



The Role of Awe in Arctic Tourism

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Abstract

It is clear that travelling to the Arctic has negative environmental impacts, but it is not clear whether it also has a possible consequence, namely increases in pro-environmental behaviour. Awe is an emotion, common in touristic experiences, that arises from encountering rare natural phenomena making people feel small and reconsider what they know. This research aimed to determine the relationship between these two variables, hypothesising that the more people experience awe during an Arctic touristic expedition, the more they report their pro-environmental behaviour after the trip compared to before. A longitudinal study was conducted with researchers and tourists during the 2022 Scientific Expedition Edgeøya Spitsbergen, measuring emotions twice daily during the trip and administering pre-and-post measures for pro-environmental behaviour. The main findings show that people do experience awe in the Arctic, yet this does not translate to a change in pro-environmental behaviours. As a result, more critical perspectives on the role of visitors in sustainable tourism are required to challenge prevailing narratives, call present practices into question, and promote responsible behaviours that emphasize the well-being of local populations and ecosystems.

Keywords: arctic tourism, awe, Edgeøya Spitsbergen, pro-environmental behaviour, SEES, the Arctic regions

The Role of Awe in Arctic Tourism

Despite their reputations as places with extremely cold and difficult living circumstances, both the Arctic and the Antarctic have drawn travellers for more than 200 years for the possibility to see unscathed nature (Stonehouse & Snyder, 2010). Particularly, the Arctic is known for its abundance of wildlife, including 40 species of mammals such as lemmings, arctic hares, bowhead whales, and musk oxen (Stonehouse & Snyder, 2010). Aside from its diverse animal populations, the Arctic is also known for its vast tundra and taiga landscapes, icebergs, and glaciers, making it a highly sought-after travel destination (Pashkevich, 2014). Alarmingly, the Arctic is heating at a tremendous rate far outpacing the global average, leading to a continuous loss of ice, more precipitation, and threats to wildlife (Post et al., 2019). These irreversible damages, likely caused by climate change, provide a sense of urgency and encourage even more tourists to visit before it's too late, an emerging trend known as 'Last Chance Tourism.' Consequently, tourism in the Arctic has quadrupled in the summer months and expanded by over 600 percent in the winter months, from 2006 to 2016 (Runge et al., 2020). This spike in tourism has resulted in a large increase in the tourist footprint during the last 20 years. Generally, a trip to the Arctic causes high CO₂ emissions because it usually includes flying, cruise ship travel and shipped food. D'Souza and colleagues (2021) showed that individual emissions per trip to Churchill ranged from 1.54 to 8.61 tonnes of CO₂ per trip. By contrast, the average amount of CO₂ per individual per year equals 4.79 tonnes (*CO₂ Emissions per Capita*, n.d.). Therefore, a trip to the Arctic can potentially double or even triple the amount of the individual's yearly emissions leading to a self-perpetuating cycle in which increased tourism generates larger climate-related challenges, in turn attracting more tourists. Thus, it is

important to consider what Pashkevich (2014, p.1) said: “One of the critical concerns in understanding arctic tourism is in recognizing its boundaries.”

Overall, boundaries imply that there might also be positive consequences associated with the growth in tourism to the Arctic, leading to the question: Is there a silver lining to increased tourism? Tour operators claim that when returning from the polar regions, tourists can act as sustainability ambassadors due to long-lasting impressions. A cruise ship company called ‘Hurtigruten Expeditions’ states that by raising awareness about climate change in lectures and workshops, they are hoping that tourists will be inspired to do all they can to “cherish and protect the precious world we all share” (Taking Sustainability Seriously, 2023). More generally, studies indicate that nature encounters can raise visitors' respect for their surroundings (Hartel et al., 2015), which in turn raises awareness of the need for environmental protection (Packer & Ballantyne, 2010), and builds their inclination towards pro-environmental behaviour (Zelenski & Desrochers, 2021). In sum, this could imply that tourism can indeed have the potential to stimulate pro-environmental behaviour, helping to contribute to protecting the environment. However, how and to what extent the vision of pristine nature leads to sustainable behaviour is yet unclear (Wang & Lyu, 2019). Therefore, this study aims to investigate the main question: Can people coming back from the Arctic act more pro-environmentally than before?

Awe and Arctic Tourism

Currently, little research is present on the link between arctic tourism and pro-environmental behaviour and specifically what can trigger people to act more sustainably (Wang & Lyu, 2019). One specific mechanism that has been linked to the visitors' touristic experiences and satisfaction is a particular emotion. To better understand how this emotion is experienced, Consider the following scenario. Imagine yourself seeing a polar bear or a glacier in real life.

You may feel overwhelmed by the size and beauty of this rare observation, your eyes may widen and your mouth may fall open. You may feel small in comparison as if your own life and goals are not that important anymore, and you suddenly feel a sense of connectedness to nature (Zelenski & Desrochers, 2021). This experience is referred to as feeling the emotion of awe. Keltner and Haidt (2003) have defined awe in terms of two main characteristics, firstly 'perceived vastness' and secondly a 'need for accommodation'. In layman's terms, the experience of awe occurs when people encounter something that is overwhelming and enormous, making them feel small in the process (perceived vastness), causing them to reconsider what they know, and can make people feel startled and confused (need for accommodation). People are likely to experience awe when they perceive natural phenomena that are unusual or they have never seen before, such as the ocean, animals and mountains (Zelenski & Desrochers, 2021), as well as objects with infinite repetition, such as waves, fractals, and natural patterning (Keltner & Haidt, 2003).

