Journal of Sustainable Tourism
Volume 29 Issue 10, 2021
0966-9582 (Print)

Routledge
Taylor & Francis Group

Journal of Sustainable Tourism

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rsus20

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To cite this article: Christy Hehir, Emma J. Stewart, Patrick T. Maher & Manuel Alector Ribeiro (2021) Evaluating the impact of a youth polar expedition alumni programme on post-trip pro-environmental behaviour: a community-engaged research approach, Journal of Sustainable Tourism, 29:10, 1635-1654, DOI: 10.1080/09669582.2020.1863973

To link to this article: https://doi.org/10.1080/09669582.2020.1863973

JOURNAL OF SUSTAINABLE TOURISM
2021, VOL. 29, NO. 10, 1635–1654
https://doi.org/10.1080/09669582.2020.1863973

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Evaluating the impact of a youth polar expedition alumni programme on post-trip pro-environmental behaviour: a community-engaged research approach

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ABSTRACT

Youth-based programmes providing education-based expeditions to the Polar Regions have been offered for more than two decades, and whilst studies hint that participants return as inspired and empowered ambassadors, research to date has been inconclusive as to what impact such expeditions have had on their participants' subsequent lifestyle decisions and pro-environmental behaviours. To address this research gap, Social Identity Theory (SIT) was used to evaluate the impact of youth polar expeditions on participants' pro-environmental behaviour, up to 18 years after their polar voyage. In collaboration with Students on Ice (SOI), this study tested the direct and indirect relationships between previous SOI students' (n = 217) social identity towards the alumni programme and their subsequent connections with nature and pro-environmental behaviours. Findings suggest that social identity might be one way to explain the long-term impact of educational expeditions in terms of desired future pro-environmental behaviours, underscoring the critical importance of an alumni programme. Furthermore, a Community-Engaged Research (CER) approach was adopted to evidence the impact of this research beyond the realm of academia. We reflect on the CER approach with the intention of assisting others to produce impactful and socially robust knowledge, maximising the real-world impact of the findings.

ARTICLE HISTORY
Received 5 March 2020
Accepted 7 December 2020

KEYWORDS
Community-engaged research; social identity theory; polar regions; societal change; pro-environmental behaviour; youth travel

Introduction

In the face of rapid environmental change in the Polar Regions, it is becoming increasingly important to understand how contact with – and psychological (re)connection to – the world's natural environments are linked to future pro-environmental behaviours. Conservationists highlight that in order to protect biodiversity (of a species and/or ecosystem), people will only care about what they have experienced (Williams, 2013). Travel to the Polar Regions has long been believed to facilitate impactful nature-based experiences; however, international travel continues

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to be criticised for harming the environment tourists wish to see (Denley et al., 2020; Hall, 2010). Could increasing numbers of tourists be loving an already dying destination to an early death (Dawson et al., 2010)? To date, research into the lasting impacts of such travel experiences has been problematic due to the methodological challenges of documenting actual long-term environmental behaviours.

The contested notion of "ambassadorship" has emerged in polar tourism literature (and marketing collateral of tour operators and agencies) to help explore the links between visitation and tourists' pro-environmental behaviour. In the Antarctic context, Alexander et al. (2019, p. 502) defined an ambassador as "someone [i.e. individual or group] who has a connection to, knowledge of and passion for the Antarctic (as a space, place or idea), who represents and champions Antarctica and its values, and who supports Antarctica through communication and behaviour." Powell et al. (2008) indicated that at least some tourists join environmental advocacy groups, donate to environmental charities, and make other pro-environmental choices immediately upon return from Antarctica. This minimal behaviour change was echoed by Maher (2010) and Maher et al. (2011). Manley et al. (2017) drew similar conclusions in the Arctic, where cruise tourists expressed a slight increase in some environmentally oriented behaviours after their cruise, for example, attending environment-focused meetings in their community or voting for elected officials who support environmental protection. Miller et al. (2020) showed that polar bear viewing experience in Alaska has the *potential* to increase visitors' pro-environmental and ambassadorship behavioural intentions. By contrast, Eijgelaar et al. (2010) found no evidence of Antarctic tourism having an impact upon overall environmental awareness or travel choices of tourists upon their return home.

Whilst these contradictory studies explored the impact of polar tourism experiences on the immediate actions and intentions of returning visitors, there is a lack of research on actual future environmental behavioural change over the long-term. Furthermore, the existing ambassadorship research has focused on the adult polar cruising demographic, limiting the generalisability and explanatory scope into the expanding area of youth expeditions.

Youth-based programmes, providing predominantly education-based expeditions to the Polar Regions, have been offered for at least the last two decades. These expeditions last 2–4 weeks (depending on the specific location) aboard an expedition ship and include in-depth curriculum study (biology, geography, cultural studies, etc.) alongside various adventurous activities, such as hiking, birdwatching, and kayaking. For example, Students on Ice (SOI), established in 2000, offers educational expeditions to the Antarctic and the Arctic, predominantly for high school students. In the Antarctic specifically, the Sir Peter Blake Trust, The New Zealand Antarctic Heritage Trust, Sir Robert Swan's International Antarctic Expedition (IAE), and the Enderby Trust all offer young people a similar chance to take part in expeditions to the southern continent. Common across all these youth expedition programmes is a desire to immerse participants in the Polar Regions in order to help them foster a new understanding of and respect for the polar environment, share their experiences and enthusiasm with other people, grow awareness of the Polar Regions (Green, 2010), and take action more broadly on environmental issues. Worthy of note in these programmes is the level of ongoing connection participants' experience once they return home, which is made possible through an alumni programme. Several youth-based programmes provide ongoing alumni support to leverage the deep experiences from the expeditions in order to build a community of like-minded students, scientists, educators, elders, community leaders, and artists (Students on Ice, 2020).

In this paper, Social Identity Theory (SIT) (Tajfel & Turner, 1979) is used to evaluate how meaningful engagement within a community (i.e. the alumni programme) leads to developing participants' identity within that community and how it can influence participants' subsequent behaviours. The theory indicates that immersion in an expedition, whereby a community is built around its participants, may result in environmentally conscious decisions by those who identify as members of that community. We draw on SIT for our research as we explore the following

question: Does an alumni programme support/influence participants to continue contributing to pro-environmental behaviours long after their expedition?

