandria, USA: Alliance of Marine Mammal Parks and Aquariums.

Alliance of Marine Mammal Parks and Aquariums. (2005). *Marine mammal poll*. Retrieved from http://www.ammpa.org/_docs/HarrisPollResults.pdf

Alliance of Marine Mammal Parks and Aquariums. (2013). *Annual Report 2013*. Westminster, USA: Alliance of Marine Mammal Parks and Aquariums.

Back, K. W., & Gergen, K. J. (1943). *Idea orientation and ingratiation in the interview: A dynamic model of response bias* (Technical Report No. 13). Durham, USA: Duke University.

Ballantyne, R., Packer, J., Hughes, K., & Dierking, L. (2007). Conservation learning in wildlife tourism settings: Lessons from research in zoos and aquariums. *Environmental Education Research, 13*, 367-383. DOI: 10.1080/13504620701430604

Barney, E. C., Mintzes, J. J., & Yen, C. F. (2005). Assessing knowledge, attitudes and behaviour toward charismatic megafauna: The case of dolphins. *The Journal of Environmental Education*, *36*, 41-55. DOI: 10.3200/JOEE.36.2.41-55

Bennet, K., Ekinsmyth, C., & Shurmer-Smith, P. (2002). Selecting topics for study. In P. Shurmer-Smith (Ed.), *Doing cultural geography* (pp. 81-93). London, UK: SAGE.

Berk, R. A. (1983). An introduction to sample selection bias in sociological data. *American Sociological Review 48*, 386-398. Retrieved from http://www.jstor.org/stable/2095230

Born Free Foundation. (2018). *Captive whales and dolphins - global*. Retrieved from http://www.bornfree.org.uk/campaigns/zoo-check/captive-whales-dolphins/global/

Brensing, K., & Linke, K. (2003). Behavior of dolphins towards adults and children during swim-with-dolphin programs and towards children with disabilities during therapy sessions. *Anthrozoos*, *16*, 315-331. DOI: 10.2752/089279303786992035

Brida, J. G., & Zapata-Aguirre, S. (2010). Cruise tourism: Economic, socio-cultural and environmental impacts. *International Journal of Leisure and Tourism Marketing*, *1*, 205-226. DOI: 10.1504/IJLTM.2010.029585

Change for Animals Foundation. (2018). *CFAF's Work for Whales and Dolphins in Captivity*. Retrieved from http://www.changeforanimals.org/whales-and-dolphins-in-captivity

Coldwell, W. (2014, September 12). Marine park attractions: Can they survive? *The Guardian*. Retrieved from http://www.theguardian.com/travel/2014/sep/12/seaworld-blackfish-marine-park-attractions-future

Constantine, R. (2001). Increased avoidance of swimmers by wild bottlenose dolphins (*Tursiops truncatus*) due to long-term exposure to swim-with-dolphin tourism. *Marine Mammal Science*, *17*, 689-702. DOI: 10.1111/j.1748-7692.2001.tb01293.x

Constantine, R., Brunton, D.H., & Dennis, T. (2004). Dolphin-watching tour boats change bottlenose dolphin (*Tursiops truncatus*) behaviour. *Biological Conservation*, *117*, 299-307. DOI: 10.1016/j.biocon.2003.12.009

Cowperthwaite, G. (Producer/Director), & Oteyza, M. V. (Producer). (2013). *Blackfish* [Motion picture]. USA: Manny O Productions.

Curtin, S. (2006). Swimming with dolphins: A phenomenological exploration of tourist recollections. *International Journal of Tourism Research*, *8*, 301-315. DOI: 10.1002/jtr.577

Curtin, S., & Wilkes, K. (2007). Swimming with captive dolphins: Current debates and post-experience dissonance. *International Journal of Tourism Research*, *9*, 131-146. DOI: 10.1002/jtr.599

