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Navn: Sondre Hellen,  
Gregor Falkner

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**Name of students**

Gregor Falkner

Sondre Hellen

**Study programme**

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## **Abstract**

Many Chinese consumers experience environmental problems like air and water pollution first-hand - does that lead them to making greener consumption choices? We aim to show the suitability of Protection Motivation Theory for such environmental research and to increase the understanding of how Chinese consumers perceive green product attributes. In particular, this research examines Chinese consumers' perception of threat and coping mechanisms regarding environmental threats and investigates their predictive power for intention and behavior to make green consumption choices. In co-operation with the Norwegian cruise company Hurtigruten, a conjoint analysis measures the relevance and actual price tag consumers put on green product attributes in a choice-situation with multiple product attributes. We find high levels of intention to engage in environmentally friendly behavior, but those intentions translate into green consumption choices only for a minority of consumers. For the majority, there exists a significant Value-Action Gap, especially when green choices involve negative tradeoffs on other attributes. For 43% of respondents in our sample, the gap from intention to behavior does not narrow even when they perceive an environmental threat as a both real and solvable. Companies marketing green products should pay attention to segmentation as some consumers expect substantial price premiums and others expect discounts for green product attributes. For public policy makers, our results suggest that consumer behavior does not change, and demand for green products does not grow, all by itself. To encourage such change, future campaigns should aim at modifying perceptions of green product attributes rather than increasing behavioral intention or knowledge about a threat.

## **Introduction**

According to the United Nation's Sustainable Development Goals, "it is still possible, using a wide array of technological measures and changes in behavior, to limit the increase in global mean temperature to two degrees Celsius above pre-industrial levels." (United Nations, 2016) Our research project aims to examine the second and presumably most difficult of those two conditions – change in behavior given that technological options for reducing environmental impact are available. Already today, there are behavioral choices consumers can make to reduce the

impact of their consumption on the environment. However, previous research has identified a significant Value-Action Gap. Consumers report that they are environmental-conscious, but do seldom make corresponding green choices, especially if green consumption behavior involves sacrifices. (Barr 2006; Olson, 2013; McDonald, Chai & Newell, 2015)

Environmental challenges are very real in many parts of the world today. Natural disasters, deforestation, waste issues as well as water and air pollution occur more frequently. For example, 98% of cities in low and medium income countries with above 100,000 inhabitants do not meet air quality guidelines set by the World Health Organization. Globally, air pollution has increased by 8% from 2008 to 2013 (WHO, 2016). Some environmental challenges receive extensive media coverage and some, such as air pollution, are directly observable for millions of consumers. Consequently, consumers increasingly express their concern about environmental issues. (National Geographic & Globescan, 2014) When consumers actually experience the impacts of environmental change themselves, will this give the much-needed push in the right direction to finally make green consumption choices?

We investigate this question in China, as it is a suitable country for various reasons. There has been limited research on green consumption in China, even though the choices that millions of Chinese consumers make in the future will have a large impact on the planet's environment. China is already the largest contributor to global CO<sub>2</sub> pollution (IPCC, 2014). Also, China struggles with a number of serious environmental challenges, with air pollution being the best known and, arguably, most serious (Chan & Yao, 2008). In megacities such as Beijing, Shanghai and Guangzhou, there is a significant problem with low air quality. On between 10 and 30 percent of days, the air quality falls below the Grade II standards, a threshold for the number of micrograms of certain particles in the air set by Chinese authorities. Compared to European standards, Grade II is equivalent to what is defined as the 'alert threshold' (AMFIC, n.d.). Although measures have been taken to increase air quality in China, air pollution remains an issue, especially during summertime (Streets et al., 2007). Consequently, many of China's citizens directly feel the impact of air pollution.

We choose the cruise industry as a suitable setting for our research, as the ever-growing fleet of massive cruise liners is one of today's sinners when it comes to pollution. (Klein, 2011; Copeland, 2007; Eckhardt et al., 2013) Cruise ships release massive amounts of carbon dioxide, nitrogen oxide and particles. One large cruise ship can release the equivalent amount of CO<sub>2</sub> as just above 83,000 cars. The environmentally harmful gas which cruise ships release the most disproportionate amount of, at least compared to cars, is sulfur dioxide (SO<sub>2</sub>) where one large cruise ship can release an equivalent amount to 376 million cars. The higher amount of sulfur released can largely be attributed to differences in the quality of the fuel burned. While normal cars burn refined gasoline or diesel, ships often use heavier fuels such as marine fuel oil which can contain up to 3,500 times more sulfur than road-diesel. (The Guardian, 2016).

This research project is supported by the Norwegian cruise ship operator Hurtigruten. Hurtigruten operates 15 cruise ships (Hurtigruten.no) along the Norwegian coast, the Arctic and Antarctica. Although the ships operated are smaller than conventional massive cruise ships, they contribute to a total of one percent of Norway's net emissions of CO<sub>2</sub>, four percent of NO<sub>x</sub> and six percent of SO<sub>2</sub>. (NRK, 2008). Hurtigruten management has high ambitions for introducing green technologies and has been among the first to equip their ships with shore power to reduce emissions in ports. In 2018, Hurtigruten will introduce the first hybrid cruise ship (Appendix A, Picture 1) which will reduce CO<sub>2</sub> emissions by up to 20 %, allowing it to explore areas with higher emission restrictions purely on electric power. Based on those substantial investments, Hurtigruten management is interested to measure demand and price expectations for green cruises, which will be priced approx. 17% above cruises with other Hurtigruten ships. China constitutes a key market for Hurtigruten as the Chinese cruise market is among those with the highest growth worldwide (CLIA, 2016). The number of cruise passengers stemming from China is expected to increase from 986,000 in 2015 to 5.6 million by 2024 (Cruise Industry News, 2017).

To gain a deeper understanding of how Chinese consumers perceive and react to environmental threats, we apply Protection Motivation Theory (Rogers, 1975; Maddux & Rogers, 1983). When faced with a threat, Protection Motivation Theory suggests that people evaluate the threat itself and their possibilities to cope with the



threat. Together, these two factors determine whether and how people will try to defend themselves against the threat. In our case, consumers' attitudes and behavior towards green consumption should be determined by how they perceive environmental threats and how they feel they can cope with them. As such, we are interested to see if Protection Motivation Theory can predict how consumers choose and value different cruise trips, based on how they perceive threats in their environment. This research project is inspired both by Bockarjova & Steg (2014), who investigated the adoption of electric vehicles with Protection Motivation Theory, and by Olson (2013) who identified tradeoff effects on green preference and choice using conjoint analysis. Our specific research question is: How do Chinese consumers' perceptions of environmental threats translate into the way they value green product attributes?

In the remainder of this article, we review the literature on environmental product attributes, the Value-Action Gap and Protection Motivation Theory. From this, the conceptual model and hypotheses are developed. The methodology gives detailed descriptions about research and survey design, sampling, data collection as well as dependent and independent variables. We will then present and discuss the results of our research to answer our research question. The paper concludes with a discussion of implications, limitations and suggestions for further research.

## **Literature review**

In the following section, we present an overview of previous literature on green product attributes, Value-Action Gap and Protection Motivation Theory.

### **Green product attributes and environmental impact**

With growing concern about environmental problems, companies started to introduce product versions with a lower environmental impact, commonly called green products. Those products allow consumers to indirectly protect the environment, or at least cause somewhat less environmental damage when consuming them. (Cornwell & Schepker, 1995; Cleveland, Kalamas & Laroche, 2005). Previous research (e.g. D'Souza, Taghian & Lamb, 2006; Borin & Krishnan, 2011) established that green product attributes lead to more positive product evaluations and higher purchasing intentions. At the same time, Schuitema and Groot show in an experimental study (2015) that most consumers only consider

green attributes when so-called “self-serving motives” such as low price and familiar brand are fulfilled. Ginsberg & Bloom (2004) draw a more nuanced picture and argue that consumers can be divided into segments according to their willingness to purchase green products, reaching from a minority of “True Blue Greens” to a majority of “Basic Browns”.

What is considered to be green by consumers and what actually contributes the most to reduce environmental impact may differ. According to Gershoff & Frels (2015), the centrality of the “green” product advertised can affect how green a product feature is perceived. For instance, improvements in the engine of a ship could be considered as having a higher benefit to the environment than improvements in e.g. the marine paint or hull design. In their research on adoption of electric vehicles, Bockarovja and Steg (2014) use measures such as air pollution, CO<sub>2</sub> and climate change as measures for environmental risks but also apply some energy security risks such as exhaustion of petroleum resources, price changes and dependency on import of fossil fuels.