As this special issue confirms, the desire for a new mode of scholarly inquiry is receiving much needed global attention, and there is now an expectation on researchers to document *real-world* effects of their work and to engage end-users effectively in the research process. Some tourism scholars claim that a paradigm shift in research approach and management is now required, given the urgency of the challenges faced by contemporary society (Reid, 2014; Ruhanen & Cooper, 2004) not only to produce world-class research but also to ensure that the greatest possible impact extends to all "sectors of the economy, levels of government, and communities of policy and practice" (Higham & Miller, 2018, p. 1). We suggest in this paper that approaches informed by Community-Engaged Research (CER) might offer a way forward, that is, they might provide a way to meaningfully partner with end-users (who are ultimately impacted by the research) and to capture evidence of real-world change. Consequently, this paper has two overarching, yet connected, goals: 1) to evaluate if, and why, youth expedition experiences in the Polar Regions can lead to meaningful and long-lasting environmental behaviours; and 2) to showcase the CER approach used to ensure that the real-world impact of the research can be maximised.

Literature review

Social identity theory (SIT)

Social identity is defined by Tajfel and Turner (1979, p. 63) as, "part of an individual's self-concept which derives from his [sic] knowledge of his [sic] membership of a social group (or groups) together with the value and emotional significance attached to that membership." Thus, social identity implies that membership to a certain social group (such as an alumni programme) has significant value (Hogg & Terry, 2000) and, as a result, a sense of unity among members is established.

There are three components to social identity. The first is the cognitive component, or self-categorisation. This is associated with a cognitive awareness of one's membership in a social group (Ellemers et al., 1999) and implies that identification with the community results from apparent similarities with other community members and dissimilarities with non-members (Algesheimer et al., 2005). The second is the evaluative component, which relates to the positive or negative value association attached to a particular group membership (Ellemers et al., 1999). This component is associated with the sense of belonging and identification or the feeling, belief, and expectation that one fits in the group and has a place there. This component is linked to group self-esteem (McMillan & Chavis, 1986). The third component is member commitment to the group – or their emotional attachment – and includes feelings of attachment and belonging to the community (Bagozzi & Dholakia, 2006).

The way unity entails a position of respect for different social groups has implications for how one responds to certain social and political issues, including environmental issues (Clayton & Myers, 2015). Given the increasing inter-group conflict taking place between stakeholders in tourism (e.g. government, industry, and environmental activists) (Stern et al., 1995), it is important to research social identity within tourism. To date, within the specific realm of tourism, SIT has been used as the link between the intention to participate in an online travel-related virtual community and behavioural intentions to use the firm's products/services (Casaló et al., 2010); however, further exploration is needed to see if this can be more widely applied.

Behavioural change

There is a complex association between identity and pro-environmental behavioural change. Pro-environmental behaviour can be defined as actions by individuals or groups that minimise harm to, or benefit, the natural environment (Arbuthnott et al., 2014). These actions can be identified by either their impact or their intent (Stern, 2000). For example, in one study, people with pronounced environmental self-identity were more likely to engage with a range of everyday pro-environmental behaviours, including eco-shopping, reducing waste and water consumption, and conserving domestic energy (Whitmarsh & O'Neill, 2010).

In another study, environmental self-identity was similarly associated with various everyday behaviours, but it also included not flying for the purposes of holiday travel (Gatersleben et al., 2014). More specifically, SIT has been used to understand pro-environmental behaviour from a collective action position (Opotow & Brook, 2003). Clayton (2003) created an Environmental Identity Scale (EID) to assess the relationship between environmental identity and pro-environmental behaviour. This scale included both connectedness to nature and social identity items. The statistically significant findings revealed that the EID was correlated with environmentally sustainable actions, including at-home behaviours such as switching off lights and donating to an environmental organisation. In a study relating to environmental activism, Postmes and Brunsting (2002) correlated social identity with several forms of environmental activism; however, the relationship of such with pro-environmental behaviour awaits further investigation.

In a tourism context, confirming a relationship between individuals' pro-environmental behaviour change and the impact of their travels upon this change is difficult to make, but it is a growing area of interest (Landon et al., 2019; Lee & Jan, 2015; Miller et al., 2020). The notion that visitors become important advocates or ambassadors for a place or cause is common in tourism literature (see Beaumont, 2001; Higham & Carr, 2002). However, it is difficult to ascertain if a specific trip can be directly attributed as the catalyst. Beaumont (2001) noted that we may be preaching to the converted. Furthermore, as Ryan (2003, p. 327) stated, "There exists neither a political nor public willingness to change patterns of life … movements are simply commodifications wherein tourists justify their explorations in terms of assuaging guilt rather than a serious concern about environmental issues." This may hold true when we treat tourism or unique experience as being outside everyday life, but what if we consider all as intertwined? In other words, what if our travels (educational expeditions) form part of our ongoing social identity?

Results from Maher (2010), in an Antarctic context, suggest that visitors are more likely to undertake easy-to-complete, everyday pro-environmental behaviours (recycling, using energy efficient lightbulbs) than any location-specific ones (writing letters to politicians, protesting future developments) upon their return home. Similarly, Miller et al. (2020) linked tourists' increased pro-environmental behaviour intentions with their polar bear viewing experience. In the context of educational expeditions, intent to engage in pro-environmental behaviours post-trip was demonstrated (Tarrant et al., 2014). Similarly, Rexisen (2013) found that a "study abroad" experience significantly altered students' environmental views on a global scale. However, it is the conversion from intent upon reflection to proven application that is the missing link in the research.

Inclusion of nature in the self

Human beings and the natural world are dependent upon one another for survival (Davis et al., 2011). Phrases such as "living in harmony with the environment" are examples borrowed from interpersonal bonds language to describe feelings and connections towards the natural world (Schultz, 2002). As environmental problems accelerate, researchers, including Nisbet et al. (2009), are directing their studies towards the connections between human–nature relationships and pro-environmental behaviour. In other words, to tackle pro-environmental behaviour change, it is thought a (re)connection to nature is required, and it is an individual's environmental identity

that acts as a strong predictor of behaviour (Davis et al., 2011). Identity is defined as a person's self-concept, which gives meaning to personal experiences and shapes their individuality through dispositions and responses to situations (Stryker & Burke, 2000). Understanding relationships with nature and identity is important as individuals who perceive a connection between themselves and nature are potentially more likely to engage in pro-environmental behaviours (Schultz, 2001). This is because such individuals cognitively and affectively relate damaging the environment to harming themselves (Schultz et al., 2004).