649 Dee, L. (n.d.). *A Big "NO" to Captive Dolphins in Arizona!* Retrieved from
650 http://www.thepetitionsite.com/en-gb/234/874/624/a-big-%22no%22-to-captive-
651 dolphins-in-arizona/
652 Dijkstra, W. (1987). Interviewing style and respondent behavior: An experimental study of the
653 survey-interview. *Sociological Methods and Research*, *16*, 309-334. DOI:
654 10.1177/0049124187016002006
655 Dolphin Cove development to begin next year. (2014, June 30). *Turks and Caicos Weekly News*.
656 Retrieved from http://tcweeklynews.com/dolphin-cove-development-to-begin-next-year-
657 p5214-107.htm
658 Dougherty, S. D. (2013). The Marine Mammal Protection Act: Fostering unjust captivity
659 practices since 1972. *Journal of Land Use and Environmental Law*, *28*: 337-367.
660 Retrieved from http://law-wss-01.law.fsu.edu/journals/landuse/vol28_2/dodson.pdf
661 Draheim, M., Bonnelly, I., Bloom, T., Rose, N., & Parsons, E. C. M. (2010). Tourist attitudes
662 towards marine mammal tourism: An example from the Dominican Republic. *Tourism in*
663 *Marine Environments*, *6*, 175-183. DOI: 10.3727/154427310X12764412619046
664 Edge Research. (2014). *Findings from 2014 US National Survey on Orca Captivity*. Retrieved
665 from
666 https://uk.whales.org/sites/default/files/edge_orca_poll_media_summary_may_2014.pdf
667 Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo elicitation interview (PEI):
668 Using photos to elicit children's perspectives. *International Journal of Qualitative*
669 *Methods*, 5, 1-11. DOI: 10.1177/160940690600500301
670 Falk, J. H., & Adelman, L. M. (2003). Investigating the impact of prior knowledge and interest
671 on aquarium visitor learning. *Journal of Research in Science Teaching*, *40*, 163-176.
672 DOI: 10.1002/tea.10070
673 Fiksdal, B. L., Houlihan, D., & Barnes, A. C. (2012). Dolphin-assisted therapy: Claims versus
674 evidence. *Autism Research and Treatment*, *2012*, Article ID 839792. DOI:
675 10.1155/2012/839792
676 Fisher, S. J., & Reeves, R. R. (2005). The global trade in live cetaceans: Implications for
677 conservation. *Journal of International Wildlife Law and Policy*, *8*, 315–340. DOI:
678 10.1080/13880290500343624
679 Fisheries Protection Ordinance 1998 (TCI).
680 Friend, M. (2006). *Disease emergence and resurgence: The wildlife-human connection* (Circular
681 1285). Reston, USA: US Geological Survey.
682 Frith, H., Riley, S., Archer, L., & Gleeson, K. (2005) Editorial. *Qualitative Research in*
683 *Psychology*, 2: 187-198. DOI: 10.1191/1478088705qp037ed
684 Frohoff, T. G. (2003). Interacting with captive dolphins. In T. Frohoff & B. Peterson (Eds.),
685 *Between species: Celebrating the dolphin–human bond* (pp. 331-334). San Francisco,
686 USA: Sierra Club Books.
687 Frohoff, T. G., & Packard, J. M. (1995). Human interactions with free-ranging and captive
688 bottlenose dolphins. *Anthrozoos*, *8*, 44-53. DOI: 10.2752/089279395787156527