Despite growing criticism for cruise ships’ high environmental impact, there is a lack of research on how consumers perceive green attributes of cruise ships. According to Lindeman and Väänänen (2000), green product attributes can be stated in terms of environmental protection and “cruelty free”-ness. Environmental protection attributes can for instance be measured in the amounts of harmful gases and waste released by the ship, the type of fuel it uses and whether it has installed scrubber technology or land power to reduce the use of diesel generators while onshore. Characteristics of “cruelty-free”-ness relate to the ship’s and cruise company’s treatment of the flora and fauna around it. This can vary widely from company to company. Hurtigruten, for example, conducts stress tests on penguins to ensure sustainable contact with the animals and disinfects tourists before entering fragile arctic environment (Internal source, Hurtigruten). Green product attributes for cruise ships, which we use in our research, have been developed together with Hurtigruten and are summarized in Appendix A, Table A4.

### **Value action gap**

The concept of the value action gap can be described as the missing link between feeling that something should be done and actually doing it. One can for instance

have a personal value that one should not pollute, but still feel incapable to find the motivation required in order to walk 20 meters to find the nearest trash can when disposing of a used soda bottle. Likewise, one can feel that sustaining air quality is an important effort, but still disregard environmental attributes of the goods or services that one consumes, for example a trip on a cruise ship. More formally, Chai, Bradley & Reser (2015) recently defined the value action gap as “the standardized difference between individuals’ overall concern [...], on the one hand, and their propensity to engage in a number of [...] mitigation practices”.

Already in 1994, Redclift & Benton described “rational appeals to change attitudes or lifestyles” as ineffective, not due to irrationality, but due to the “uneven distribution of power to make a significant difference”. People’s values are described as “negotiated, transitory and sometimes contradictory”. The concept of the value action gap has then been introduced by Blake in 1999 and has since been recognized as an important topic in environmental research and as a significant barrier to achieving intended results for environmental campaigns and policies. Consequently, it has been the topic of numerous research projects, amongst others Kollmuss & Agyeman (2002) who describe the underlying complexities of the Value-Action Gap with a range of models from economics, sociology and psychology. Each has some degree of validity under certain circumstances, which makes the gap complex to overcome. Bamberg (2003) argues that environmental concern should not be seen as a direct, but as an indirect determinant of behavior. Further evidence of the existence of a Value-Action Gap in the population can be inferred from the lack of significant increases in reported pro-environmental behavior, in spite of an increase in information about these issues that should have generated awareness. (UN, 1997). This is further exemplified by Olson (2013) who shows that the link between intention and behavior is even more weakened in trade-off situations. In a case example of waste minimizing behavior, Barr (2006) even finds that “fundamentally different factors predict a willingness to minimize waste, as opposed to actual behavior.” In the environmental domain, intention and behavior can almost seem like two unrelated concepts.

## **Protection Motivation Theory**

Protection Motivation Theory is part of expectancy-value theories and was first proposed by Rogers (1975) and Maddux & Rogers (1983). It aims to predict intentional and behavioral responses to a threat based on how individuals perceive different aspects related to both the threat itself and possible coping behavior.

Threat appraisal consists of three components. First, the assessment of perceived severity relates to the seriousness of the threat at hand. Second, perceived vulnerability is an assessment of how susceptible one is to the threat. Third, the rewards which are connected to current behavior, such as pleasure or saved time, are assessed under this category as well. An increase in perceived severity and vulnerability will increase the likelihood of adaptive behavior whereas an increase in the rewards of mal-adaptive behavior will work in the opposite direction.

Coping appraisal also consists of three psychological evaluations. First, perceived self-efficacy refers to an assessment of whether one is able to actually perform the protective action. In other words, “Can I do what it takes?” Second, perceived response efficacy is an evaluation to which extent the protective action actually will reduce the risk. Third, the perceived cost of the protective action covers both monetary costs as well as time, effort and inconvenience. Increases in self-efficacy and response-efficacy will increase motivation to perform an adaptive action while an increase in perceived cost will lower such behavioral intention.

The final behavioral intention outcome will be determined by both threat and coping appraisal, which may happen both consciously or subconsciously. The original theory proposed multiplicative relationships among the variables, but those interaction effects lack empirical support (Norman, Boer & Seidel, 2005). As most other Protection Motivation Theory-studies (e.g., Bubeck, Botzen & Aerts, 2012), we assume the model to be additive and consider only main effects.

Threat and coping appraisals are based on how an individual perceives their underlying elements. This has two important implications. Behavioral intentions and outcomes will differ among individuals as their perceptions are not only driven by environmental inputs such as facts or arguments, but also by top-down processes from individual experiences, attitudes and beliefs. In order to change behavior, one

can specifically try to change how one or more elements of Protection Motivation Theory are perceived in people's' minds. For example, anti-smoking campaigns have employed social risk messages to increase perceived severity and vulnerability among young smokers (Pechmann , Zhao & Goldberg & Reibling., 2003).

At first glance, Protection Motivation Theory might seem like an individual-focused theory. However, it can take into account an individual's social relations. In the special circumstance of slow-onset risks such as environmental threats, vulnerability and seriousness typically increase over time and reach higher levels for each new generation. Campis, Prentice-Dunn & Lyman (1989) extended Protection Motivation Theory to include respondent's children. We too measure how respondents perceive severity and vulnerability for future generations and how this might affect threat and coping appraisal factors. Another social aspect of Protection Motivation Theory is interpersonal risk, which may serve as a powerful motivator in addition to self-protection goals. (Maddux & Rogers, 1983, Mahler, Fitzpatrick, Parker & Lapin, 1997; Schoenbachler & Whittler, 1996) For example, smoking has developed from being socially desirable to highly undesirable in many Western cultures. Likewise, aspects of green behavior have become a trend in some societies, putting social pressure on members to perform adaptive behavior. (Griskevicius, Tybur & van den Bergh, 2010; Mazar & Zhong, 2010) Social pressure is an important determinant for decision-making in Asian outbound tourism (Sparks & Pan, 2008) and is therefore important for us to measure.

Protection motivation theory was primarily used to study health-related topics such as preventing diseases by engaging into a healthy lifestyle (Miller & Sanchez 1994, Rippetoe & Rogers 1987, Plotnikoff & Higginbotham 2002). Two meta studies published in 2000 by Floyd, Prentice-Dunn & Rogers and Milne, Sheeran & Orbell summarized the first two decades of Protection Motivation Theory research and found satisfactory results for its predictive power. Already in 1983, Rogers acknowledged that Protection Motivation Theory could be applied in a wide field of other research topics as well. Only in recent years has a new stream of literature emerged in which Protection Motivation Theory is applied to measure people's motivation to engage in green behavior when faced with an environmental threat. When studying chronic exposure to an environmental hazard, Vaughan (1993) established the link for Protection Motivation Theory from health to environment,

laying the basis for its application for different environmental topics. Keshavarz & Karami (2015) studied how environmentally farmers behaved when faced with the threat of drought. Bubeck et al. (2012) applied Protection Motivation Theory to better understand underlying motivations of citizens located in flood areas, finding that response- and self-efficacy were the most important determinants of coping intention and behavior.

Few other researchers have utilized Protection Motivation Theory to research environmental behavior of Chinese consumers or tourists. Horng, Hu, Teng & Lin (2013) examined energy saving and carbon reduction behavior of Asian tourists and identified a significant Value-Action Gap between intention and behavior. Zhao, Cavusgil & Zhao (2015) studied base-of-the-pyramid consumers' green behavior and found that they engage in such behavior to a great extent, motivated primarily by self-protection and care for environmental quality. Our research will examine the more affluent groups of the Chinese population, whose threat perceptions, intentions and green travel choices have not been studied to the best of our knowledge.

### **Gaps in literature**

There remain several gaps in the current literature which our research project aims to close or narrow. First of all, we want to contribute to the young and still scarce stream of literature applying Protection Motivation Theory to predict environmental behavior and demonstrate the applicability of Protection Motivation Theory for this important research topic.

Second, we intend to address weaknesses of previous environmental studies. The majority of Protection Motivation Theory studies are survey-based measuring behavioral intentions (e.g., Horng et al., 2014) or experiments measuring actual behavior (e.g., Milne & Sheeran, 2002). As previously mentioned, there exist a significant Value-Action Gap in our research area which can compromise validity when drawing conclusions from intentions to behavior. Experiments, on the other hand, are by their very nature a compromise between decreased ecological validity and increased control. (Locke, 1986; Jimenez-Buedo & Miller, 2010) With our research project, we aim to address both shortcomings. Values for threat and coping appraisal will be collected through a survey, but we introduce *expected price premium from high to low environmental impact* as an independent variable in

addition to *behavioral intention*. Measured by a conjoint analysis, this will provide us with a price premium consumers expect to pay for the “greenness” of their product. Although this does not constitute an actual behavior, it should be highly predictive of such as respondents are forced to make realistic tradeoffs in a choice situation. The gap between both our independent variables can be conceptualized as the Value-Action Gap.

Third, our study applies Protection Motivation Theory to understand the environmental values and behaviors of potential outbound tourists in China, a group that to the best of our knowledge has not received such scientific attention.