In a specific tourism context, Clark et al. (2019) positively associated a tourist's environmental identity with increased pro-environmental intentions. More specifically, Landon et al. (2019) described how educational expeditions that include nature-based experiences within climate-sensitive environs, such as the Polar Regions, may build affective association with environments that are at threat. To improve the ability of such programmes to elicit change in participants, Landon et al. (2019) suggested that educators need to better understand the social-psychological processes that influence participants' beliefs. Importantly, such findings may enable executives of existing programmes to evaluate those programmes' ability to achieve desired outcomes. To do so is critical for continuous quality improvement in educational expedition programming and for achieving future funding (Landon et al., 2019; Students on Ice, 2020).

The mediating effect of inclusion of nature in self (INS)

The literature claims that environmental identities come from interactions with natural environments as well as from a socially constructed understanding of oneself and others, which includes nature (Clayton, 2003). Drawing on such a claim, it is possible to hypothesise that an interplay between social identity and pro-environmental behaviours exists (Clayton, 2003), which may potentially be mediated by an individual's inclusion of nature in self (INS). More specifically, the suggested mediation has been identified based on the two relationships. The first was identifying that an individual's engagement in nature leads to a stronger connection to nature (Mayer & Frantz, 2004). This stronger connection is then linked to an individual's pro-environmental behaviour (Schultz, 2001), forming the second relationship. The present study is not the first to use Inclusion of Nature in Self (INS) as a mediator. In research exploring the way in which mindfulness impacted an individual's belief in climate change, the mediating effect of INS was tested (Wang et al., 2019) and found to be significant. In the present study, Inclusion of Nature in Self (INS) is measured as a second-order construct assessed by two first-order dimensions: connection to nature polar (the Polar Region where participants travelled) and participants' connection to nature in general .

When considering the tourism literature specifically along with the broader literature examining pro-environmental behaviour, it is evident that there is potential to better align polar expeditions to the concepts of ambassadorship and future pro-environmental behaviour. Consequently, the aim of this study was to evaluate the impact that an alumni programme has upon the long-term pro-environmental behaviours of its participants. Based on the above discussions and using the SIT within the context of youth expeditions, the following hypotheses and model are proposed:

Hypothesis 1: Social identity with an alumni programme positively influences students' pro-environmental behaviour towards global sustainability.

Hypothesis 2: Social identity with an alumni programme positively influences students' Inclusion of Nature in Self (INS).

Hypothesis 3: Inclusion of Nature in Self (INS) postively influences students' environmental behaviour towards global sustainability.

Hypothesis 4: The positive indirect effect of social identity with an alumni programme on students' enivronmental behaviour is mediated by the Inclusion of Nature in Self (INS).

Proposed hypothesised model

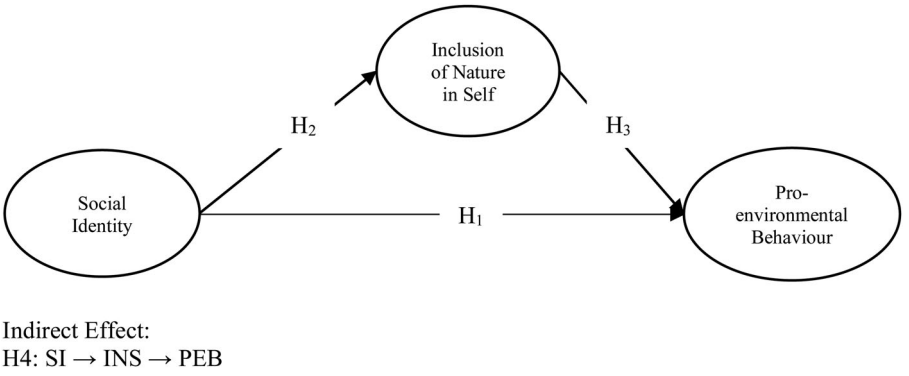

Figure 1. Proposed hypothesised model. Indirect Effect: H4: SI → INS → PEB.

Case study

In order to explore these hypotheses, we use a case study of the Students on Ice (SOI) programme. Established in 1999, SOI is a Canadian-based charitable organisation that leads educational expeditions (approximately 2–3 weeks in duration) to the Polar Regions for predominantly high school students. SOI offers unique educational expeditions to the Antarctic and the Arctic, with a mandate to provide students, educators, and scientists with inspiring educational opportunities at the Poles and, in doing so, to help participants foster a new understanding of and respect for the environment (Green, 2010). Some of the explicit objectives of the programme are to: raise awareness and take action on environmental issues; provide experiences that connect youth to the natural world; investigate and raise awareness about the impacts of climate change on the Polar Regions; and determine the solutions, actions, and adaptations required to reduce these effects (Green, 2010). Specific programming includes activities directly linked to secondary school curriculum – biology, geography, and cultural studies. The programmes are led by both world-renowned experts and secondary school teachers. This takes place through lectures, hands-on workshops, and site-specific visits, which are supplemented by adventurous activities, such as hiking and kayaking, zodiac cruising and birdwatching, or community visits (to villages in the Arctic or scientific stations in the Antarctic). Aside from the SOI expedition itself, a hallmark of the SOI experience is its ongoing connections through the alumni programme, which to date is an active community of over 3,000, including students, scientists, educators, elders, community leaders, and artists (Students on Ice, 2020).