689 Gaber, J., & Gaber, S. L. (2004). If you could see what I know: Moving planners' use of
690 photographic images from illustrations to empirical data. *Journal of Architectural and*
691 *Planning Research*, *21*, 222-238. Retrieved from
692 http://japr.homestead.com/files/GABER.pdf
693 Garland, R. (1991). The mid-point on a rating scale: Is it desirable? *Marketing Bulletin*, 2, 66-70.
694 Retrieved from http://rangevoting.org/MB_V2_N3_Garland.pdf
695 Gibson, A. W., Newman, P., Lawson, S., Fristrup, K., Benfield, J. A., Bell, P. A., Nurse, G. A.
696 (2014). Photograph presentation order and range effects in visual-based outdoor
697 recreation research. *Leisure Sciences, 4*, 183-205. DOI: 10.1080/01490400.2013.862886
698 Hacket, J. (2016, March 17). Sea World Ends Controversial Captive Breeding of Killer Whales.
699 *Scientific American*. Retrieved from
700 https://www.scientificamerican.com/article/seaworld-ends-controversial-captive-
701 breeding-of-killer-whales/
702 Hammersley, M., & Gomm, R. (1996). Bias in Social Research. *Sociological Research Online*,
703 *2*. Retrieved from http://oro.open.ac.uk/20401/
704 Harley, H. E., Fellner, W., & Stamper, M. A. (2010). Cognitive research with dolphins (*Tursiops*
705 *truncatus*) at Disney's The Seas: A program for enrichment, science, education, and
706 conservation. *International Journal of Comparative Psychology 23*, 331-343. Retrieved
707 from http://escholarship.org/uc/item/92z8z9wq
708 Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual Studies*, *17*, 13-26.
709 DOI: 10.1080/14725860220137345
710 He, H., & Chen, J. (2012). Educational and enjoyment benefits of visitor education centers at
711 botanical gardens. *Biological Conservation*, *149*, 103-112. DOI:
712 10.1016/j.biocon.2012.01.048
713 House of Commons Environmental Audit Committee. (2014). *Sustainability in the UK Overseas*
714 *Territories* (Tenth report of session 2013–14). London, UK: The Stationery Office
715 Limited.
716 Huggan, G. D. M. (2017). Killers: Orcas and their followers. *Public Culture*, *29*, 287-309. DOI:
717 10.1215/08992363-3749069
718 Hughes, P. (2001). Animals, values and tourism — structural shifts in UK dolphin tourism
719 provision. *Tourism Management*, *22*, 321-329. DOI: 10.1016/S0261-5177(00)00070-4
720 Hunt, T. D., Ziccardi, M. H., Gulland, F. M. D., Yochem, P. K., Hird, D. W., Rowles, T., &
721 Mazet, J. A. K. (2008). Health risks for marine mammal workers. *Diseases of Aquatic*
722 *Organisms*, *81*, 81-92. DOI: 10.3354/dao01942
723 International Trade Administration. (2014). *2014 market profile: Caribbean*. Washington, D. C.,
724 USA: US Department of Commerce, International Trade Administration.
725 Jiang, Y., Lück, M., & Parsons, E. C. M. (2007). Public awareness, education, and marine
726 mammals in captivity. *Tourism Review International*, *11*, 237-249. DOI:
727 10.3727/154427207783948829

728 Kuo, V., & Savidge, M. (2014, February 10). Months after 'Blackfish' airs, debate over orcas
729 continues. *CNN*. Retrieved from http://edition.cnn.com/2014/02/07/us/blackfish-
730 wrap/index.html?iref=allsearch
731 Kyngdon, D. J., Minot, E. O., & Stafford, K. J. (2003). Behavioural responses of captive
732 common dolphins *Delphinus delphis* to a 'Swim-with-Dolphin' programme. *Applied*
733 *Animal Behaviour Science*, *81*, 163-170. DOI: 10.1016/S0168-1591(02)00255-1
734 Lerer, K. (2014, August 14). The End of SeaWorld. *Huff Post Green*. Retrieved from
735 http://www.huffingtonpost.com/kenneth-lerer/the-end-of-
736 seaworld_b_5680119.html?utm_hp_ref=tw
737 Lowe, A. (2014, July 18). Group wins fight against Blackbeard's Cay. *The Nassau Guardian*.
738 Retrieved from http://www.thenassauguardian.com/bahamas-business/40-bahamas-
739 business/48875-group-wins-fight-against-blackbeards-cay-
740 Luksenburg, J. A., & Parsons, E. C. M. (2014). Attitudes towards marine mammal conservation
741 issues before the introduction of whale-watching: A case study in Aruba (southern
742 Caribbean). *Aquatic Conservation: Marine and Freshwater Ecosystems*, *24*, 135-146.
743 DOI: 10.1002/aqc.2348
744 Lunsford, T. R., & Lunsford, B. R. (1995). The research sample, part I: Sampling. *Journal of*
745 *Prosthetics and Orthotics*, *7*, 17A. Retrieved from
746 http://www.oandp.org/jpo/library/1995_03_105.asp
747 Marino, L., & Lilienfeld, S. O. (2007). Dolphin-assisted therapy: More flawed data and more
748 flawed conclusions. *Anthrozoos*, *20*, 239-249. DOI: 10.2752/089279307X224782
749 Marino, L., Lilienfeld, S. O., Malamud, R., Nobis, N., & Broglio, R. (2010). Do zoos and
750 aquariums promote attitude change in visitors? A critical evaluation of the American Zoo
751 and Aquarium Study. *Society and Animals*, *18*, 126-138. DOI:
752 10.1163/156853010X491980
753 Mazet, J. A. K., Hunt, T. D., & Ziccardi, M. H. (2004). *Assessment of the risk of zoonotic disease*
754 *transmission to marine mammal workers and the public: Survey of occupational risks*
755 (Final Report). Davis, USA: Wildlife Health Center School of Veterinary Medicine
756 University of California.
757 Miles, L., & Johnston, L. (2007). Detecting happiness: Perceiver sensitivity to enjoyment and
758 non-enjoyment smiles. *Journal of Nonverbal Behaviour*, *31*, 259-275. DOI:
759 10.1007/s10919-007-0036-4
760 Miller, L. J., Zeigler-Hill, V., Mellen, J., Koeppel, J., Greer, T., & Kuczaj, S. (2013). Dolphin
761 shows and interaction programs: Benefits for conservation education? *Zoo Biology*, *32*,
762 45-53. DOI: 10.1002/zoo.21016
763 Milman, O. (2016, April 25). Desert dolphins: plan to bring animals to Arizona for show
764 outrages activists. *The Guardian*. Retrieved from
765 https://www.theguardian.com/environment/2016/apr/25/dolphins-arizona-dolphinaris-
766 odysea-animal-rights-activists-outraged