### Theoretical Background, conceptual model and hypotheses

Previous research on environmental behavior has utilized a number of different theories. We believe that Protection Motivation Theory has superior predictive power for our research setting as it is specifically designed to predict behavior in the presence of a threat. We therefore develop our first three hypotheses from Protection Motivation Theory. (Figure 1)

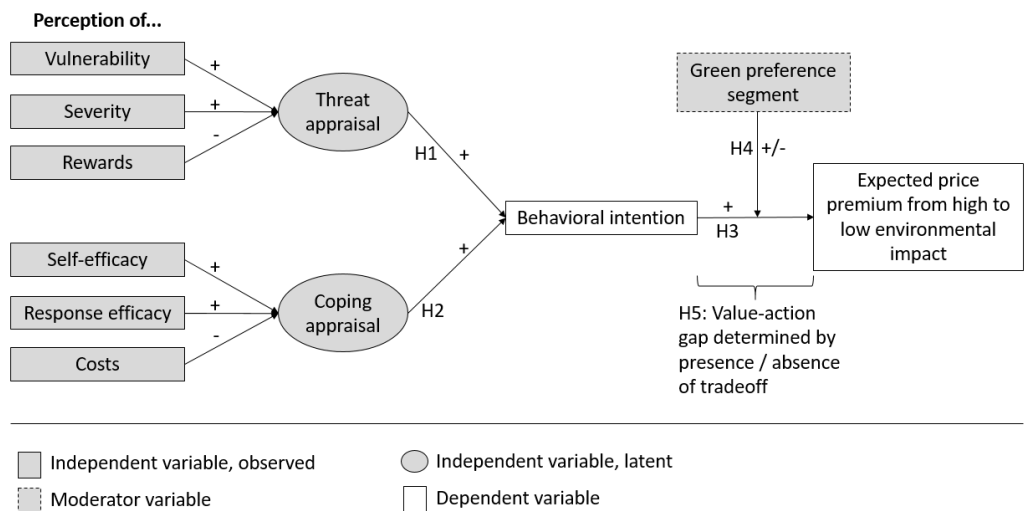


Figure 1 Conceptual Model

*Hypothesis 1:* Threat appraisal of environmental problems has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 2:* Coping appraisal of environmental problems has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 3:* Intention to pursue an adaptive behavior has a direct positive effect on the price premium consumers expect to pay for a cruise with a low environmental impact compared to the same cruise with a higher environmental impact.

In line with market segmentation theory, previous research found that consumers differ in their attitudes and preferences towards green products. Ginsberg & Bloom (2004) identified four different consumer segments based on their willingness to buy green products. Olson (2013) described “consumers [who] are willing to pay the price to go green when the product offers few compensatory qualities” as a dark green segment. Based on those findings, we hypothesize the following.

*Hypothesis 4:* The effect of intention to pursue an adaptive behavior on the expected price premium from high to low environmental impact is moderated by which segment of green preferences a consumer belongs to.

Previous research has established that the effect of behavioral intention on actual behavior is weaker in the presence of tradeoffs. (Chau & Chang, 2010; Olson, 2013) The majority of people is willing to make green consumption choices as long as those choices do not involve sacrifices on other product attributes. As soon as such sacrifices come into play, one of the central elements of prospect theory (Kahneman & Tversky, 1979) applies: Losses loom larger than gains. When an increase in environmental friendliness (gain) is accompanied by a decrease in another product attribute, the decrease weighs more and most consumers are not willing to make the tradeoff. We expect this tradeoff-effect to be present in our data and hypothesize its occurrence as follows.

*Hypothesis 5:* The effect of intention to pursue an adaptive behavior on the expected price premium from high to low environmental impact is weaker when negative trade-offs on other product attributes are present.

## **Methodology**

### **Research design**

The research design we have chosen is confirmatory, intended to develop and test a set of hypotheses. We have further opted for a survey-based quantitative research approach through an online survey with three main parts. First, respondents were presented with demographic and warmup questions. Second, we measured the



dependent variable *expected price premium from high to low environmental impact* through a conjoint analysis in which respondents were asked to rate different cruises. Third, we measured our independent variable *intention to pursue adaptive behavior* through scale questions where respondents rated the extent to which they agreed with various statements. Respondents also indicated previous exposure to certain environmental phenomena.

### **Sampling & Data collection**

We used different data collection channels for our research. While the data for the pretest was collected through convenience sampling techniques such as distribution through social media, the data used for the actual research was gathered through two means. The first batch of respondents ( $N = 118$ ) was collected by the assistance of Hurtigruten's agency in China which posted a link to the survey on the company's website and social media channels. The completion rate of this batch did however prove to be low and only 24 of these respondents provided usable answers. In this first batch, there were no limitations as to which demographics could reply. The second batch was collected by the help of a professional panel agency (Qualtrics) as a paid service. To facilitate better measurement of differences between geographic regions, Qualtrics filtered out respondents that were not from either Shanghai or Beijing. By the end of this batch, another 105 usable responses had been collected and the total  $N$  for our sample was now 129. Having a high enough  $N$  value is important for several assumptions when doing our statistical analysis such as the assumption of normal data.

When we considered the target group for our survey, it was important for us that it was broad and generalizable to the general population. However, we did wish to impose some limitations to this. The main reasoning behind this is that it would be more beneficial for our research, as well as Hurtigruten management that the respondent pool represents a potential customer that is more likely to purchase a cruise than the general population may be. The more relevant the product is to our respondents, the more valid we believe the answers will be. As such, we did for instance only look for respondents over 20 years.

## Survey design

The respondents were first asked to fill in their demographics. This was amongst others to make filtering easier for the Qualtrics team as irrelevant respondents could be sorted out earlier in the survey. Respondents were then asked warmup questions about their intentions to undertake a cruise vacation sometime in the near future as well as their previous travel experience. In the following, respondents were presented with nine cards (examples in Appendix A, Figure A1), each of them describing a hypothetical 7-day cruise with three attributes: *service*, *destination* and *environmental impact*. For each card, they were asked to indicate their purchase intention on a 7-point Likert scale where 1 is "extremely unlikely" and 7 is "extremely likely". Respondents were also asked to give a price in Chinese Yen that they would expect to pay for this cruise. Some cards were designed in such a way that all attribute levels were held constant with only levels of *environmental impact* changing. Those pairs of cards were used to estimate the presence and magnitude of the tradeoff effect in hypothesis 5.

We then measured the independent predictor variables suggested by Protection Motivation Theory, such as perceived vulnerability and severity, using well-established scales from previous literature (Appendix A, Table A1). Each construct is measured on multiple dimensions using a seven-point Likert Scale from 1 "strongly disagree" to 7 "strongly agree". The measurement of the dependent variable is positioned before the measurement of the independent Protection Motivation Theory variables to avoid possible priming effects. Questions about environmental threats may make respondents more sensitive to the environmental attributes than they would be in a nominal situation. (Collins & Loftus, 1975)

A pretest was used to identify problems with the survey. After a conduction with a sample of  $N = 74$  where only 24 were complete respondents, a few changes had been made. The wording of several of the question had been clarified to make it easier to understand and few superfluous questions had been removed. The aim was that this would increase completion rate.

In order to make the survey available to the highest number of Chinese respondents possible it was translated to Mandarin by Hurtigruten's agency in China. It was then qualified by a second Mandarin proficient individual to ensure that the translation

was consistent and reflected the English version. When taking the survey, respondents had the choice between taking it in English or Mandarin, with Mandarin being the default option. A copy of the entire survey is presented in Appendix B.

### **Conjoint Analysis**

Conjoint analysis is a very informative form of regression analysis (Green, Krieger & Wind, 2001). In the second part of our survey, respondents were presented with various hypothetical products with varying levels of certain attributes. The respondents were asked to rate the attractiveness of the product based on those levels. Coefficients can then be estimated from those ratings. In the data analysis, we can then determine the relative importance of each attribute as well as the most preferred level of each attribute. Conjoint analysis is highly applicable to environmental choice situations in which value action gaps are likely to occur. Especially when consumers are confronted with a tradeoff, they often behave differently than their stated intentions (Olson, 2013). A conjoint analysis forces respondents to make such a tradeoff by evaluating several attributes combined and thus creates a more realistic environment for evaluation.

To the best of our knowledge, there has not been conducted research on which attributes are most important for a Chinese consumer when in the process of purchasing a cruise product. Attributes and attribute levels were designed in collaboration with Hurtigruten's management (Appendix A, Table A2). Our focal attribute, the *cruise ship's environmental impact*, is adapted by combining several important polluting factors and writing them up in a way that would make the differences clear to the respondents and allowing them to put meaningful differentiation between the levels. The attributes *service level* and *destination* are attributes that Hurtigruten uses as points of difference in their marketing and were therefore seen as suitable to include in the product evaluation. Both attributes can be related to a cruise's environmental impact. A cruise ship with a luxury service level might have a higher environmental impact than a ship with a lower service standard, for example due to more laundry and food waste as well as larger cabins resulting in higher fuel consumption per passenger. As for the destination attribute, cruises to popular destinations with well-established port infrastructure will impact

the surrounding environment less than cruises to natural destinations which are not prepared to handle the arrival of cruise passengers.