There is anecdotal evidence that participants undergo a transformative experience, with alumni making such statements as the following: "I will forever be changed and touched by Antarctica and I know why people are so passionate and protective of such a place. I hope to do the same!"; "As of yet, I don't know how exactly my life will change at home, but I know that it will."; "This expedition has opened up windows in my mind that I never knew existed!" and "The program is a recipe for transformation." Invariably, participants leave the expedition inspired and empowered to make positive change in their own lives and in communities across the globe. However, little is known about the real-world impact of the SOI programme and its alumni programme over the last two decades of operation. What impact has generating knowledgeable, inspired, and empowered youth – with connection to the land, peers, and mentors from around the world – had on their subsequent lifestyle decisions and pro-environmental behaviours? To address this research gap, SIT (Tajfel & Turner, 1979) was used to evaluate the impact of the SOI alumni programme upon its participants. Relationships between students' social identity towards the alumni programme and their current behaviours towards connectedness with nature and pro-environmental behaviour were tested.

Methodology

A cornerstone of sustainable tourism research has been the examination of the multi-faceted impacts of tourism, where the collective academic impact of such work has been considerable. By contrast, it is not clear what real-world impact has occurred from this collective effort. With this in mind, the research project was purposefully designed in collaboration with the Students on Ice (SOI) programme to maximise the impact of the findings. The research design was informed by a Community-Engaged Research (CER) approach, defined by Stanton (2008, p. 20) as research "that partners university scholarly resources with those in the public and private sectors to enrich knowledge, address and help solve critical social issues, and contribute to the public good." CER is characterised as having an intentional public purpose and a direct or indirect benefit to a community; moreover, it is a collaborative approach to the research process that yields a range of research outcomes (Stanton, 2008). While the degree of collaboration might differ, a key attribute of a CER approach is the purposeful engagement of non-academic actors in the research process (Stanton, 2008). The CER approach was adopted in the present study because of the potential it offered in seeking genuine engagement between scholarly communities and end-users (in this case, SOI) to enrich scholarship, research, and creative activity, to address critical societal issues, and to contribute to the public good (Bloomfield, 2005; Schwartz, 2012; Stanton, 2008). In this research, we followed three main phases of the CER approach: Phase A) Framing and Foundation; Phase B) Data and Analysis; and Phase C) Application and Dissemination. Ethical clearance for the research project was first approved by the Research Ethics Board at Cape Breton University (Canada) where author Patrick Maher was based at the time [File #: 1819-073] and subsequently endorsed by the Human Ethics Committee at Lincoln University (New Zealand) and the University Ethics Committee at the University of Surrey (UK).

Phase A: framing and foundation

The scholarly genesis for this study was the International Polar Tourism Research Network (IPTRN) conference and community tour in Canada's Yukon Territory in June 2018, where (three authors of this paper, Hehir, Stewart and Maher) were in attendance. Two members of the emergent research team (Hehir and Maher) were also alumni of the SOI programme – one as a student, the other as an educator. Shortly thereafter, at an alumni event in London, UK, the project leader, Christy Hehir, floated the idea of a collaborative project with Geoff Green, Founder, Executive Director, and Expedition Leader of SOI. Green highlighted the importance of the alumni programme, and it was suggested that social identity may play a role in SOI's alumni success, thereby helping to frame the research project. This meeting signalled the formation of a research team with a shared desire to conduct research that could be recognised academically and whose findings would be used in practice to capture the real-world impact of SOI's work over the last two decades.

Phase B: data and analysis

The key constructs for the study (social identity, pro-environmental behaviour, and inclusion of nature in self) were developed in conjunction with SOI but under the guidance of the project leader, Christy Hehir, as this aligned well with her research expertise.

Social identity

This study used multi-scales to measure both first- and second-order constructs. Observed indicators for the first-order constructs and higher-order constructs (e.g. second-order) have multiple latent variables as lower-order subcomponents (Hair et al., 2019). Measurements of social identity

were drawn from the previously developed and validated multi-item scale by Ellemers et al. (1999), which has been previously used in tourism research (Palmer et al., 2013) to measure residents' identity when investigating the effects of residents' social identity and their advocacy of incoming tourism. Ellemers et al. (1999) distinguished between three components of social identity – self-categorisation, commitment to the group, and group self-esteem – using 10 items. These three components were accomplished via the specification of a second-order factor model that suggests that the first-order constructs estimated are subdimensions of a broader and more compacting second-order factor (Hair et al., 2019; Ribeiro et al., 2018). In this study, participants responded to the items on a 5-point Likert Scale ranging from 1 = "strongly disagree" to 5 = "strongly agree."

Inclusion of nature in self

The person–environment relationship was measured using a well-established close relationship measure. Aron et al. (1992) Inclusion of Other in the Self (IOS) scale is a closeness measure assessing the connectedness between individuals in close interpersonal relationships, using Venn-like pictorial diagrams. Interconnectedness has been used in abundance in close relationships research and has also been used in other areas, including the self in a community (Mashek et al., 2006), inclusion of the in-group in the self (Tropp & Wright, 2001), and Inclusion of Nature in Self (INS) (Schultz, 2002). This study uses Schultz's (2002) version of the IOS scale to examine inclusion of nature in the self-concept (inclusion of nature in the self) by replacing "other" with "nature." The diagrams consist of a sequence of seven increasingly overlapping pairs of circles (one representing the self and one representing nature). Participants selected from the Venn-like diagrams, numbered 1–7 (1 = least overlap and 7 = greatest overlap) which degree of overlap of circles best described their relationship with nature. Higher scores represented greater Inclusion of Nature in Self (INS). Schultz (2002) believed these cognitive representations serve as the fundamental aspect of human–nature relations. The INS scale has also been developed to test specific elements of the natural world. For example, Leary et al. (2008) developed the Allo-Inclusive Identity Scale, which consists of 16 IOS diagrams and in which the "other" ranged from a wild animal to a tree. The present study further develops the INS scale measure to compare individuals' relationships to nature at different locations. Alongside the "nature in general" item, three others were added: nature in your home community; nature I experienced during my first SOI expedition; and the Polar Regions in general.