Now that it is understood how people may experience the feeling of awe, it is also clear why people would want to experience it, and travelling is one of the simplest methods to do so. Altogether, the value of awe can stretch beyond the scope of personal enjoyment to comprehending the relationship between arctic tourism and subsequent pro-environmental behaviour. Thus, this article will discuss the potential role of awe in the stimulation of environmental behaviour after an arctic experience.

From Awe to Pro-environmental Behaviour (PEB) in Arctic Tourism

Keltner and Haidt (2003) identified a pathway for the general experience of awe. Concerning the role of awe in pro-environmental behaviour, this pathway can be applied in the following way. Firstly, a person experiences awe by, for example, seeing large mountainous

landscapes. This induces ‘perceived vastness’ and the ‘need for accommodation’. ‘Perceived vastness’ makes people feel small and consequently shifts attention from the self and encourages attention towards other beings and the environment (Keltner and Haidt, 2003). The person would pay less attention to daily personal concerns, and turn from their own needs, wants and worries since they would believe their self-concept is less significant (Stellar et al., 2017). The individual will then experience a sense of connectedness with a larger group or community (Rudd et al., 2012) and increase their compassion and care for global challenges. Similarly, goal framing theory proposes that people simultaneously have different goals in life, which include self-focused and other focused goals (Lindenberg & Steg, 2007). People’s behaviour is virtually always guided by many goals that depend on people’s values and the current context in which they are currently in (Steg, 2018). Because travelling to the Arctic is a drastic change in external cues, we propose that the experience of awe changes the goals people focus on, from focusing on themselves (egocentric and hedonistic goals) to a focus on others and the environment (altruistic and biospheric goals, respectively). As a result, awe, with its specific qualities, can help someone adopt a broader perspective on life by taking into account the well-being of others and their surroundings (Yang et al., 2018). That, in turn, promotes prosocial choices (Hoberg et al., 2021), such as generosity, moral judgement, helping behaviour, volunteerism, and concern for the needs of the community (Wang & Lyu, 2019). More generally, biospheric and altruistic values have been shown to be associated with pro-environmental behaviour, because they take into account the connection of all living species and acknowledge the need for collective well-being and sustainable coexistence (Steg, 2018). Especially, when people have strong biospheric values, they see nature as innately valuable, deserving of protection and conservation because of its

inherent worth and the advantages it gives to current and future generations (Gatersleben et al., 2012).

While there has been limited research on the relationship between awe and PEB in last-chance tourism, a few studies have indicated that prosocial and pro-environmental behaviours can be seen as related. Recent research suggested that pro-environmental behaviours can be construed as altruistic behaviours because ‘altruism’ refers to a selfless concern for others, typically understood to be other people, but can also encompass non-human others, such as animals or other parts of the natural environment (Otto, 2021). Additionally, according to Zelenski & Desrochers (2021), pro-environmental behaviours, such as reducing CO2 emissions, are pro-social but depend on widespread cooperation to be successful. This is because pro-environmental behaviour frequently does not result in an immediate benefit to oneself, but rather benefits society in the long run. As it is fundamentally characterised as a behaviour taken by individuals to protect the environment (Krajhanzl, 2020; as cited in Lee & Khan, 2020), it has an inherent selfless orientation. Which demonstrates a resemblance in the explanation and provides theoretical reasoning for their interrelatedness. Therefore, this pathway leads to the main question of my research, which is: do people that experience awe in the Arctic increase their pro-environmental behaviour?

Previous Studies on Awe and Environmental Behaviour

So far, two studies have examined the link between awe and pro-environmental behaviour. First, a correlational research design by Yan & Jia (2021), conducted in China's largest and best-preserved Guandi Temple, found that visiting a religious site can trigger the experience of awe, which in turn will influence three different types of values; altruistic, biospheric and egoistic, subsequently stimulating pro-environmental behaviour. This research,

however, lacks a review of how observing natural phenomena during an expedition to the Arctic might elicit awe. Second, Wang & Lyu (2019) investigated the role of awe on PEB in National scenic areas in China, mediated by the perception of the small self. Also, in this case, the experience of awe was associated with more pro-environmental behaviour. One drawback addressed in the study design, as well as an intriguing future research subject, is “how awe unfolds over time” (Wang & Lyu, 2019, p.115). Additionally, both of these studies are from China not being generalizable and there is a lack of a before measure of pro-environmental behaviour, which means there is no baseline data. That could have negatively affected the validity of the results and this study will address this.

Current Research

To address these gaps in the literature, we will examine whether awe can explain when and why a visit to the Arctic leads to pro-environmental behaviour. In tourism encounters, awe has been shown to be a highly anticipated emotion (Keltner & Haidt, 2003), especially because the emotion can frequently be triggered by experiences that individuals have never experienced before. That is why the polar regions, due to their remoteness, are places with high expectations of awe-inducing experiences for tourists. As a result of this, we will investigate this question by conducting a longitudinal study with researchers and tourists who visited the Arctic in 2022 as part of the Scientific Expedition Edgeøya Spitsbergen (SEES). The study includes pre- and post-measures for pro-environmental behaviour and emotions twice a day during the trip. Thus, this study will advance the findings of Yan & Jia (2021) and Wang & Lyu (2019) by measuring changes in the experience of awe to PEB in a different context over time.