After establishing the attributes and their levels, orthogonal design was applied by using the built in function in the statistical software SPSS 24. Although the highest amount of possible combinations for our variables were 18, orthogonal estimation showed that we could measure all attributes by applying 9 different combinations. (Table 1) This is not an ideal amount as it is not divisible by the levels of each factor, but was useful for our purpose as we had received feedback from some respondents in our pretest that they found it tedious to rate each of the cards. For the same reason, as well as that we did not find it essential, we neither included holdout cards. This had not been done in similar research as well (Olson, 2013). For purposes of repeatability, our seed used in the orthogonal design was 200000.

<b>Cruise</b>	<b>Service</b>	<b>Destination</b>	<b>Environmental Impact</b>
1	Premium	Remote	High
2	Premium	Popular	Medium
3	Eco	Remote	Medium
4	Premium	Remote	Low
5	Eco	Popular	Low
6	Medium	Popular	High
7	Medium	Remote	Medium
8	Medium	Remote	Low
9	Eco	Remote	High

*Table 1 Composition of the cruise cards*

One challenge was that some respondents would rate cruises equally on both price and purchase behavior. If this was because respondents did not spend enough effort to evaluate each card properly, we would find a significant impact of the amount of time respondents used to complete the survey and the number of unique values they entered. However, we did not find such a relationship ( $b < .001$ ;  $t = -.144$ ;  $p = .885$ ) and can therefore rule out this explanation. We assume that duplicate values realistically reflect our respondents' indifference between two cards. This was solved by randomizing the rank order of these similar ratings 10 times and then using an average of the conjoint value. As an example, a respondent that rated 3 cruises similarly [1,2,3,3,3,6,7,8,9] would have the equal block randomized to e.g. [3,4,5], [4,3,5] and so on. After doing this 10 times a t-test showed no significant differences on a 99% level of significance between the conjoint coefficients

generated and we therefore assumed that the results were representative for what we were measuring. The results from the t-test are presented in the appendix (table A3)

### **Operationalization of *expected price premium from high to low environmental impact* as dependent variable**

The data we gathered through the conjoint analysis allows us to calculate a monetary value for how much respondents value a green cruise. To convert CNY into NOK, we applied the official exchange rate of August 14, 2017 (1 CNY = 1.19216 NOK, xe.com). We used the following procedure for our calculation.

In the survey, each respondent provided a monetary value in CNY for how much they would expect to pay for each of the nine cruises they were presented with. Matching those values with the calculated utility each respondent gets from each cruise, we get a monetary value corresponding to 1 utility point. For example, if a respondent expected to pay NOK 50,000 for a cruise from which she could get 10 utility points, then one utility point is worth NOK 5,000 to this respondent. Next, we looked at each respondent's coefficients for cruises with low and high environmental impact. The difference between those coefficients tells us how much more (or less) utility a respondent gets if a cruise's environmental impact changes from high to low. For example, a respondent with a coefficient of 2 for a low-impact cruise and a coefficient of -1 for a high-impact cruise gets three more utility points from a low-impact cruise than if the same cruise had a high environmental impact. Next, we multiplied this utility value with the NOK-value equivalent to 1 utility point. The result is a NOK value indicating how much a respondent would expect to pay to turn a cruise from high to low environmental impact. In our example,  $\text{NOK } 5,000 \times 3 \text{ utility points (difference in coefficients)} = \text{NOK } 15,000$ . In a last step, to make the results more comparable among respondents, we divided this NOK-value by how much each respondent would pay for an average cruise, providing us with a percentage for the premium (discount) each respondent would expect to pay (get) if a cruise's environmental impact changed from high to low. If our example respondent would expect to pay NOK 30,000 for a cruise on average, then NOK 15,000 corresponds to a 50% premium. To ease readability in the remainder of this paper, we sometimes refer to *expected price premium from high to low environmental impact* simply as *price premium*.

## Results

We collected our data using Qualtrics and analyzed it with SPSS 24.0 and Stata/IC 15.0. Analysis of outliers and missing values did not reveal any issues with the data. No values or responses were deleted as we consider the occurrence of few non-systematic outliers to reflect natural variations in the population. Table 2 provides an overview of sample demographics. Tables A5 and A6 in Appendix A give a comprehensive overview over descriptive statistics and results from analysis of variance, respectively. Our sample consists of 129 respondents from China, 51.6% female and 48.4% male. Respondents are residents of major Chinese cities with 41.1% from Beijing, 40.3% from Shanghai and 18.6% from other cities. The mean age is 37.7 years ( $SD = 9.6$ ). Compared to the demographics of the general Chinese population, consumers between the ages 25 and 64 are overrepresented in our sample (CIA, 2016). Respondents also report higher income levels than the general population. Those differences are due to the fact that cruise trips are relevant only for a certain part of the Chinese population today. According to Barton, Chen & Jin (2013), the demographics of our sample will be considerably more representative for the general Chinese population, and for the urban population in particular, within 2022 due to China's rapidly growing middle class. All respondents have experienced environmental issues before, with air pollution being the most prominent (96.9%). One third (33.3%) of respondents have previously experienced three or more different environmental problems.

<b>Variables</b>	<b>N=129</b>	<b>%</b>
<b>Gender</b>		
Male	61	46,9
Female	65	50
Missing	4	3,1
<b>Age</b>		
Under 20	1	0,8
21-29	20	15,4
30-39	51	39,1
40-49	34	26,1
50-59	14	10,8
60 or above	3	2,4
Missing	7	5,4
<b>Income</b>		
below NOK 120,000	15	11,5
NOK 120,000-240,000	34	26,2
NOK 240,000-360,000	23	17,7
NOK 360,000-480,000	20	15,4
NOK 480,000-600,000	16	12,3
above NOK 600,000	16	12,3
Missing	6	4,6
<b>City of residence</b>		
Beijing	53	41,1
Shanghai	52	40,3
Other	24	18,6

Table 2 Summary of sample demographics

For each respondent, we gathered data on the constructs of Protection Motivation Theory as well as data to perform a conjoint analysis. We will first present the results from Protection Motivation Theory, then from the conjoint analysis and will subsequently link the results of both through our conceptual model using Structural Equation Modelling.

The different constructs of Protection Motivation Theory, e.g. *perceived vulnerability*, were measured through established scales. A scale reliability test revealed that scales for *vulnerability*, *rewards*, *self-efficacy*, *response-efficacy*, *costs* and *behavioral intention* all show satisfactory levels of scale reliability with Cronbach's alpha values equal or above .67 (Appendix A, Table A1). The scale for *severity* showed unsatisfactory results ( $\alpha = .29$ ). Questions on this scale asked about *threat perceptions* to personal health and perceived pressure to behave environmentally friendly. Respondents obviously put different evaluations on these topics. We therefore include the scores of both questions from the severity scale as separate predictor variables in our model.

The different constructs of Protection Motivation Theory relate to each other as predicted (Figure 1 & Table 3). *Perceived vulnerability* and *severity* both have positive significant impacts on the latent variable of threat appraisal ( $b_{\text{vulnerability}} = 1.000$ ; *std.  $b_{\text{vulnerability}} = .680$* ;  $p_{\text{vulnerability}} < .001$ ;  $b_{\text{severity}(1)} = .889$ ;  $p_{\text{severity}(1)} < .001$ ;  $b_{\text{severity}(2)} = .638$ ;  $p_{\text{severity}(2)} = .002$ ). *Perceived rewards* of non-adaptive behavior has a negative impact on threat appraisal, which is not significant ( $b_{\text{rewards}} = -.414$ ;  $p_{\text{rewards}} = .113$ ). *Self-efficacy* and *response-efficacy* have positive significant impacts on the latent variable of coping appraisal ( $b_{\text{self-efficacy}} = .896$ ;  $p_{\text{self-efficacy}} < .001$ ;  $b_{\text{response\_efficacy}} = 1.489$ ;  $p_{\text{response\_efficacy}} = .003$ ;) whereas *perceived costs* has a significant negative impact ( $b_{\text{costs}} = -.794$ ;  $p_{\text{costs}} = .034$ ). Regression results are presented in table 3.