Pro-environmental behaviour

Initially, discussions centred around using existing pro-environmental psychology behaviour scales, such as the General Ecological Behaviour (GEB) scale for adolescents (Kaiser et al., 2007) to assess participants' contributions to global sustainability, including their everyday pro-environmental behaviours, consumerism, and various behaviours towards conservation. However, SOI did not agree with using such scales as they were deemed too western and not appropriate for many of their indigenous (First Nations, Inuit, and Metis) participants. For example, *reducing your meat consumption* or *I try to persuade my parents to drive an energy-efficient car* may be culturally insensitive and/or not feasible to implement. Therefore, collaborating as a CER team, we came up with an alternative question which asked more generically how participants' SOI expedition was influential in changing "behaviours back home" or "travelling behaviours" as those behaviours relate to participants' actions towards global sustainability. "Global sustainability" was the wording already used by SOI and noted throughout its alumni programme, which is why we used this term in the survey rather than employing the more widely accepted academic term, "pro-environmental behaviour." An item on attitudes towards other cultures and participants' decision to take action on causes they are passionate about was also added as the result of a

request from the SOI Alumni Team Lead. Participants indicated, on scale of 1–5 (1 = definitely not and 5 = definitely yes or not applicable), the degree to which they believed their SOI expedition was influential on their pro-environmental behaviour. To further understand these behaviours, an additional open-ended question asked participants to elaborate on their answers and note any specific behaviours.

Data collection procedure

Over the course of a number of months and iterations, the questions for the online survey were discussed (predominantly via online meetings). They were confirmed with the research team, as well as with several members of SOI's team, including the Alumni Team Lead, Learning Design Manager, and Communications & Media Relations Manager. The research team designed an online questionnaire on Qualtrics, and the URL link was sent to SOI. SOI further launched and promoted the survey throughout their social media platforms, including Facebook and Twitter. Data were collected from 17–31 October 2019. A reminder e-mail and social media posts were sent/posted on 24 October 2019. To ensure inclusivity of all SOI participants, SOI also requested we prepare a postal survey. This survey was offered to ensure any remote participants with limited internet capabilities were also able to participate; however, no surveys were actually distributed in this manner. Overall, 1,553 alumni were reached with the email send-out, and thus the estimated response rate was around 15%, resulting in 217 respondents completing the survey. As recommended by Hair et al. (2019), questionnaires with missing data were eliminated from the study to avoid biased statistical results. Afterwards, a total of 217 usable questionnaires were retained for data analysis, satisfying the minimum sample requirement of 200 for effective use of structural equation modelling (Hair et al., 2019).

Data analysis strategy

The proposed model (Figure 1) was assessed via AMOS 26, using the two-step approach, with maximum likelihood (ML) estimation recommended by Anderson and Gerbing (1988). The confirmatory factor analysis (CFA) was used to test the underlying factor structure of the construct and to examine the validity and reliability of the factors. First, the two-stage approach was applied to confirm social identity and inclusion of nature in self (INS) as second-order models. Next, the first-order pro-environmental behaviour was tested together with the second-order model construct for reliability, internal consistency, and construct reliability. Then, the path analysis approach was used to examine the direct effect of the constructs as proposed in the model (Preacher et al., 2010). Both measurement model and structural equation were tested for the validity, reliability, and goodness of fit indices, as recommended in the literature (Hair et al., 2019; Hu & Bentler, 1999). The mediating effect of Inclusion of Nature in Self (INS) was tested using Hayes' PROCESS macro model 4 (Hayes, 2018), with a 10,000 bootstrap re-sampling procedure. Social identity was entered as an independent variable, pro-environmental behaviour was treated as dependent variable, and Inclusion of Nature in Self (INS) was treated as the mediator (Hayes, 2018).

Phase C: application and dissemination

In this final phase, the project applied and disseminated the research findings with the intention of showcasing the utility of the research for both theory and practice. Key intentions of this phase of the process were: a) highlight key findings through industry events and academic conferences; b) reflect on research findings to inform the SOI programme; c) draft an impact report detailing the legacy of the SOI programme after 20 years of operation; and d) reflect on the mutual learnings of a collaborative research project. The application of these three phases of this

CER project is demonstrated throughout the remainder of the paper by sharing our collaboration insights. These were written by all members of the team.

Results

Sample characteristics

As summarised in Table 1, 69.1% of the participants were female, 28.5% were male, and 2.4% responded with other. A large portion of the respondents were between 14 and 17 years old (64.9%) when they participated in their first polar expedition. The majority of the respondents were between 21 and 30 years of age (52.2%) when they completed the survey, and the majority took their first expedition to the Arctic (60.4%). Regarding the level of education, at the time of the expedition, 72.6% participants had earned or were working towards a high school certificate, while at the time of the survey completion, 43.5% held or were working towards an undergraduate degree, and 33.8% held a master's or doctorate degree. In terms of experiential education/experience-based programmes, 33.5% of the respondents indicated that SOI was the only experiential education programme/experience in which they had ever participated.

For context, participants were asked to elaborate upon each behavioural construct. Examples of responses given by participants are noted in Table 2. Changing one's behaviours back home predominantly included reducing emissions, be it through transportation or food choices. Participants most often mentioned their reduction of flying as the change made to their travelling behaviours. Examples of changing attitudes included a deeper understanding of and respect for others. The final construct participants noted their increased levels of confidence and ability to speak up. These were in addition to actions they decided to take, following their experience, on causes they were passionate about it. These actions included volunteering and public speaking.

Measurement model

As previously mentioned, social identity and Inclusion of Nature in Self (INS) have multidimensional scales. However, prior to testing the proposed hypotheses, we conducted confirmatory factor analysis (CFA) to assess the validity of these constructs with social identity and Inclusion

Table 1. Demographic profile.

Items	Category	Distribution (%)
Gender	Male	28.5
	Female	69.1
	Other	2.4
Age at your first expedition	14-17	64.9
	18-21	23.1
	22-24	12.0
Current Age	20 or less	28.5
	21-30	52.2
	31-40	19.3
Place of first SOI Expedition	Antarctica	39.6
	Arctic	60.4
Level of Education at the time of expedition	Less than high school	4.3
	High school	72.6
	Trade certification	1.0
	Undergraduate degree	18.8
	Postgraduate degree	3.4
Current level of Education	High school	12.1
	Trade certification	2.4
	Undergraduate degree	43.5
	Postgraduate degree	33.8
	Other	8.2

Table 2. Participant definitions of pro-environmental behaviour.