We hypothesise the following;

*H*₁: Participants who went to the Arctic expedition will experience awe

*H*₂: Participants will report more pro-environmental behaviour after the Arctic expedition than before.

*H*₃: The more people experience awe during an Arctic tourist expedition, the more they report their pro-environmental behaviour after the trip compared to before.

Methods

Context

The SEES (Scientific Expedition Edgeøya Spitsbergen) was an expedition organised by the Arctic Centre of the University of Groningen made possible because of the Dutch Research Council (NWO), Netherlands Polar Programme and Oceanwide Expeditions (SEES, 2022). Scientists and tourists travelled together to one of the polar region's most remote locations with the primary objective of conducting scientific research on Edgeøya. The secondary objective was to educate the general population about the research being conducted, which is why writers, journalists and artists also joined the Arctic expedition. It was a 10-day trip with guided tours, where tourists could volunteer to help with research and collect plastic from the beach.

Participants and Procedure

This is a longitudinal study design with three measurement points, before, during and after the expedition. The participants of the research were 100 scientists and tourists travelling to the Arctic as part of the SEES expedition. Tourists who paid to enter were chosen on a first-come, first-served basis, whereas scientists had to apply for funding and were chosen through a selection process. Therefore, there was no monetary compensation for participation. Out of the 100 participants, 69 filled out the onboard questionnaire. Demographic characteristics were completed by 61 of the participants. The participants ranged in age from 25 To 76 ($M = 53.68$, $SD = 13.52$). There were 31 scientists, 30 tourists, 27 females and 34 males in the study.

Participants' median income ranged from 3500 to 7500 (further information in Appendix A) The majority of the participants in the sample were from the Netherlands (47 participants), other nationalities included Belgium (3 participants), Germany (1 participant), Norway (5 participants), Sweden (2 participants), Switzerland (2 participants), Wales (1 participant). The questionnaire itself was completed in Dutch or English.

A priori power analysis was not conducted, because of the limited number of participants able to be present on the expedition ship. Therefore, a post hoc power analysis was conducted using G*Power (Faul et al., 2009), using an alpha level of 0.05. For a small effect ($f^2 = 0.02$) the power was 0.289, for a medium effect ($f^2 = 0.15$) the power was 0.91, employing an alpha level of 0.05.

All participants received an online questionnaire implemented via Qualtrics, either in Dutch or English, approximately one month before the trip, assessing their pro-environmental behaviours and intentions. All the participants received an invitation and link via email from the SEES organisation. During the expedition, participants completed a 10-item emotion measurement twice a day using a physical questionnaire diary. It was supposed to be completed in the morning after breakfast and in the evening before the daily recap. This procedure was explained on the first day by one of the researchers, and there were continuous reminders throughout the week to complete the diary. This questionnaire took approximately 1 to 2 minutes each time. After the expedition, participants again completed online questionnaires that assess their pro-environmental behaviours. The before and after questionnaires took approximately 20-25 minutes. Data across measurement points are linked via a unique code that participants generated and included during each questionnaire.

Measures

Pro-environmental Behaviour

Before and after the trip, participants indicated the extent to which they engaged in four pro-environmental behaviours: Saving energy at home, sustainable food consumption, sustainable goods consumption, and travelling in a sustainable way, on a 7-point scale, from 1 (Never) to 7 (Always). Additionally, participants had to rate this statement “I would be willing to greatly change my lifestyle to reduce climate change”, on a 7-point scale, ranging from 1 (strongly disagree) to 7 (strongly agree). For means and standard deviations, see Table 1.

Awe

During the trip, an ecological momentary assessment was used where participants completed an emotions questionnaire a total of 17 times over the course of 9 days. The item to measure read: ‘At this moment, I feel.... In Awe’. Participants indicate on a five-point scale to what extent they feel awe, ranging from ‘not at all (1) to ‘very much ‘5’ (M = 3.17, SD = .86, $\alpha = .95$). The assessment during the trip was conducted through a physical questionnaire diary.

Data Analysis

The datasets from T1 and T2 together with the awe data from the ship were coupled together using a unique code generated by participants. During the physical questionnaire, some participants did not respond on certain days, thereby creating missing values. Per day this varied from 2 to 10 missing values for the whole group. To deal with this, the average of awe per individual was imputed. The experience of awe was then assessed longitudinally across 17 time points. To examine how the longitudinal experience of awe relates to a change in pro-environmental behaviour, we treated this data in two distinct ways. First, we examined whether mean scores on awe across all days are related to changes in pro-environmental behaviour.

Second, we also examined whether people's variability in awe, that is, the extent to which their awe fluctuated from day to day, is a predictor of pro-environmental behaviour. To examine the effect of variability, we calculate the mean squared successive difference of awe for each participant. We hypothesised that the higher the mean and variability of awe per participant during the trip, the more willing they are to change their pro-environmental behaviour after the trip compared to before. To analyse whether awe (mean and mssd) predicts changes in pro-environmental behaviour between T1 and T2, we used a linear regression method, with pro-environmental behaviour at T2 as the Dependent variable, and adding pro-environmental behaviour at T1 as a covariate. This approach leads to lower standard errors and is currently the preferred way of analysing pre-post changes (Fu & Holmer, 2016).