767 Ministry of Finance Trade and Investment. (2013). *Ministry of Finance Trade and Investment*
768 *Strategic Plan FY 2013/14*. Grand Turk, TCI: Ministry of Finance Trade and Investment.
769 Morisaka, T., Kohshima, S., Yoshioka, M., Suzuki, M., & Nakahara, F. (2010). Recent studies
770 on captive cetaceans in Japan: Working in tandem with studies on cetaceans in the wild.
771 *International Journal of Comparative Psychology*, *23*, 644-663. Retrieved from
772 http://escholarship.org/uc/item/2r8461z4
773 Orams, M. B. (1997). Historical accounts of human-dolphin interaction and recent developments
774 in wild dolphin based tourism in Australasia. *Tourism Management*, *18*, 317-326. DOI:
775 10.1016/S0261-5177(96)00022-2
776 Orca Home. (2016). *Orcas in captivity*. Retrieved from http://www.orcahome.de/orcastat.htm
777 Parsons, E. C. M., & Muhs, K. (1994). Field trips and parent chaperones: A study of self-guided
778 school groups at the Monterey Bay Aquarium. *Visitor Studies: Theory, Research, and*
779 *Practice*, *7*, 57-61. Retrieved from http://www.informalscience.org/field-trips-and-parent-
780 chaperones-study-self-guided-school-groups-monterey-bay-aquarium
781 Parsons, E. C. M. (2012). Killer whale killers. *Tourism in Marine Environments*, *8*, 153-160.
782 DOI: 10.3727/154427312X13491835451494
783 Parsons, E. C. M., Bauer, A., McCafferty, D., Simmonds, M. P., & Wright, A. J. (2013). *An*
784 *introduction to marine mammal biology and conservation.* Burlington, USA: Jones and
785 Bartlett Learning.
786 Parsons, E. C. M., de Calventi, I. B., Whaley, A., Rose, N. A., & Sherwin, S. (2010). A note on
787 illegal captures of wild bottlenose dolphins (*Tursiops truncatus*) from the coastal waters
788 of the Dominican Republic. *Journal of International Wildlife Law and Policy*, *13*, 240-
789 244. DOI: 10.1080/13880292.2010.503123
790 Patterson, K. W. (2010). *Conservation, captivity, and whaling: A survey of Belize whalewatching*
791 *tourists' attitudes to cetacean conservation issues* (Master's thesis, George Mason
792 University, USA). Retrieved from http://esp.gmu.edu/wp-
793 content/uploads/2013/05/KPatterson.doc
794 Perelberg, A., Veit, F., van der Woude, S. E., Donio, S., & Shashar, N. (2010). Studying dolphin
795 behavior in a semi-natural marine enclosure: Couldn't we do it all in the wild?
796 *International Journal of Comparative Psychology*, *23*, 625-643. Retrieved from
797 http://escholarship.org/uc/item/9sz5j17r
798 Pernetta, C. A. P. (2014). Biodiversity news. *Biodiversity*, *15*, 6-15. DOI:
799 10.1080/14888386.2014.890544
800 Pesman, P. D. (Producer), Stevens, F. (Producer), & Psihoyos, L. (Director). (2009). *The Cove*
801 [Motion picture]. USA: Diamond Docs, Fish Films, Oceanic Preservation Society,
802 Participant Media, & Quickfire Films.
803 Peterson, K. (2014, November 13). "Blackfish" continues to stalk wounded SeaWorld. *CBS*
804 *Moneywatch*. Retrieved from http://www.cbsnews.com/news/seaworld-continues-to-
805 suffer-after-blackfish/