Pro-environmental Behaviour Qualitative explanations of Constructs	Examples given by participants
Changing your behaviours 'back home' in consideration of your own actions in the world	Public transportation, eliminating waste, took steps to elongate emissions, transportation choices, using carpool options, reducing travel, food choices (e.g. less meat or switching to a plant-based diet), engaging in activism, day to day travel by walking and biking more often
Changing your 'travelling' behaviours in consideration of your own actions in the world	Avoid vehicles or transportation methods that are more polluting to the environment such as cruise ships, not flying, reduce air travel, offsetting any flight emissions, only flying for the purposes of education (and not leisure), use travel natural companies where possible, fly only for long-haul trips.
Changing your attitudes towards other cultures	Deeper understanding and admiration and respect for indigenous peoples, learning to listen, empathize with a lot of people, understanding white privileges, how to be a good ally to people from other backgrounds, diversity = strength and gift
Changing your decision to take action on causes you are passionate about	Increased confidence to fight in what I believe in, commitment to generating new ideas to make the world better, becoming a climate activist, volunteering for conservation, advocating for strong policy and protected areas, more willing and ready to take action - both leading and following, organised climate actions and attend conferences, joined numerous local committees and groups at university connected to sustainability, and conservation biology. Sat on the Canadian youth committee for the International Polar Year. Started motivational public speaking.

of Nature in Self (INS) modelled as second-order factor with their first order-order dimensions. The second-order measurement model provided a satisfactory fit to the data ($\chi^2 = 132.534$, df = 70, χ^2/df = 1.89; Comparative Fit Index [CFI] = .96; Tucker Lewis Index [TLI] = .95; Root Mean Square Error Approximation [RMSEA] = .064; Standardized Root Mean Square Residual [SRMR] = .042), demonstrating the accuracy of the model (Kline, 2016). The standardised first-order factor loadings were significant, suggesting that all social identity and all Inclusion of Nature in Self (INS) constructs were defined. Furthermore, the second-order loadings were associated with their respective higher latent constructs: group self-esteem (.82), self-categorisation (.83), commitment to the group (.89), connection to nature personal (.86), and connection to nature group (.80). Afterwards, we added pro-environmental behaviour into the second-order CFA model, and the model provided a satisfactory fit to the data ($\chi^2 = 225.146$, df = 120, χ^2/df = 1.88; CFI = .96; TLI = .94; RMSEA = .064; SRMR = .042).

All constructs were deemed reliable since their coefficient alphas (Campbell & Fiske, 1959) and composite reliability (CR) values were all greater than the suggested 0.70 (Nunnally & Bernstein, 1994). Additionally, as presented in Table 3, the model met requirements for convergent validity, with each item loading meaningfully and significantly (above 0.5) on the predictable latent construct and the AVE values being higher than the recommended threshold of 0.5 (Hair et al., 2019). Also, Table 4 shows that the square roots of AVE for each construct (presented in the diagonal) were greater than their inter-construct correlation, demonstrating discriminant validity (Fornell & Larcker, 1981).

Additionally, to reduce the risks of common method bias (CMB) (Conway & Lance, 2010), the common method factor test (Podsakoff et al., 2003) was used to compare the confirmatory factor analyses (CFAs) for the measurement model with the one-factor model. Therefore, we ran a CFA with all 18 items loading onto a single common factor to verify whether a single-factor model can account for all the variance in the data set (Baldauf et al., 2009). The results demonstrated a significant deterioration of the chi-Square ($\Delta\chi^2 = 807.09$; df = 15; $p < .001$), suggesting that

Table 3. Results of the measurement model.

Constructs and Indicators	Std. β	*t*-value	CR	AVE
Social Identity – *Second Order*				
Group Self-esteem (α = 0.88)			0.895	0.683
I think the SOI alumni has little to be proud of	.931***	N/A		
I feel good about being part of the SOI alumni	.851***	17.952		
I have little respect for SOI alumni	.719***	13.166		
I would rather not tell others that I belong to SOI alumni	.790***	15.536		
Self-categorization (α = 0.78)			0.815	0.595
I identify with other members of SOI alumni	.726***	N/A		
To be with people who enjoy the same things I do	.780***	10.384		
The SOI alumni is an important reflection of who I am	.806***	10.647		
Commitment to the group (α = 0.92)			0.843	0.643
I would like to continue interacting with the SOI alumni	.727***	N/A		
I dislike being a member of the SOI alumni	.853***	11.787		
I would rather belong to another group than SOI alumni	.820***	11.396		
Inclusion of Nature in Self – *Second order*				
Connection to Nature Polar (α = 0.88)			0.800	0.667
Nature I experienced during my first SOI Expedition	.803***	N/A		
The polar regions in general	.830***	7.535		
Connection to Nature General (α = 0.85)			0.743	0.592
Nature in General	.754***	N/A		
Nature in your home community	.784***	8.047		
Pro-environmental Behaviour (α = 0.88)			0.912	0.721
Changing your behaviours 'back home' in consideration of your own actions in the world	.868***	N/A		
Changing your 'travelling' behaviours in consideration of your own actions in the world	.878***	17.159		
Changing your attitudes towards other cultures	.875***	17.076		
Changing your decision to take action on causes you are passionate about	.772***	13.818		

Scale: 1 = Strongly Disagree to 7 = Strong Agree.
Note. ***p < 0.001 level (Tw-tailed); CR = composite reliability; AVE = average variance extracted; N/A – In Amos, one loading has to be fixed to 1; hence, t-value cannot be calculated for this item.

Table 4. Interconstruct correlations for discriminate validity.

	Mean	SD	SI	CTN	PEB
Social Identity (SI)	2.847[a]	0.242	**0.818**		
Inclusion of Nature in Self (INS)	5.190[b]	0.904	0.465	**0.849**	
Pro-environmental Behaviour (PEB)	4.333[a]	0.601	0.704	0.488	**0.797**

Note: The bold elements diagonal matrix are the square root of the average variance extracted (AVE); interconstruct correlations is shown off-diagonal.
[a]All items measured on 5-points Liker Scales.
[b]All items measured on 7-points Liker Scales.
All correlations are significant at the $p < 0.001$ level.