Results

To examine if and how participants experienced awe during the trip, we first examined people's self-reported awe visually. For each participant, we generated a graph demonstrating how their reported awe developed over time. Four types of patterns of experienced awe could be determined. Most participants ($n = 41$) experienced awe erratically, meaning that they experienced both high and low levels of awe, and its effect did not prevail for longer periods of time. Some participants ($n = 20$) consistently reported awe on a scale of 3 or above, implying that they were always in some state of awe during this expedition. A few participants ($n = 8$) never crossed the middle mark of 3 but did experience some level of awe while on the ship. There was only one participant that did not report any awe across the duration of the journey. A representative illustration of each of these types of experiences is presented in Figure 1.

After grouping them, it was important to determine if participants' feelings of awe were influenced by the passage of time. The analysis revealed no clear temporal trends, demonstrating

that there doesn't seem to be a time impact and that the emotion is elicited randomly.

Autocorrelation, which can occur when two observations that are near to one another are correlated and one value influences the other, was then evaluated. Even though it was not expected in this analysis some of the participants were showing partial/autocorrelation. However, this could be because the majority of the awe-inducing encounters took place in the middle of the journey.

Based on these analyses, we conclude that the first hypothesis, testing if participants experienced awe during the expedition, was supported. This explains that the Arctic expedition and within it seeing the landscapes, flora and fauna triggered the emotion of awe.