Protests in TCI about possible dolphinaria. (2014, February). *UK Overseas Territories Conservation Forum - Forum News*, 42, pp. 11-12. Retrieved from http://www.ukotcf.org/pdf/fNews/42.pdf

R Core Team (2015). R: A language and environment for statistical computing [Computer software]. Vienna, Austria: R Foundation for Statistical Computing.

Rechberg, M. J. (2011). Dying to entertain us or living to educate us - a comprehensive investigation of captive killer whales, their trainers, and how the law must evolve to meet their needs. *Journal of the National Association of the Administrative Law Judiciary*, *31*, 720-844. Retrieved from http://digitalcommons.pepperdine.edu/naalj/vol31/iss2/7

Reeves, R. R., Smith, B. D., Crespo, E.A., & Notarbartolo di Sciara, G. N. (2003). *Dolphins, whales and porpoises: 2002–2010 conservation action plan for the world's cetaceans*. Gland, Switzerland and Cambridge, UK: IUCN.

Rose, N., Parsons, E. C. M., & Farinato, R. (2009). *The case against marine mammals in captivity*. Washington, DC, USA: The Humane Society of the United States and World Society for the Protection of Animals.

Rossiter, J. C. (2009). *A comparison of social desirability bias among four widely used methods of data collection as measured by the impression management subscale of the balance inventory of desirable responding* (Doctoral thesis, Kent State University College and Graduate School, USA). Retrieved from https://etd.ohiolink.edu/!etd.send_file%3Faccession%3Dkent1240263500%26disposition%3Dinline

Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers* [second edition]. London, UK: SAGE.

SeaWorld. (2013, December 20). SeaWorld: the truth is in our parks and people - an open letter from SeaWorld's animal advocates [Letter to the editor]. *The Wall Street Journal*. Retrieved from http://online.wsj.com/public/resources/documents/print/WSJ_-A007-20131220.pdf

Shani, A, & Pizam, A. (2008). Towards an ethical framework for animal-based attractions. *International Journal of Contemporary Hospitality Management*, *20*, 679-693. DOI: 10.1108/09596110810892236

Shani, A, & Pizam, A. (2009). Tourists' attitudes toward the use of animals in tourist attractions. *Tourism Analysis*, *14*, 85-101. DOI: 10.3727/108354209788970225

Small, R. J., & Demaster, D. P. (1995). Survival of five species of captive marine mammals. *Marine Mammal Science*, *11*, 209-226. DOI: 10.1111/j.1748-7692.1995.tb00519.x

Tizzi, R., Accorsi, P. A., & Azzali, M. (2010). Non-invasive multidisciplinary approach to the study of reproduction and calf development in bottlenose dolphin (*Tursiops truncatus*): the Rimini Delfinario experience. *International Journal of Comparative Psychology*, *23*, 734-776. Retrieved from http://escholarship.org/uc/item/9rr8k6jd

Turks and Caicos Islands Government. (2012a). *Population and housing census*. Grand Turk, TCI: Turks and Caicos Islands Government.

Turks and Caicos Islands Government. (2012b). *Turks and Caicos Islands Development Strategy 2013-2017*. Grand Turk, TC: Turks and Caicos Islands Government.

Turks and Caicos Tourist Board. (2015). *Turks and Caicos Islands tourism statistics 2015*. Grand Turk, TCI: Turks and Caicos Tourist Board.