CBM is not a pervasive issue in this study. Lastly, we assessed the normality of the data by analysing the values of both skewness and kurtosis, which are known to influence the analysis of variances and covariances underlying SEM. A rescaled value higher than 2 for skewness and higher than 7 for kurtosis indicates a departure from normality (Curran et al., 1996; Ribeiro et al., 2018). Results provided by AMOS output indicated that no item presented a skewness and kurtosis value higher than 2 and 7 respectively, supporting the normality conduction underlying the maximum likelihood (ML) estimation of SEM (Curran et al., 1996; Nunkoo et al., 2018).

Hypotheses testing

After assessing the model fit of the measurement model, we tested the proposed theoretical model, using a structural equation model and employing AMOS 26 with maximum likelihood estimation methods. The results showed that the model fits the data reasonably well (χ^2 =

Table 5. Standardized Regression Weights for structural model.

Standardized hypothesized relationship	*Std. Estimates*	*t-value*	Result
H1: Social Identity → Inclusion of Nature in Self	.47	3.24***	Supported
H2: Social Identity → Pro-environmental Behaviour	.61	6.35***	Supported
H3: Inclusion of Nature in Self → Pro-environmental Behaviour	.20	2.44*	Supported
Indirect effect	Effect	$SE_{(boot)}$	$Boot_{95\%\ CI}$
H4: Social Identity → Inclusion of Nature in Self → Pro- Environmental Behaviour	.157	.050	.057, .254

Note: ns = not significant.
*$p < 0.05$; ***$p < 0.001$.
Variance Explained:
$R^2_{\text{Inclusion of nature in self}} = 0.22$.
$R^2_{\text{Pro-Environmental Behaviour}} = 0.53$.

269.40, $df = 127$, $\chi^2/df = 1.12$, CFI = .94, TLI = .93, RMSEA= .072, SRMR= .074). To estimate the accuracy of the structural framework, the R^2 of variance explained for Inclusion of Nature in Self (22%) and pro-environmental behaviour (53%) were calculated as predictive power (Hair et al., 2019). As summarised in Table 5, all four proposed hypotheses were supported. Specifically, hypothesis 1 proposed that social identity positively affects Inclusion of i Nature in Self ($\beta = .47$, $p < .001$), providing support to H1. Hypothesis 2 proposed a positive relationship between social identity and pro-environmental behaviour ($\beta = .61$, $p < .001$), thus confirming H2. As proposed by hypothesis 3, the parameter estimation between inclusion of Nature in Self and pro-environmental behaviour is positive and significant ($\beta = .20$, $p < .001$), therefore supporting H3.

To test the mediation effect (hypothesis 4) with Inclusion of Nature in Self (INS) as a mediator, social identity as predictor and pro-environmental behaviour as outcome, Hayes PROCESS (Hayes, 2018) model 4 was used. A significant indirect effect was found ($ab = .15$,795% CI [.057, .254]) from the mediation analysis, suggesting that relationship between social identity and pro-environmental behaviour is mediated by the Inclusion of Nature in Self (INS), supporting H4.

Discussion and implications

Theoretical implications

With polar tourism criticised as paradoxically harming the environment the tourists wish to visit, this study is one of the first to evaluate *why* tourists partake in new pro-environmental behaviours, in some cases long after their visit. Using Social Identity SIT underpinnings, we evaluated the impact of youth polar expeditions on participants' pro-environmental behaviour, up to 18 years after their polar voyage. Our prediction that path analysis would reveal a relationship between pro-environmental behaviours and social identity – which would be mediated by Inclusion of Nature in Self (INS) – was supported.

This study has extended our understanding of the role of social identity within a tourism context. Previous studies within the discipline have focussed on the construct of identity in encouraging individuals to promote tourism related services or informing tourism purchase decisions (Palmer et al., 2013). This study has additionally found that social identity can have a direct relationship with individuals' pro-environmental behaviours towards global sustainability. Further, it is the first study to use SIT within the specific context of educational expeditions to evaluate the real-world impact of their programmes, contributing new insight into the experiences of young people participating in educational expeditions to the Polar Regions (Orams, 2015).

Alongside extending our understanding of the role of social identity within a tourism context, this study makes several important contributions to tourism theory. The first contribution is the confirmation of the *relationship between social identity and participants' pro-environmental behaviours towards global sustainability*. Previous research notes that identities are developed through experience, and experiences are interpreted in part through social understandings (Clayton & Myers, 2015). Therefore, giving students the opportunity to be involved in an alumni programme

with activities and an online community allows them to percieve themselves as SOI alumni – and to be so labelled by others. Clayton and Myers (2015) suggested that as long as those labels are socially valued, they are likely to result in increased activity on behalf of nature. This is borne out in this study in the way in which it revealed a direct relationship between participants' social identity and their engagement with pro-environmental behaviours. Drawing on the theoretical basis of identity has helped us to understand not only how identities influence pro-environmental behaviours but also how they are developed and maintained (Breakwell, 2015).

In addition to the direct effect of social identity on pro-environmental behaviour, another important contribution to acknowledge from this study's empirical results is that the mediation model revealed a pattern of relationships between social identity, Inclusion of Nature in Self (INS), and pro-environmental behaviours that has not been previously demonstrated. More specifically, social identity via Inclusion of Nature in Self explained 53% of the variance in pro-environmental behaviour. Results suggest that being proud of, being able to identify with, and/or being committed to the SOI alumni programme could ensure that students become more adept at intentionally processing information about polar and environmental matters, intensifying individuals' specific experiences about the natural world (Wang et al., 2019), and consequently promoting their perception of nature connectedness. The Inclusion of Nature in Self (INS) contributes to increasing participation in pro-environmental behaviours towards global sustainability. Thus, we claim that Inclusion of Nature in Self (INS) mediates the relationship between social identity and pro-environmental behaviour.

Prior research indicated that as environmental problems accelerate, researchers are directing their attention towards human–nature relationships and their impacts on pro-environmental behaviour (Nisbet et al., 2009). Thus, to tackle pro-environmental behaviour change, a (re)connection to nature is required. This study's successful predictive validity of Inclusion of Nature in Self (INS) within the proposed model supports this approach, just as interconnectedness and commitment act as strong predictors of relationship-enhancing behaviour in close relationships (Aron et al., 1992). Interestingly, the second-order factor model identified the connection to nature polar contrasts were stronger toward human–nature relationships, and their impacts on pro-environmental behaviour were stronger than the connection to nature general and nature in your home community constructs. This begins to suggest that the expedition element of SOI to the Polar Regions is an important contributor to participants' nature connectedness (INS).