Figure 1

Example participant of an erratic experience of awe

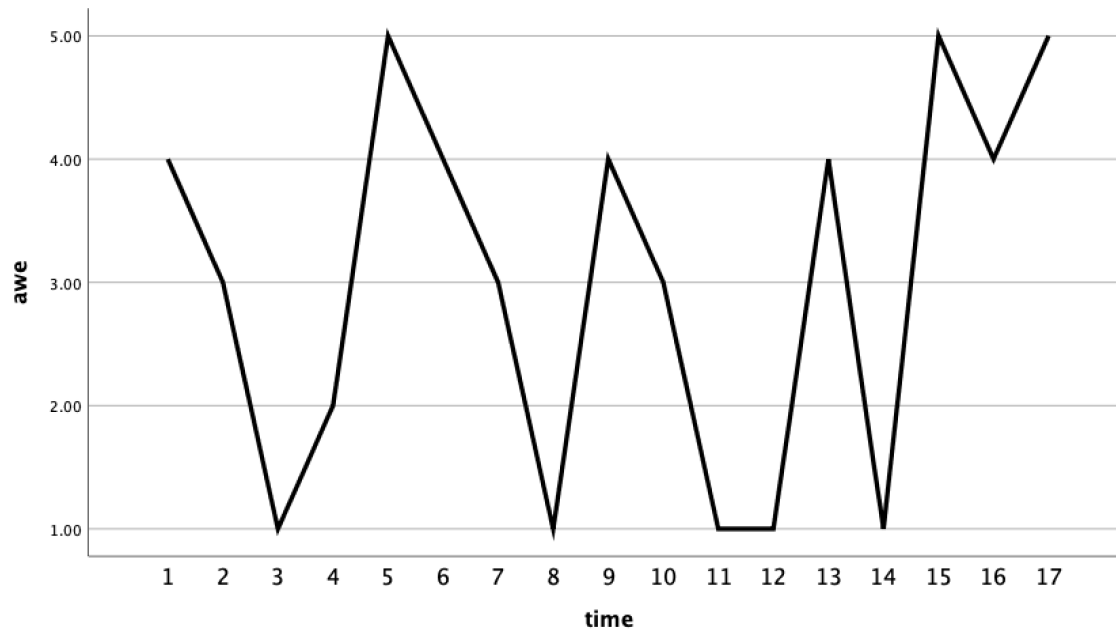


Figure 2

Example participant of an experience of awe of 3 and above

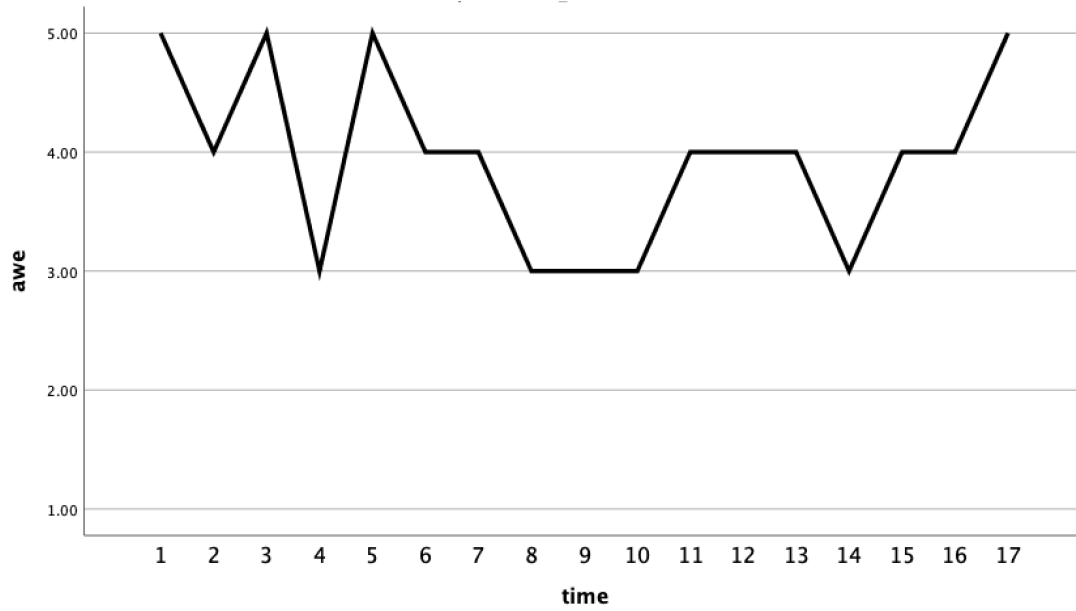


Figure 3

Example participant of an experience of awe of 3 and above

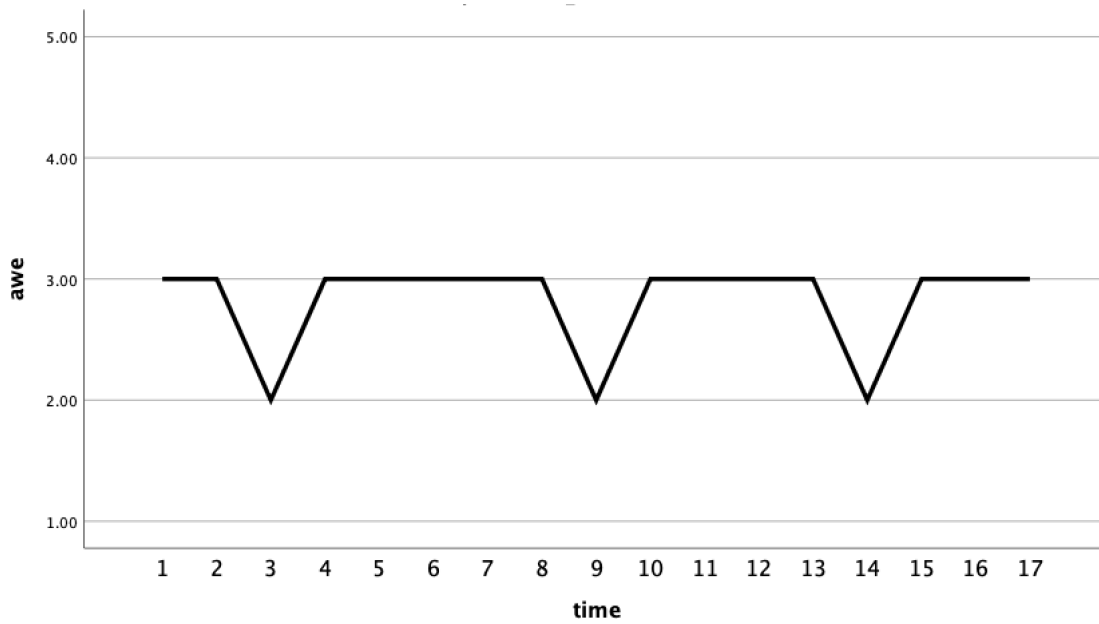
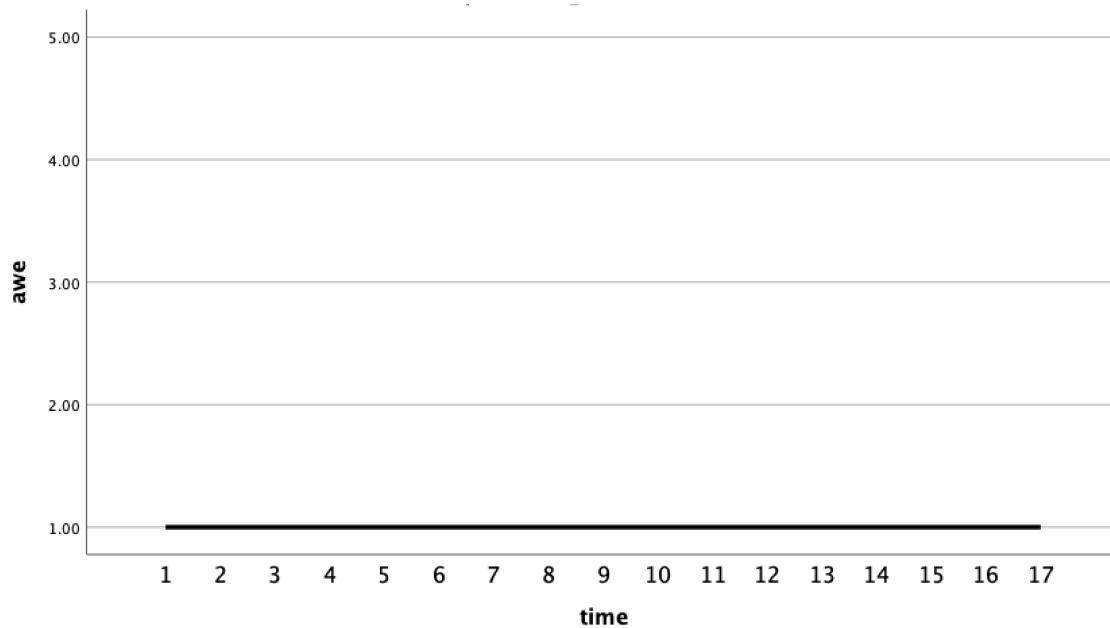


Figure 4

Example participant of never experiencing awe



To test the second hypothesis, a paired samples t-test was performed to compare pro-environmental behaviour on time 1 (T1), before the expedition and time 2 (T2), after the expedition, of the following pro-environmental behaviours; saving energy (pair 1), sustainable food consumption (pair 2), sustainable goods consumption (pair 3), sustainable travel (pair 3), sustainable travel (pair 4), overall lifestyle change (pair 5). There was no significant change in any of the dependent variables, which means that participants' pro-environmental behaviour did not increase from before to after the trip.