	Non-standardized				Standardized			
	Coef.	Std. Err.	z	P>z	Coef.	Std. Err.	z	P>z
<b>Structural</b>								
<b>Behavioral_Intention</b>								
Threat_Appraisal	.437	.221	1.980	.048	.372	.128	2.900	.004
Coping_Appraisal	1.000				.599	.118	5.070	.000
constant	5.605	.070	8.170	.000	7.058	.417	16.940	.000
<b>Weighted_price_premium_ from_high_to_low_ environmental_impact</b>								
Behavioral_Intention	-.011	.029	-.380	.707	-.022	.057	-.380	.706
Behavioral_Intention *								
DM_Greenest_Segment	.120	.010	11.880	.000	.777	.039	19.980	.000
Behavioral_Intention *								
DM_Moderate_Green_ Segment	.073	.010	7.090	.000	.465	.057	8.170	.000
constant	-.260	.161	-1.620	.106	-.645	.403	-1.600	.110
<b>Measurement</b>								
<b>Vulnerability</b>								
Threat_Appraisal	1.000				.680	.156	4.350	.000
constant	5.438	.087	62.250	.000	5.481	.352	15.550	.000
<b>Severity_1</b>								
Threat_Appraisal	.889	.406	2.190	.028	.515	.133	3.860	.000
constant	5.357	.103	52.150	.000	4.591	.299	15.350	.000
<b>Severity_2</b>								
Threat_Appraisal	.638	.273	2.330	.020	.328	.106	3.090	.002
constant	5.512	.116	47.690	.000	4.199	.276	15.220	.000
<b>Rewards</b>								
Threat_Appraisal	-.414	.261	-1.580	.113	-.187	.133	-1.410	.159
constant	3.512	.131	26.730	.000	2.354	.171	13.770	.000
<b>Self-efficacy</b>								
Coping_Appraisal	.896	.221	4.060	.000	.444	.104	4.250	.000
constant	5.124	.085	6.590	.000	5.335	.344	15.530	.000
<b>Response_Efficacy</b>								
Coping_Appraisal	1.489	.492	3.020	.003	.856	.127	6.720	.000
constant	5.895	.073	8.920	.000	7.124	.452	15.760	.000
<b>Costs</b>								
Coping_Appraisal	-.794	.374	-2.120	.034	-.274	.099	-2.760	.006
constant	3.938	.121	32.490	.000	2.860	.199	14.400	.000

Table 3 Results from Structural Equation Modelling

H1 predicted that *threat appraisal* of environmental problems has a direct positive effect on *intention to pursue coping behavior*. With a positive coefficient of .437 and a *p*-value of .048, H1 can be confirmed. H2 predicted that *coping appraisal* of environmental problems has a direct positive effect on *intention to pursue coping behavior*. With a standard coefficient of .599 and  $p > .001$ , H2 can be confirmed as well. In our sample, the effects of *threat appraisal* and *coping appraisal* lead to a mean *behavioral intention* of 5.60 ( $SD = .850$ ) on a 7-point Likert scale from 1 - 'Strongly disagree' to 7 - 'Strongly agree' to statements about respondents' pro-environmental behavior.

We are most interested in how the outcome of Protection Motivation Theory, behavioral intention, relates to the choices respondents make among green and non-green cruises, e.g. moving to the right in our conceptual model (Figure 1). However, we performed some analyses on what determines the predictor variables of Protection Motivation Theory, e.g. what precedes our conceptual model further left.

*Gender.* We found that women reported significantly higher levels of perceived vulnerability than men ( $M_{female} = 5.631$ ;  $M_{male} = 5.221$ ;  $t(124) = -2.346$ ,  $p = .021$ ).

*Age.* Age has a significant impact on all predictor variables except for severity. Compared to respondent above 39 years of age, those younger than 39 years feel more vulnerable ( $M_{below39} = 5.627$ ;  $M_{above39} = 5.221$ ;  $t(121) = -2.373$ ,  $p = .019$ ), get less rewards from non-adaptive behavior ( $M_{below39} = 3.089$ ;  $M_{above39} = 4.180$ ;  $t(121) = 4.297$ ,  $p < .001$ ), report higher levels of response-efficacy ( $M_{below39} = 6.148$ ;  $M_{above39} = 5.529$ ;  $t(121) = 4.354$ ,  $p > .001$ ) and self-efficacy ( $M_{below39} = 5.387$ ;  $M_{above39} = 4.817$ ;  $t(121) = -3.375$ ,  $p = .001$ ) and perceive the costs of adopting new behavior as lower ( $M_{below39} = 3.676$ ;  $M_{above39} = 4.317$ ;  $t(121) = 2.666$ ,  $p = .009$ ). Consequently, younger respondents report higher levels of behavioral intention. ( $M_{below39} = 5.798$ ;  $M_{above39} = 5.340$ ;  $t(121) = 3.080$ ,  $p = .003$ )

*Household income.* Income has a significant effect on three predictor variables. On average, those who earn above NOK 360,000 ( $N_{below} = 72$ ;  $N_{above} = 52$ ) perceive environmental problems as more severe ( $M_{below} = 5.236$ ;  $M_{above} = 5.760$ ;  $t(122) = 3.112$ ,  $p = .002$ ), but they also report higher self-efficacy ( $M_{below} = 4.917$ ;  $M_{above} = 5.452$ ;  $t(122) = 3.139$ ,  $p = .002$ ) and response-efficacy ( $M_{below} = 5.764$ ;  $M_{above} = 6.058$ ;  $t(122) = 1.942$ ,  $p = .054$ ) than consumers with an annual income below NOK 360,000.

*Number of experienced environmental threats.* Respondents who have experienced three or more different kinds of environmental threats ( $N_{3\_or\_more} = 43$ ;  $N_{1\_or\_2} = 86$ ) report significantly higher levels of self-efficacy ( $M_{3\_or\_more} = 5.407$ ;  $M_{1\_or\_2} = 4.982$ ;  $t(127) = 2.400$ ,  $p = .018$ ) and behavioral intention ( $M_{3\_or\_more} = 5.806$ ;  $M_{1\_or\_2} = 5.504$ ;  $t(127) = 1.925$ ,  $p = .056$ ) than those respondents who experienced one or two different kinds of environmental threats.

Now that we have established that our data fits Protection Motivation Theory in meaningful and significant ways, we turn our attention to the results of the conjoint analysis.

### Results from conjoint analysis

The results from our conjoint analysis could be said to be ambiguous and did not all go in the direction that we expected. As can be seen below in figure 2, the general tendency was that ships with the highest environmental impact received the highest utilities amongst our respondents. Although unexpected, it can possibly be explained by inhabitant assumptions amongst respondents that greener cruise ships offer an overall less luxurious experience. High levels on two attributes which consumers perceive as contradictory can decrease a product's credibility. For example, when a car is advertised as both family-friendly and exciting, the message's credibility suffers. Nagpal and Krishnamurthy (2007) describe this effect as attribute incompatibility.

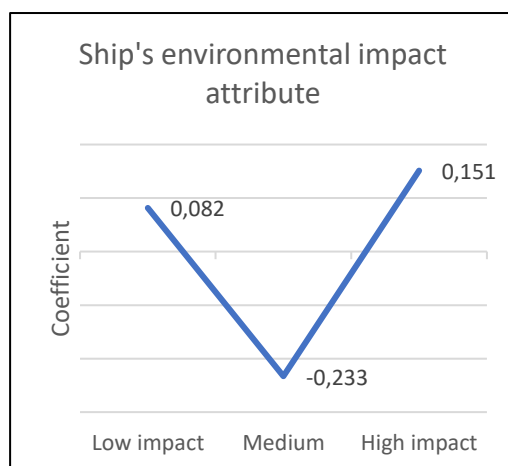


Figure 2 Coefficients for the ship's environmental impact attribute

We did not have an expectation for the destination attribute. It appears that Chinese respondents put a higher value on cruises that travel to popular destinations rather than remote destinations such as the arctic. (Figure 3)

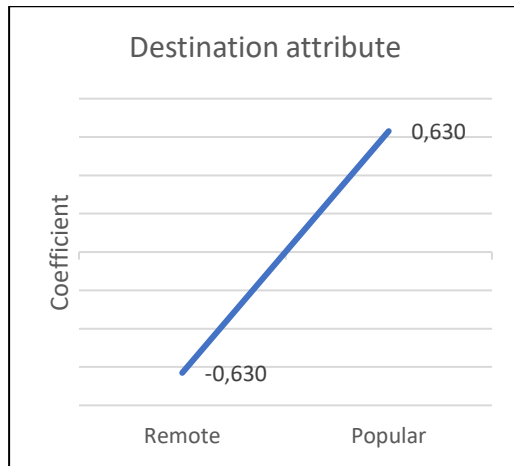


Figure 3 Coefficients for the ship's destination attribute

As for the service level we found that the Chinese respondents in our sample appeared to appreciate the most luxurious cruise alternatives. As expected, there seemed to be a linear relationship within the measurements of this variable where the eco service level was the least preferred (Figure 4).