CER: methodological reflections and practical implications

Adopting a CER approach has been largely effective in translating scholarly findings in a form that has merit and applicability in practice. We have been mindful throughout the project that running a good practice co-design process is no guarantee by itself that findings will be taken up in practice (Webb et al., 2018). To enhance the likelihood of success, a key learning from the project is the central importance of building a research relationship overtime that is grounded in trust. Undoubtedly, the existing association Christy Hehir and Patrick Maher had with SOI through the alumni programme paved the way for the project in the first place. That there was a joint ambition to aim for real-world impact from the outset of the research proved to be critical.

In practice, the research findings are important as they add empirical evidence for the first time to support the alumni programme. This work in evaluating the ability of existing programmes to achieve desired outcomes is critical for continuous quality improvement in educational expedition programming (Landon et al., 2019). As the SOI Alumni Team Lead reported, "this collaboration has been very timely to help support the work we are currently doing and has given us some direction as to where we can improve the alumni programme to better respond to alumni needs." Furthermore, the data will be reported in the first SOI "Impact Report"

(modelled on similar impact reports by Outward Bound). Such reporting is a key outcome from this research, as outlined by the SOI Alumni Team Lead: "This year, we are celebrating and reflecting on 20 years of SOI and therefore we would like to share the impact that our programs have had over the last 20 years. We will be highlighting students, staff and partners through stories and info-graphics. Our connection with alumni over the years has led us to have lots of anecdotal evidence, so this collaboration with this research team is allowing us to show the impact on alumni through numbers." In addition, the data arising from the project will allow SOI to add independent evidence to support future funding applications. Further, this collaborative project has generated a data set to act as a baseline for future longitudinal studies and has created a survey tool to capture future societal change.

Despite the positive outcomes of the research there were some challenges along the way. The development of the survey instrument took a number of iterations before the SOI approved it for circulation. As mentioned previously, environmental psychology scales were initially deemed useful in the survey, but after discussion they were thought too western for the diverse SOI alumni and were replaced with more open-ended questions. On this matter, the SOI Alumni Team Lead reflected: "I have appreciated working with academics who have truly listened to the concerns and feedback that we are providing. It took a while to get the questions to a place where both the academics and SOI were happy, but in the end it was worth it." Clear and regular communication was important, and to facilitate this process of negotiation, we elected to have the project leader communicate directly with the Alumni Team Lead at SOI. This proved to be fruitful in finalising the survey instrument in a timely fashion.

Limitations and avenues for future research

This study is not free of limitations. First, taking into account the SOI alumni population, the sample size of 217 is quite small for greater representation. This also restricted some analysis, such as making comparisons between Antarctic and Arctic trips or splitting the travel time variable to see if any impact decreased over the course of an SOI's alum's life. Therefore, we suggest the interpretation of the findings and generalisation of results must be done with caution. Future research should be conducted using the SOI alumni population and aim for a higher response rate that can better measure the theoretical relationships proposed in this study. Another avenue to pursue would be to collect longitudinal data to measure the changes over time, to see if the impact of a trip fades away across the SOI alumni's lifespan.

A further limitation of the study was the method of questioning, in which participants were directly asked to self-report on precisely the degree to which SOI was influential. This method was deemed most appropriate for this exploratory study. However, the accuracy of some responses may have been sensitive to social desirability or recall bias. For example, participants might have overinflated their contributions in order to give a positive self-description. Future work could attempt to develop a scale noting the specific participant behaviours identified in Table 2 or could ask participants about different experiences or other sources of their social identity and social inclusion which might have influenced them alongside their SOI experience.

This study examined only a small number of factors that could explain a 53% increase in pro-environmental behaviour. Even though the mediator and the criterion were assessed concurrently, it is possible that other models may apply. In this sense, there might be other variables, such as place attachment (Aleshinloye et al., 2020; Patwardhan et al., 2020), willingness to sacrifice and eco-behaviour (Landon et al., 2019), emotions (Prayag et al., 2017), and so forth, that may have significant influence on Inclusion of Nature in Self (INS) and pro-environmental behaviour. Future studies could incorporate these factors in the current model in order to increase its predictive power.

Conclusion

This study advances our understanding of the elusive and complex concept of polar ambassadorship (Miller et al., 2020). Findings suggest that social identity might be one way to explain the long-term impact of educational expeditions in terms of desired future pro-environmental behaviours, highlighting the critical importance of an alumni programme. As one of the first studies to collect data up to 18 years after the experience, this work is important as it suggests that social identity with an alumni group may continue to inspire and empower young people to make positive change in their own lives, in communities, and across the globe – not just immediately after their trip, but throughout their lifetimes. Such findings start to progress the existing literature beyond the immediate evaluation of such programmes (Hattie et al., 1997; Landon et al., 2019; Neill, 2003; Neill & Dias, 2001) to understand the subsequent development of participant pro-environmental values and actual behaviours in the longer-term.

This study acts as a starting point to showcase the potential significance and value of alumni programmes in developing the longer-term goals of the development of more sustainable lifestyles for their participants. While this provides a contribution to knowledge by extending theories of social identity to this specific context, it may be difficult to generalise the results to other contexts and natural destinations, such as the Great Barrier Reef, or to the work of groups that operate globally, such as Raleigh International and Outward Bound. As no similar research has been conducted within these contexts, additional research is needed to measure the wider implications of how social identity can play a role in more sustainable tourism development. For example, it would be interesting to investigate other educational expeditions which do not offer an alumni programme, or to see whether social identity can also be associated with tour operators' travel forums/discussion boards.

Furthermore, a Community-Engaged Research (CER) approach was adopted to evidence the maximum impact of this research beyond the academic realm. Throughout the paper, we reflected on: a) how to incorporate real-world impact from the outset; b) how to engage end-users in the research process; c) how to record and capture real-world impact accurately; and d) how to develop partnerships to ensure successful dissemination of knowledge. The study's findings and subsequent implications within SOI's day-to-day practice highlight that research can contribute to the tourism sector in a meaningful and impactful way.

Disclosure statement

No potential conflict of interest was reported by the authors.

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