Table 2*T-test results of Difference Between T1 and T2 in different pro-environmental behaviours*

		Mean	Std. Deviation	t	df	Sig. (2- tailed)
Pair 1 saving energy	T1	5.54	1.250	.000	55	1.000
	T2	5.54	1.078			
Pair 2 sustainable food	T1	4.80	1.227	-1.097	55	.277
	T2	4.91	1.133			
Pair 3 sustainable goods	T1	4.68	1.403	1.663	55	.102
	T2	4.45	1.264			
Pair 4 sustainable travel	T1	4.49	1.184	1.272	54	.209
	T2	4.35	1.142			
Pair 5 lifestyle change	T1	4.98	1.408	-1.211	55	.231
	T2	5.12	1.336			

Next, we examine whether people's experiences of awe are related to changes in people's pro-environmental behaviour between pre-and-post measures. The assumption checks showed no multicollinearity, a linear relationship between pre-test and post-test scores and randomization.

For the first pro-environmental behaviour on T2 about saving energy coefficients were assessed to ascertain the influence of each of the factors on the criterion variable. The results revealed that the mean of awe had a non-significant effect on saving energy ($B = .057$, $p = .698$), which means that people who experienced more awe overall were not more likely to have increased their energy saving at T2. The variability of awe also showed a non-significant effect

($B = .055$, $p = .547$), indicating that a more erratic experience of awe was not associated with changes in energy saving between T1 and T2.

The results further mark a non-significant effect of the mean of awe on sustainable food consumption ($B = -.160$, $p = .158$), Sustainable goods consumption ($B = -.187$, $p = .224$), travelling in a sustainable way ($B = -.111$, $p = .406$) and overall lifestyle change ($B = .034$, $p = .806$). This means that none of these behaviours increased between T1 and T2 because of the experience of awe. The variability of awe was also statistically non-significant on sustainable food consumption ($B = .008$, $p = .909$), sustainable goods consumption ($B = .066$, $p = .488$), travelling in a sustainable way ($B = .039$, $p = .638$) and overall lifestyle change ($B = .024$, $p = .788$). Implying that a more irregular pattern was unrelated to changes in any of these behaviours between T1 and T2. Therefore, concluding that H3, the more people experience awe during an Arctic touristic expedition, the more willing they are to change pro-environmental behaviour, was not supported.

Table 3

Multiple linear regression of PEB's

Variable	Saving energy (T2)			Sustainable food (T2)		
	<i>B(SE)</i>	<i>t</i>	<i>p</i>	<i>B(SE)</i>	<i>t</i>	<i>p</i>
Awe (mean)	.057(.147)	.390	.698	-.160(.112)	-1.432	.158
Awe (mssd)	.055(.091)	.607	.547	.008(.069)	.114	.909
DV at Time 1	.520(.095)	5.480	.000	.758(.074)	10.269	.000

Model fit $F(3, 55) = 10.304, p < .001, R^2 = .373$ $F(3, 55) = 35.524, p < .001, R^2 = .672$

	Sustainable goods (T2)			Sustainable travel (T2)		
Awe (mean)	-.187(.152)	-1.232	.224	-.111(.132)	-.838	.406
Awe (mssd)	.066(.094)	.698	.448	.039(.082)	.474	.638
DV at time 1	.632(.088)	7.218	.000	.710(.091)	7.772	.000

Model fit $F(3, 55) = 18.034, p < .001, R^2 = .510$ $F(3, 54) = 20.777, p < .001, R^2 = .550$

	Lifestyle change (T2)		
Awe (mean)	.034(.140)	.246	.806
Awe (mssd)	.024(.087)	.271	.788
DV at time 1	.758(.081)	9.373	.000

Model fit $F(3, 55) = 29.701, p < .001, R^2 = .631$

Exploratory Analysis

Overall, our hypotheses that awe plays a key role in explaining changes in pro-environmental behaviour were not supported. One reason may be that the scientific concept of awe may differ from how people understand the term in day-to-day life. In the Dutch language, there is also no direct translation of awe, and the term was therefore translated to mean

'impressed'. Therefore, after the trip, we asked the participants (n = 38) what awe meant to them to see if their understanding matched our theoretical definition. The recurring themes in both tourists and scientists were firstly the grandness of landscapes and their sheer beauty, i.e., "I am at awe with nature's beauty and power". This theme is relevant to the definition of awe, which talks about how vastness induces the 'small self', therefore confirming the original explanation. The second large theme was related to climate change, melting glaciers, rapid changes in the environment and the comparison of how it was when they visited before to now, i.e., "the glaciers calving and the difference in snow/ice compared to 8 years ago". Thus, an awe-inducing experience specifically in the Arctic seems to bring global warming more to the forefront, because of how quickly the environment shifts. Other themes common between both groups included the pristine, untouched nature and the closeness to animals, i.e., "walrus very close by".

The emotions discussed concerning how they perceived awe were calmness, sadness, anger, guilt as well as the feeling of being insignificant and humbled by the experience. One example states it "made me realise that nature is totally attuned to each other and humans are the disruptive factors", indicating a sense of humbleness toward nature and anger toward humanity. Additionally, tourists were impressed by the team of researchers and guides as well as the presentations on board, which caused awe-inducing experiences for them, i.e. "I was also impressed by the (young) enthusiastic researchers, who hope that their research will contribute to combating biodiversity loss and further global warming".