Turks and Caicos Tourist Board, & Department of Economic Planning and Statistics. (2009). *Tourism*. Grand Turk, TCI: Department of Economic Planning and Statistics.

Tyson, V. (2013, April 16). Dolphin Cove development in Grand Turk on the table, but Provo is off. *Turks and Caicos Sun*. Retrieved from http://suntci.com/dolphin-cove-developer-not-confident-of-local-approval-p885-106.htm

Ugaz, C., Valdez, R. A., Romano, M. C., & Galindo, F. (2013). Behavior and salivary cortisol of captive dolphins (*Tursiops truncatus*) kept in open and closed facilities. *Journal of Veterinary Behavior: Clinical Applications and Research*, *8*, 285-290. DOI: 10.1016/j.jveb.2012.10.006

Uyarra, M. C., Côté, I. M., Gill, J. A., Tinch, R. R. T., Viner, D., & Watkinson, A. R. (2005). Island-specific preferences of tourists for environmental features: Implications of climate change for tourism-dependent states. *Environmental Conservation*, *32*, 11-19. DOI: 10.1017/S0376892904001808

Whale and Dolphin Conservation Society, & The Humane Society of the United States. (2003). *Biting the hand that feeds: The case against dolphin petting pools*. Chippenham, UK, Portland, USA and Washington, DC, USA: The Whale and Dolphin Conservation Society, and The Humane Society of the United States.

Webb, N. L., & Drummond, P. D. (2001). The effect of swimming with dolphins on human well-being and anxiety. *Anthrozoos*, *14*, 81-85. DOI: 10.2752/089279301786999526

Williams, R., Krkošek, M., Ashe, E., Branch, T. A., Clark, S., Hammond, P. S., Hoyt, E., Noren, D. P., Rosen, D., Winship, A. (2011). Competing conservation objectives for predators and prey: Estimating killer whale prey requirements for Chinook salmon. *PLoS ONE*, *6*, e26738. DOI: 10.1371/journal.pone.0026738

Williams, V. (2001). *Captive orcas 'dying to entertain you' - the full story*. Chippenham, UK: Whale and Dolphin Conservation Society.

Williamson, C. (2008). Dolphin assisted therapy: can swimming with dolphins be a suitable treatment? *Developmental Medicine and Child Neurology*, *50*, 477-477. DOI: 10.1111/j.1469-8749.2008.00477.x

Zaller, J., & Feldman, S. (1992). A simple theory of the survey response: answering questions versus revealing preferences. *American Journal of Political Science*, *36*, 579-616. DOI: 10.2307/2111583

Zimmermann, T. (2014, September 9). Three former employees reveal the shocking realities of SeaWorld's dolphin feeding pools. *The Dodo*. Retrieved from https://www.thedodo.com/exclusive-three-former-employe-710451529.html

Table 1(on next page)

Types of bias potentially present in previous public opinion surveys relating to cetaceans.

1

Type of bias	Occurrence of bias	Sources
Sample	Where sample is from a population where for any reason that population is almost uniformly more informed than the general public on a public issue. Sample bias can exist when non-random samples are unintentionally enrolled as a result of respondent selection techniques.	Berk (1983); Marino et al. (2010)
Motivated	Where researchers have a desired outcome, they can convey this to respondents through subtle communication during survey administration. Researchers can also insert their own bias by designing questions that they hope will either garner responses they want, or that they will find interesting. Whilst insertion of this can be conscious and perhaps as a result unethical, it can also be unconsciously inserted by well-meaning researchers.	Hammersley and Gomm (1997); Marino et al. (2010)
Ingratiation	Respondents can adjust their answers to gain favour or avoid disagreement with researchers. They may adjust their answers to fit a hypothesis they believe the researcher to be investigating. The nature of questions and the manner or appearance of researchers can invite this kind of bias.	Back and Gergen (1943); Dijkstra (1983); Marino et al. (2010)
Social desirability	Respondents may give answers that they believe to be socially desirable so that they appear to conform to a societal position they believe is seen as favourable.	Rossiter (2009)

2

Table 2(on next page)

The demographic composition of the 292 respondents.