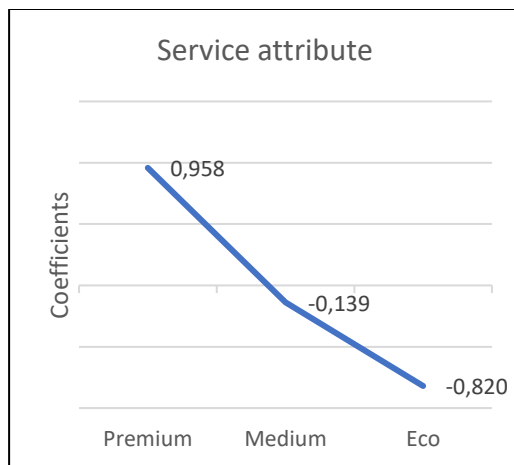


Figure 4 Coefficients for the ship's service level attribute

Overall, we found indications that Chinese respondents seem to put the highest importance on the service level when choosing between various cruise ships. It does also appear that they give higher importance to the environmental impact of the ship than the type of destination the cruise is heading towards. (Table 4)

<b>Average values</b>				
<b>Attribute</b>	<b>Importance Values</b>	<b>Levels</b>	<b>Utility Estimate</b>	<b>Std. Error</b>
Service	39.946	Premium	.958	.543
		Medium	-.139	.543
		Eco	-.820	.543
Destination	25.114	Remote	-.630	.407
		Popular	.630	.407
		Low	.082	.543
Ship's env. impact	34.938	Medium	-.233	.543
		High	.151	.543
(Constant)			5.210	.407

*Table 4 Results from conjoint analysis*

Consumers were asked to indicate the price they would expect to pay for each of the nine cruises they were presented with. The mean price was NOK 20,312 (CNY 17,312;  $SD = 26,784$ ;  $Std. Err. = 2,376$ ) which is approximately the price of a 7-day cruise along the Norwegian coast including flight tickets when ordering with Hurtigruten's agency in China. Considering the large variation in expected price levels, we will be using weighted prices in the remainder of the analysis to make respondents' values more comparable.

### **Segmentation and differences between segments**

#### *Segmentation based on maximum utility for "greenest" vs. "least green" cruise*

As part of the research it was relevant to identify differences between various segments amongst our respondents. One such way was to differentiate between those that had the highest utility scores on the "greenest" cruise and those with highest utility scores on the "least green" cruise. For our purpose, cruise #5 with an 'eco' service level and 'low' environmental impact travelling to a popular destination was deemed the greenest cruise. Cruise #1 with a 'luxury' service level, 'high' environmental impact travelling to a 'remote' destination was deemed the least green. Respondents with either of these were put in segments 1 & 2 while respondents with any of the other cruises as their first choice were assigned to segment 3. The  $N$  values for the three segments are shown in table 5.

<b>#</b>	<b>Segment</b>	<b>N</b>
1	Green (cruise #5)	26
2	Least green (cruise #1)	25
3	Others	78

*Table 5 Segments based on maximum utility for most- and least green cruise*

A one-way ANOVA showed that the utility means were significantly different for all cruise attributes between these segments on a 99.9% significance level. We also

found that various constructs of the Protection Motivation Theory model could have affected these segments differently. Amongst others, the severity aspect of threat appraisal appeared to be higher amongst respondents that preferred the greener ships. The green segment also tested higher on two of three scale items for behavioral intention and expected a higher price premium for an improvement from high impact to low environmental impact. The green segment was also the least willing to spend anything to upgrade the service level of a cruise (Appendix A, Table 7).

There were no significant differences in terms of demographics besides the fact that a larger part of the green segment appeared to be from Beijing with 60% of the segment being from the city, in comparison only 20% of the least green segment were from Beijing. This is also where we have found the highest average levels of pollution (Appendix A, Figure 2) for the last few years. Speaking against that air pollution has had an effect on this is the fact that there were no significant differences between which respondents had experienced air pollution. Our metric does however not measure the severity of the experienced air pollution which can be said to be a weakness of the measurement.

#### *Segmentation based on coefficients*

Another reasonable method of segmenting is to segment the respondents by their coefficient for the *environmental impact* attribute. With this technique, the greenest segment consists of respondents who have the highest coefficient on the attribute level ‘low environmental impact’. Similarly, the moderate (least) green segment includes those respondents who have the highest coefficient on the level ‘medium (high) environmental impact’. We will continue using this segmentation method throughout the rest of this report. We identified three segments with N values displayed in table 6.

#	Segment	N
1	Greenest - Low Imp- as 1 <sup>st</sup>	39
2	Moderate green - Low. Imp as 2 <sup>nd</sup>	36
3	Least green - Low Imp as 3 <sup>rd</sup>	56

*Table 6 Segments based on coefficients for environmental impact*

We do not observe significant and meaningful differences between segments in terms of demographics. The groups do not differ significantly in their intention to behave environmentally friendly, either ( $M_{greenest} = 5.667$ ;  $M_{moderate} = 5.733$ ;  $M_{least\_green} = 5.436$ ;  $p = .208$ ). However, all three segments showed significant and

large differences in the price premium they expect to pay for a low environmental impact cruise vs. the same cruise with high environmental impact ( $M_{greenest} = .370$ ;  $M_{moderate} = .097$ ;  $M_{least\_green} = -.356$ ;  $p < .001$ ). In absolute terms, the price premiums/discounts in NOK that we expect to command from a consumer in the greenest segment amounts to 8,138, we expect a consumer in the moderate green segment to be willing to spend 328 NOK more while a consumer in the least green segments are expected to be willing to pay NOK 7,534 less. The expected price premiums and discounts in percent are displayed in figure 5.



Figure 5 Expected price premium/discount from high to low environmental impact by segment, with current levels of behavioral intention

### Structural Equation Modelling

We can now link the results from Protection Motivation Theory and the conjoint analysis by estimating all relationships in our model using Structural Equation Modelling. The link from Protection Motivation Theory to the results of the conjoint analysis is the impact of *behavioral intention* on *expected price premium*, which we will hence devote most attention to. We started out by checking the assumptions for Structural Equation Modelling and checked for multicollinearity in our dataset. None of these gave reason for concern (VIF > 1.7 for all predictor and independent model variables). We first estimated the model without moderators. It turned out to be significant with  $\chi^2(26, N = 129) = 121.500, p < .001$ . The impact of *behavioral intention* on *expected price premium* was positive and significant at  $\alpha = 10\%$  ( $p = .076$ ) and we can therefore confirm H3. However, this relationship is

weak ( $b = .073$ ; *standardized b* = .145) with *behavioral intention* only explaining 2.1 % of the variance in *expected price premium*.

We then introduced *segment membership* as a moderator of this relationship. To do this, we created two dummy variables which indicated whether a respondent belonged to the greenest or moderate green segment. If both dummy variables take on a value of zero, then the respondent belongs to the least green segment and the regression equation does not contain any additional terms. Including those moderators clearly improved our model. *Behavioral intention* now explained 54.8 % of the variance in *expected price premium*. This new model is also more significant with  $\chi^2(42, N = 129) = 150.510, p < .001$ . The model's total  $R^2$  value is 96.3 %, indicating a good fit with our data.

Protection Motivation Theory provided us with a score for intention to behave in an environmentally friendly way. With the model fully estimated, we can examine the link from intention to behavior more closely. In H4, we hypothesized that the nature of this link would be moderated by which segment a consumer belongs to, i.e. how strong their preference for green attributes is. When we include *segment membership* as a dummy variable moderating the impact of *behavioral intention* on *expected price premium*, this impact is only positive and significant for the most green ( $b = .120; p < .001$ ) and moderate green ( $b = .073; p < .001$ ) segment. For the least green segment, the impact of behavioral intention on expected price premium (discount) is almost non-existent and insignificant ( $b = -.011; p = .707$ ). The price discount which consumers in the least green segment expect is therefore almost entirely determined by the constant of  $-.260$  and virtually not affected by levels of behavioral intention. Consequently, we can confirm H4 which stated that the impact of *behavioral intention* on *expected price premium* would be moderated by *segment membership*.

### **Tradeoff effects**

Our last hypothesis predicted the existence of tradeoff-effects among Chinese consumers. To investigate this, we compare two pairs of cruises. In the first pair, all attribute levels are held constant, but the cruises' environmental impact varies. (Figure 6) All three segments assign a higher weighted price to the green cruise than the non-green cruise. The difference is significant for the greenest segment and all respondents in total. In the second pair of cruises, a tradeoff is involved. An



improvement (decrease) in environmental impact is accompanied by a decrease in service level. (Figure 7) In this case, the most green and moderate green segment still assign a significantly higher weighted price to the greenest cruise. The least green segment, however, clearly prefers the cruise with the worse (higher) environmental impact and higher service level. The differences between the segments offset each other so that the total difference is insignificant. We conclude that there exist significant tradeoff effects on the segment level and therefore confirm H5.