Based on these recurring themes, it has been found that one of the two components of the theoretical explanation, namely 'perceived vastness' (Keltner & Haidt, 2003) was experienced during the expedition. Therefore, it is possible that there is a missing link between the first

component, feeling small and the second component, which leads individuals to rethink what they know. None of the above participants indicated confusion or startlement or a change in their mental schema. Therefore, indicating that the experience of awe during this trip did potentially not lead to rethinking what the individuals know. It is also possible that the individuals did not yet process the second component of the theoretical definition and as such, need more time to do so.

General Discussion

The expansion of arctic tourism is having a negative impact on the environment, which will only continue to grow as the number of tourists increases (Stonehouse & Snyder, 2010). This phenomenon called last-chance tourism creates a self-perpetuating cycle between tourism and harm to the surrounding regions (Vila et al., 2016). Nevertheless, recent research findings indicate that encounters with nature can increase tourists' respect for their surroundings (Hartel et al., 2015), raise awareness of preserving the environment (Packer & Ballantyne, 2010), and foster their pro-environmental behaviour (Zelenski & Desrochers, 2021). However, what specifically motivates individuals to act more sustainably following encounters with nature while on vacation, is still unclear (Wang & Lyu, 2019).

In this study, we specifically examined whether awe, an emotion when witnessing something powerful or immense, could explain if people act more pro-environmentally after a trip to the Arctic, by changing people's frame of reference and making them reconsider their values and goals in life particularly when encountering remarkable natural occurrences that have never been observed before (Zelenski & Desrochers, 2021). We had two main research questions. First: Can people coming back from the Arctic act more environmentally than before? Second: Do people that experience awe in the Arctic increase their pro-environmental

behaviour? We examined these questions in a longitudinal study among tourists and researchers on board a Scientific Expedition ship travelling to Edgeøya Spitsbergen (SEES). Awe was explored using a questionnaire on board and pro-environmental behaviour was investigated through a questionnaire before and after the trip.

Awe

First, our results show that people who travelled to the Arctic experienced the emotion of awe, which has shown to be consistent with previous findings on the subject (Wang & Lyu, 2019; Lu et al., 2017). This implies that the pristine landscapes, such as glaciers, and rare flora and fauna trigger the 'small self' (perceived vastness) and cause individuals to generally feel confused and startled (need for accommodation) during this experience (Keltner & Haidt, 2003). Yet, according to an additional qualitative exploratory analysis, in which participants defined what awe meant to them, the overall descriptions of awe did not necessarily always fulfil the theoretical definition of awe. The first part of the definition of 'perceived vastness' was described often, yet the second part of 'need for accommodation' (i.e., startlement and confusion) was not discussed by the participants. This could indicate one of two things: either that past schemas hadn't been altered in response to the experience aboard the ship or the definition of awe might not always apply to what people experience. However, we would argue that the 'need for accommodation' is the most important for behaviour change because it implies that a behaviour shift is taking place. As a result, the precise reason why participants did not discuss the 'need for accommodation' should be investigated in future research. Additionally, research participants also mentioned feeling awe about other things than strictly natural environments, such as the implications of climate change, which has shown to be a novel finding in awe literature. However, the erraticism of the pattern indicates that awe was not stable over time. Meaning, that while concern about climate change was an important theme in the

qualitative analysis, we would anticipate awe to be considerably more consistent over time if it was merely reflecting people's general worries about climate change. Therefore, awe experienced on the expedition ship fits the description of how awe is elicited; arising unexpectedly in response to rare natural phenomena (Keltner & Haidt, 2003).

Awe and Pro-Environmental Behaviour

Despite experiencing awe during the trip, participants did not enhance their pro-environmental behaviour thereafter, rejecting both the second and third hypotheses. This finding conflicts with previous literature on the topic of awe, where research indicated that experiencing awe would motivate pro-environmental behaviour (Wang & Lyu, 2019; Yan & Jia, 2021). Therefore, we propose possible explanations for not finding the hypothesised effect below.

First, the researchers and visitors chosen to board the expedition ship had a high level of environmental concern before being exposed to the Arctic environment through a cruise expedition. Half of the participants are climate scientists with sustainability challenges on environmentally relevant projects such as 'The Arctic Marine Litter Project and 'Mercury levels in soil and vegetation of arctic terrestrial ecosystems' (complete list on sees.nl/2022). The other half of the participants were tourists assisting in these projects, and learning from the researchers about their area of work. In fact, research recently published by Löff et al. (2023) found that the tourists on the SEES expedition had above-average environmental awareness. Their decision to join this expedition might have formed from a natural interest in sustainability. That generally provides a high baseline for pro-environmental intent that could have created a ceiling effect, occurring when participants' scores cluster toward the upper end of the measure (Garin, 2014). After looking at the mean scores of T1, this was the case. The average of all participants was above 4 (on a scale of 7) on T1 on all pro-environmental behaviours. Therefore, there could have

been little room for improvement in response to the expedition ship experience. As a result, any variations in pro-environmental behaviour reported in the questionnaire between T1 (pre-) and T2 (post-) have shown to be minor, resulting in a lack of a substantial difference. This in turn could have limited the influence of awe on further enhancing their pro-environmental intentions. Because of this, the results are not generalizable to the more 'average' tourist travelling to the Arctic.