1

	Sub-Category	Count	Percent (%)
Age (yrs.)	18-29	42	11.7
	30-39	29	8.1
	40-49	86	24.0
	50-59	64	17.8
	60-69	40	11.1
	70+	17	4.7
	No response	14	3.9
Gender	Male	109	37.3
	Female	171	58.6
	No response	12	4.1
Residency	USA	208	71.2
	Canada	75	25.7
	Other & no response	9	3.1
Parental status	Has children	136	46.6
	Has no children	155	53.1
	No response	1	0.3
Visits to TCI	Multiple	152	52.1
	One	137	46.9
	No response	3	1.0
Interest in cruise tourism	Have cruised/ Would again	76	35.2
	Have cruised/ Would not again	64	29.6
	Have never cruised/ Would cruise	33	15.3
	Have never cruised/ Would not cruise	115	53.2
	No response	4	1.9
Accommodation type	All-Inclusive	115	39.4
	Other	175	59.9
	No response	2	0.7

2

Table 3(on next page)

Visitation likelihoods of TCI tourists to each attraction.

1

Attraction	Visitation Likelihood (%)			
	very likely	*likely*	*unlikely*	*very unlikely*
SWTD	36.6	23.7	18.1	21.6
MMP	15.4	23.8	28.0	32.9
Aquarium	22.0	35.5	21.6	20.9
Botanical Gardens	22.2	34.4	23.3	20.1
Maritime Museum	5.9	23.7	30.0	40.4
Craft Market	17.4	31.4	26.1	25.1

2

Table 4(on next page)

Summary of qualitative opinions offered by TCI tourists on captive cetacean attractions.

1

		MMP		SWTD	
	Visitation Likelihood (%)	*likely / very likely to visit*	*unlikely / very unlikely to visit*	*likely / very likely to visit*	*unlikely / very unlikely to visit*
		(N = 5)	(N = 48)	(N = 26)	(N = 51)
Negative attitudes	Animal welfare concerns	20.0	72.9	15.4	56.9
	Not entertaining	-	10.4	-	21.6
	Human welfare concerns	-	4.2	3.8	9.8
	Overly commercial experience	-	14.6	-	3.9
	Conservation concerns	-	4.2	3.8	2.0
	Attractions too costly	-	-	-	2.0
	Unclear reasoning	-	4.2	-	5.9
Positive attitudes	Entertaining	100.0	-	96.2	2.0
	Appropriate for children	20.0	-	34.6	11.8
Influence of media on opinions	Cited media influence	-	16.7	3.8	2.0
	Stated they had seen *Blackfish*	-	14.6	3.8	2.0

2

Table 5(on next page)

Visitation likelihoods of TCI tourists to captive cetacean attractions by demographic group.

1

	MMP			SWTD	
Visitation Likelihood (%)	*likely / very likely to visit*	*unlikely / very unlikely to visit*		*likely / very likely to visit*	*unlikely / very unlikely to visit*
Accommodation Type					
All-inclusive	48.7	51.3		24.8	75.2
Other	69.0	31.0		49.4	50.6
Interest in cruise tourism					
Interested	42.6	57.4		67.0	33.0
Not interested	36.6	63.4		56.0	44.0
Residency					
USA	41.7	58.3		65.7	34.3
Canada	34.2	65.8		50.0	50.0
Other	22.2	77.8		22.2	77.8
Age (yrs.)					
18-29	37.5	62.5		70.0	30.0
30-39	41.4	58.6		69.0	31.0
40-49	50.6	49.4		68.2	31.8
50-59	28.6	71.4		58.7	41.3
60-69	42.1	57.9		48.7	51.3
70+	11.8	88.2		35.3	64.7
Gender					
Female	35.3	64.7		59.4	40.6
Male	44.8	55.2		62.3	37.7
Visits to TCI					
One	43.6	56.4		64.0	36.0
Multiple	33.3	66.7		56.9	43.1
Parental Status					
Has children	44.7	55.3		64.7	35.3
Has no children	34.6	65.4		56.9	43.1

2

Figure 1

Map of the Turks and Caicos Islands.

Islands in the TCI associated with current or potential cetacean tourism. Map from Esri, HERE, GARMIN © OpenStreetMap contributors, and the GIS user community. The data is available under the Open Database License, licensed as CC BY-SA .