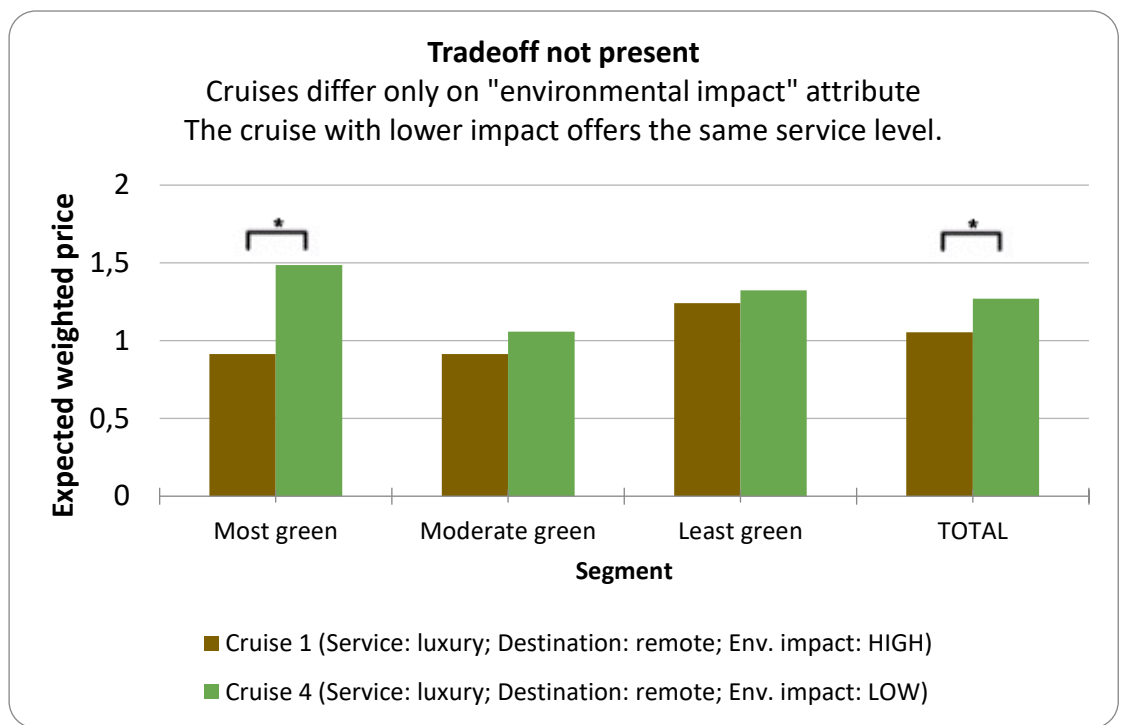


Figure 6 Expected weighted price for a green vs non-green cruise without tradeoff

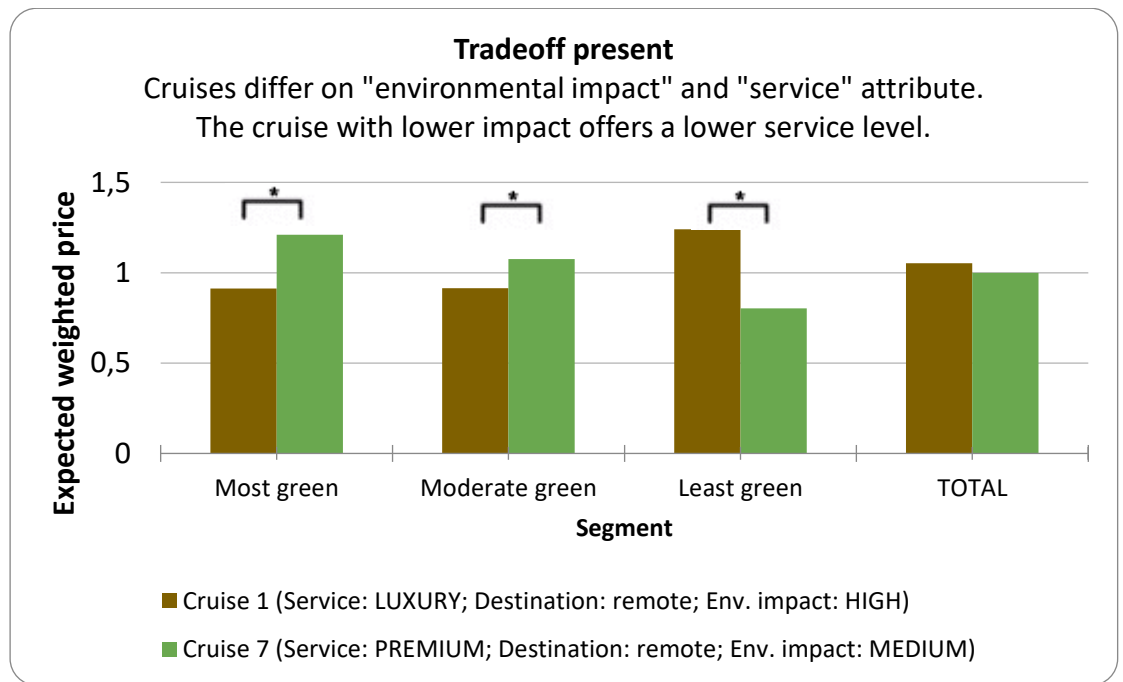


Figure 7 Expected weighted price for a green vs non-green cruise with tradeoff

## Discussion

Our results confirm that Protection Motivation Theory is suitable for understanding how Chinese consumers perceive environmental threats. These perceptions lead them to a high level of behavioral intention, but only the most green and moderate green segment is willing to pay a substantial price premium for a green vs. a non-green cruise.

Some of our findings may seem discouraging. Ships with the highest environmental impact receive the highest utility values. Also, the majority of respondents actually expects a price discount instead of a price premium for turning a non-green cruise into a green cruise. This finding is compatible to a 2002 survey in which 41% of respondents stated they would not buy green products "because they worried about the diminished quality of ecofriendly versions". (Bloom & Ginsberg, 2004) What might seem encouraging at first is that younger respondents report higher levels of perceived vulnerability, self-efficacy and response efficacy as well as lower levels of perceived costs of adaptive behavior and rewards of non-adaptive behavior. Consequently, they state higher intentions to make green consumption choices. The dispiriting part of the story is that this does not at all translate into how much they would expect to pay for a green vs. a non-green cruise.

We now apply our model to make predictions for a scenario in which consumers' behavioral intention change. Figure 5 is a snapshot of what price premiums consumers expect to for green cruises pay with current levels of behavioral intention. Today, levels of behavioral intention are rather high already and range between 5.4 and 5.7 for all segments. Our model predicts how those consumers' *expected price premiums* change as their levels of behavioral intention increase or decrease. Figure 8 depicts this relationship between *behavioral intention* and *expected price premium for green cruises* for all segments and the population in total. With low behavioral intention, none of the segments are willing to pay a positive price premium. This indicates that green attributes are initially perceived as negative. When levels of threat appraisal and coping appraisal rise, and jointly increase behavioral intention, some consumers start to expect positive price premiums for green attributes. The greenest segment expects positive price premiums from a behavioral intention score of approx. 2. For the moderate green segment, this threshold lies at approx. 4. The least green segment expects price discounts instead of premiums no matter how high levels of behavioral intention get. In fact, the discount this segment expects increases slightly with behavioral intention. This is a surprising trend, but in line with empirical findings from National Geographic's 2014 Greendex Report stating fears about the environment increased whereas sustainable behavior decreased in China since 2012.



Figure 8 Expected price premium as a function of behavioral intention

With increasing environmental problems and emerging green technology, we can expect both threat appraisal and coping appraisal in China to rise even further. For example, rising air pollution will make people perceive it as a bigger threat. At the same time, green technology such as hybrid and electrical engines will make people perceive it as a problem that can be coped with. Together, both effects will lead to even higher levels of behavioral intention. The question that arises is if behavioral intention - and consequently, expected price premium for green attributes - can increase to such levels at which it is profitable to offer green products to a majority of the population.

Our model suggests that the answer is “probably not”. Even if behavioral intention among Chinese consumers increased to a maximum of 7 on our scale, only the two greenest segments would pay a considerable price premium – an effect which is partly offset by the price discount the least green segment expects. In total, our model predicts an expected price premium of 5.88% if all Chinese consumers reached maximum levels of behavioral intention – presumably not enough for a green economy to develop by itself.

## **Implications**

The most obvious managerial implication of this research project is for Hurtigruten and other companies to know whether it is worthwhile to market green product attributes as competitive points of difference in China. Hurtigruten is about to introduce a new hybrid cruise ship with significantly less environmental impact than other ships of comparable size and comfort. Company officials intend to price cruise trips on this ship at 17% above cruise prices for non-hybrid ships. This price premium is not exclusively due to the ship’s hybrid technology, but also due to better facilities and the ship’s novelty value. As is illustrated in Figure 8, only the most green segment would be willing to pay such a price premium at current levels of behavioral intention. If Hurtigruten is able to target this segment successfully, offering green cruises for the Chinese market is an economically viable strategy. However, effective segmentation requires further research, primarily psychographic profiling, as the segments differ little on traditional demographic variables. Psychographics have been found to have higher predictive value for green behavior. (Roberts, 1996; Schlegelmilch, Bohlen, & Diamantopoulos, 1996)

On a more general level, companies which succeed at developing green products and communicating their (absence of) environmental impact to the right segment will enjoy a competitive advantage. At the same time, companies need to understand when not to talk about the greenness of their products as this causes many consumers to discount the value of the product.

Approx. 31% of respondents in our sample expect price premiums at or above 17% to go from high to low environmental impact. Interestingly, approx. 68% of all respondents would pay such a 17% price premium to upgrade from eco to luxury service. This suggests that it would make more sense for Hurtigruten to promote their premium priced hybrid ship on the basis of luxury rather than environment. However, other cruise companies compete on the basis of luxury already whereas environmental arguments are not used by any competitors today. As this paper is among the first to examine green preferences in developing markets, few direct comparisons are available. We can however put our results in a global perspective as other researchers have investigated willingness to pay for green attributes in developed markets. (Table 7) Compared to other countries, a larger part of Chinese consumers is willing to pay price premiums for green attributes. This is consistent with the results of the 2014 global Greendex report in which Chinese consumers rank second in terms of green behavior.