Second, it has not previously been investigated how long it will take to change people's behaviour when they experience awe. The current study includes one measurement of pro-environmental behaviour before the expedition and one after. The challenge is predicting when and how things in the mind will unfold after an awe-inspiring experience, as well as how long it will take for people to re-evaluate their schemas and change their behaviour. As a result, it is possible that the time between T1 and T2 was too short for change to occur. Therefore, a follow-up measurement for T3 six months later could have revealed different results.

Third, the focus on individual pro-environmental behaviours might have been misplaced. This study focused on an overarching question of changing one's lifestyle, with sub-parts of sustainable food consumption, sustainable travel, buying sustainable goods and saving energy. These are all behaviours focused on changing people's lives on an individual level. However, findings from a research article by D'Souza et al. (2021), that focused on last-chance tourism of Manitoba's polar bear viewing industry, stated that visitors' consumption patterns have not changed after the trip despite a growing awareness of climate change and its impacts. This could, in part, be because routine/habitual behaviours, including eating, are difficult to change, require consistent work, dedication, sacrifice (Kollmuss & Agyeman, 2002; Huang et al., 2020) and are generally perceived as "barriers against pro-environmental behaviour"(Steg, 2018, p. 240).

Potentially, although people went to the Arctic and experienced awe and had intentions for behaviour change, the familiar context at home likely abated these experiences and led them to continue engaging in the same patterns that they are used to. Additionally, the present infrastructure in many cities does not support a sustainable lifestyle due to poor design and layout, which, for example, results in excessive energy usage (United Nations, 2019). Overall, individuals may view habitual behaviour change as demanding, assuming a limited impact on environmental issues, while advocacy could allow for communal contributions without significant lifestyle changes. That is why Snyder (2007) contends if done properly, the major benefit of arctic tourism does not lie in the change of individual behaviours, but rather in its potential for ambassadorship. Arctic tourists that experience awe from seeing the polar environment's pure beauty, remoteness, and natural occurrences, may be more likely to advocate for the protection of the visited locations and become supporters of conservation actions and organisations all over the world.

Practical Implications

Previous research had found a link between awe and pro-environmental behaviour (PEB), but the longitudinal component of this relationship had not yet been investigated. This study expands on previous research by examining this connection over time, yielding contradictory results. Meaning that even though participants felt awe (Keltner & Haidt, 2003; Yang et al., 2018), their pro-environmental behaviour did not change upon their return home from the Arctic. This challenges tour operators' claims that a trip to the Arctic motivates people to act more pro-environmentally (Taking sustainability seriously, 2023), leaving the role of tourists in sustainable tourism unclear. Therefore, more critical perspectives are needed on whether and how arctic tourism should continue, and how this can be done as sustainably as possible. Vila and

colleagues (2016) discuss the importance of shifting the sole responsibility of visitors becoming advocates for the Arctic and practising self-regulation to instead place a larger focus on potential laws and regulations, greater planning and the use of management tools to help conserve the Arctic regions. One of the important issues that were raised in these interviews was that companies are escaping control and accountability, which makes it easier for cruise ship tour operators to put the responsibility on the consumer rather than the organisation as a whole. Yet, it is still unclear what companies can or should do to make sure that tourists do become more environmentally friendly. Inevitably, "Tourism and climate are interrelated" (Shijin et al., 2020, p.7). Therefore, one way for tour operators to increase their accountability for travelling to the Arctic regions and placing a larger focus on behaviour change after an awe-inducing experience is by carrying out a follow-up or reinforcement exercise. Some examples include a news-letter about current sustainability challenges, email reminders about possible influential pro-environmental behaviours, donations to /partnerships with conservation initiatives, creation of Arctic-ambassadorship challenges with potential prizes, as well as building a community space on social network platforms to stimulate climate discussions.

Limitations and Future Research

There are two major limitations that could be addressed in future research. Firstly, The sample size was small and the sample was not representative. This reduces the research's generalizability to other touristic contexts. Second, as previously stated, it is difficult to predict when certain changes in the brain will occur over time. As a result, while the temporal component of this research is a strength, including a measurement at a later time would have been beneficial in this longitudinal study. As a result, future research should include a sample that does not have heightened environmental concerns, as well as a large number of climate

researchers. Furthermore, examining a broader range of behaviours over longer time periods could aid in better distinguishing the pattern by which awe can translate into pro-environmental behaviour.

Conclusion

As the climate impact of cruise-ship tourism becomes more apparent, it is important to consider the role of tourists in pro-environmental behaviour. By specifically testing the effect of awe among Arctic tourists, this study established a significant link between travelling to the Arctic and awe-inducing experiences. However, tourists' pro-environmental behaviour did not change. This suggests that, while travelling to the Arctic induces awe, it does not stimulate pro-environmental behaviour. Therefore, tour operators must assume greater responsibility for both reducing climate impacts and encouraging accountability for acting environmentally among their visitors. And, future research into the role of awe on PEB should focus on the role of time as well as the interpretation of awe-inducing events to better understand this proposed pathway.

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Appendix A**Table 1***Income: Median income = between 3500 – 5000 and 5000-7500*

	count
Less than €1500	1
Between €1500 and €2500	4
Between €2500 and €3500	6
Between €3500 and €5000	19
Between €5000 and €7500	19
Between €7500 and €10.000	3
Over €10.000	2
Prefer not to say	7