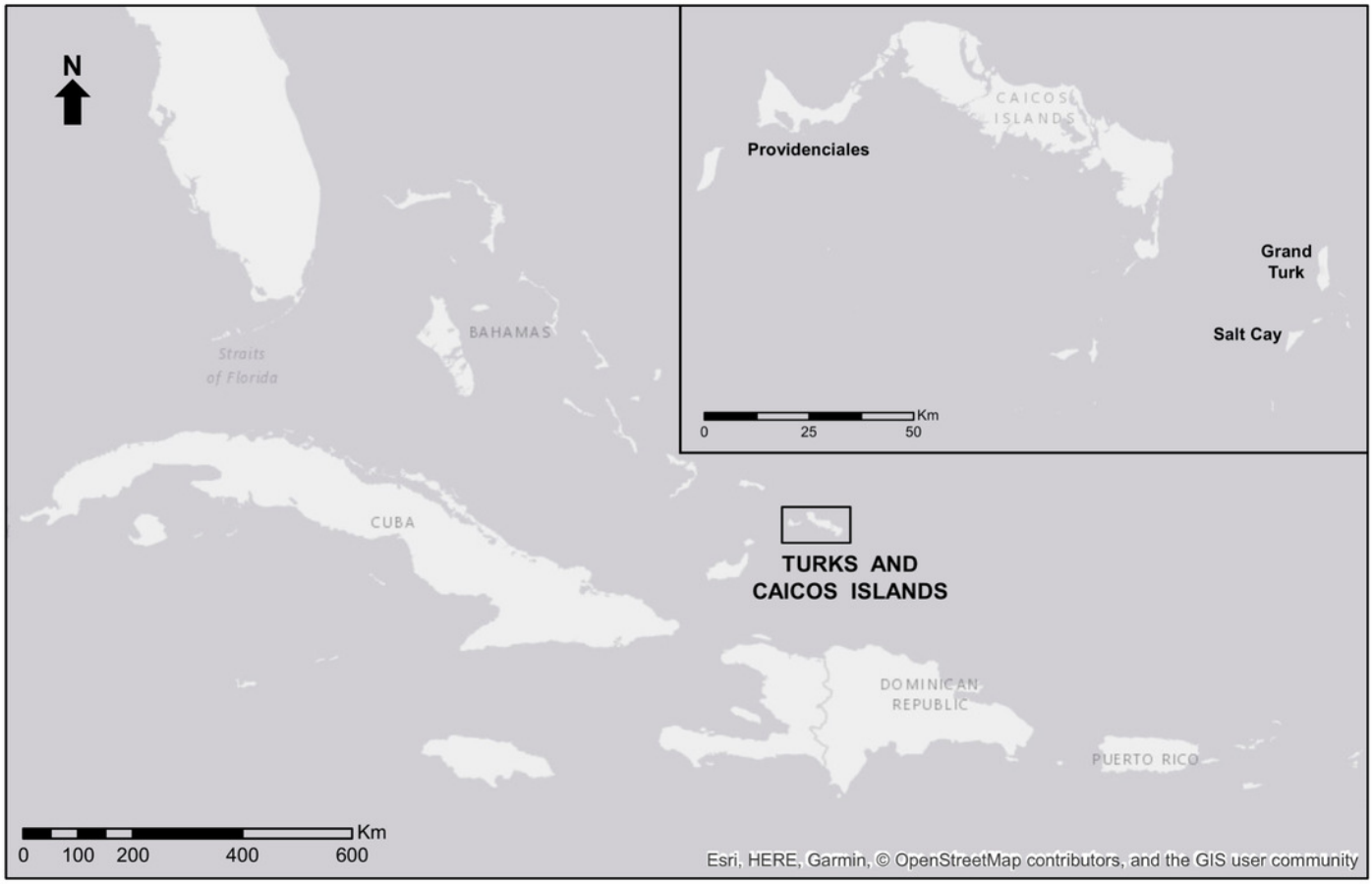

Figure 2

Tourists' visitation likelihoods for the attractions.

Significant groupings of tourists' visitation likelihoods for the six attractions including swim-with-the-dolphins (SWTD) and marine mammal park (MMP). Asterisks summarise the value of P more generally (* P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001).