<b>Author</b>	<b>Research subject</b>	<b>Country</b>	<b>Percentage of sample willing to pay <math>\geq</math> 10% green price premium</b>
Deloitte (2008)	Green hotel	U.S.	28.0%
TripAdvisor (2007)	Environmentally friendly hotel	U.S.	12.0%
Hu et al. (2010)	Green Restaurant	Taiwan	38.2% (8% price premium)
Namkung & Jang (2017)	Green Restaurant	U.S.	26.3%
Hellen & Falkner (2017)	Green cruise	China	37.0%

*Table 7 Percentage of sample willing to pay 10% or more price premium for green product attributes*

Academic implications reach back to the literature gaps identified earlier. This study contributes to a young stream of literature arguing for the applicability of Protection Motivation Theory to environmental behavior research. It also introduces a framework for green product attributes for cruise ships. Our results confirm the existence of different green segments in China, which were earlier

identified by Ginsberg & Bloom (2004) and Olson (2013) in developed markets. According to the predictions of our model, those segments differ little for low values of behavioral intention at which all segments expect price discounts instead of premiums for green product attributes. Finally, measuring behavioral output through a conjoint analysis shows a road to more realistic and predictive results.

For decision makers in public policy, our research suggests that there is no self-regulating process for environmental problems in which consumers eventually engage into green behavior, thereby preventing problems from becoming more severe. It is not a viable solution to wait until consumers are afraid enough and feel capable enough - because the increasing willingness to pay price premiums of some segments will be offset by the constant expectancy of discounts of others. The key to increasing willingness to pay for green attributes and to making green products profitable is to “move” consumers to greener segments by changing attitudes towards and perceptions of green attributes. Traditionally, environmental campaigns have aimed at increasing consumers’ knowledge or behavioral intentions about environmental issues. Even if those campaigns succeed, our results suggest that this only partially translates into greener consumption choices. For the majority of the population, the Value-Action Gap is too large. The goal of new campaigns should rather be to change negative perceptions most consumers seem to have about green product attributes – thereby moving them up to a greener segment.

### **Limitations and Suggestions for Future Research**

This research project tries to strike a delicate balance between broad scientific contribution and the specific measures our supporting company Hurtigruten is interested in. We acknowledge two threats to its external validity. The sample composition might be too homogenous as only a small percentage of the Chinese population can afford cruise holidays today. However, China’s middle class is growing rapidly (Barton et al., 2013). It is therefore crucial to understand the underlying motivations of Chinese outbound tourists today to prevent damaging mass-tourism from developing in the future. Also, the setting of cruises might be too specific, thereby limiting external validity. Again, growth makes a solid counter argument. Since 2012, the number of Chinese cruise travelers has increased by a 66 percent compound annual growth rate, indicating that cruises will soon constitute a

major share of the Chinese holiday market. (CLIA, 2016) Still, managers in other but relatable industries may want to be careful if they wish to apply the findings to their marketing of for instance airlines as the mindset of the consumers may vary from industry to industry. To make the setting more relevant for today's broad public, upcoming research can adopt our model and apply it to mass products like airline tickets instead of cruises.

A further limitation of our research is the scope of some of the measured variables. Some variables, such as exposure to air pollution, were measured on a binary level. As this in particular was an effect that almost all respondents reported having experienced, this had little effect on segmentation. It could be interesting to see for instance how the level of experienced pollution affected their intentions for green behavior. The size of our sample is relatively small and it covers respondents from a limited geographic area. China is not homogeneous in its demography and it is therefore a possibility that the results of this study are not generalizable to all parts of China.

We observed that Chinese consumers differ significantly in their perceptions and valuation of green attributes. We were also able to divide our respondents into three different segments based on those perceptions and valuations, but those segments did not differ meaningfully in terms of the demographic variables we measured. More research is needed so that those segments can be properly identified in the Chinese market, presumably using psychographic variables. Future research could also aim to identify consumers' underlying motivations and explain the differences in how they evaluate green attributes. In a next step, the descriptive approach of this research project can be turned into a prescriptive one. For example, an experimental study could show ways to change consumers' negative perceptions of green attributes based on the findings of previous research.

It might also be worthwhile to connect the segments we identified to innovation diffusion theory to investigate whether the most green segment can drive the change towards greener consumption patterns. In such a setting, we can conceptualize the greenest segment as innovators, the moderate green segment as early adopters and the least green segment as majority and laggards. (Rogers, 2010) As the greenest segment adopts products with green attributes, they expose these products for the

rest of the population which in turn might change their initially negative perceptions towards them. (Zajonc, 1968) Such an approach would open for international research, comparing markets in which green products are more salient with those which are dominated by non-green products.



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## Appendix A – Tables and Figures

Picture 1: “Roald Amundsen”



Picture 1 "Roald Amundsen"

The world’s first hybrid cruise ship, Hurtigruten’s “Roald Amundsen”, is due to launch in July 2018 (Hurtigruten.no, 2017).

**Table A1: Scale reliability**

Measure	Items	Scale Reliability - Cronbach's alpha
<b><i>Threat appraisal</i></b>		
<i>Vulnerability</i>	Protection Motivation Theory_TA_VUL_1: I am vulnerable to the harmful effects by the polluted environment.* Protection Motivation Theory_TA_VUL_2: I feel that my children's life will be negatively affected by the poor environment.*	.77
<i>Severity</i>	Protection Motivation Theory_TA_SEV_1: My health is threatened by environmental deterioration.* Protection Motivation Theory_TA_SEV_2: I feel pressure to behave in an environmentally friendly way.	.29***
<i>Rewards</i>	Protection Motivation Theory_TA_REW_1: It feels good not having to think about pollution and environmental problems. Protection Motivation Theory_TA_REW_2: I typically buy the best value for money product, even if it is not very environmentally friendly. Protection Motivation Theory_TA_REW_3: I frequently do what is most convenient or comfortable even when I know it is bad for the environment.	.80
<b><i>Coping appraisal</i></b>		
<i>Self-efficacy</i>	Protection Motivation Theory_CA_SE_1: I know how to take precautions against environmental pollution in everyday life.* Protection Motivation Theory_CA_SE_2: I am able to find ways to deal with air pollution in everyday life.*	.67
<i>Response efficacy</i>	Protection Motivation Theory_CA_RE_1: I am sure that our environmentally friendly behaviors can have a positive effect on the environment.*	.78



	Protection Motivation Theory_CA_RE_2: I am confident that together we can save the natural resources.*	
<i>Costs</i>	Protection Motivation Theory_CA_CO_1: Behaving in an environmental friendly way puts an extra burden on my life. Protection Motivation Theory_CA_CO_2: It is a hassle to recycle garbage.	.70
<b><i>Dependent variable</i></b>		
<i>Behavioral Intention</i>	Protection Motivation Theory_DV_1: It is important to me that the products I use do not harm the environment.** Protection Motivation Theory_DV_2: I am concerned about wasting the resources of our planet.** Protection Motivation Theory_DV_3: I would describe myself as environmentally responsible.**	.76

Table A 1 Scale reliability

\* Scale items adopted from Zhao et al. 2016

\*\* Scale items adopted from Haws et al. 2014

\*\*\* Both scale questions are included as individual predictor variables due to low scale reliability score.

**Table A2: Conjoint analysis attributes and attribute levels**

<b>Attribute</b>	<b>Description</b>	<b>Attribute levels</b>	<b>Description</b>
<b>Service level</b>	Range of facilities Personalization of services Number of included meals (directly related to food waste) Space per passenger (directly related to fuel consumption per passenger)	Luxury	Comparable to five-star hotel Formal atmosphere Formal dress code Space per passenger 30 Gross Tons
		Premium	Comparable to four-star hotel Relaxed atmosphere Casual dress code Space per passenger 20 Gross Tons
		Eco	--
<b>Destination type</b>	Type of destinations the cruise ship calls at during the cruise	Remote natural area	E.g., Arctic or Alaska Protected marine environments, fragile biological and zoological environments. Strict rules for wildlife and biosecurity in place (e.g., AECO, PAME).
		Major cities	E.g., European capitals Urban environment

			with established port infrastructure. No special environmental guidelines. Possibly include pollution PPM or similar?
<b>FoE Environmental Impact Grade</b>	Score of the cruise ship's environmental Impact based on sewage treatment, air pollution and water quality compliance	A - very good	Advanced sewage and waste water management system Scrubbers and shoreside power installed High utilization of low sulfur fuels Low negative impact on the environment
		C - medium	Either scrubbers or shoreside power installed Some utilization of low sulfur fuels Some negative impact on the environment
		F - very poor	Neither scrubbers nor shoreside power installed Limited utilization of low sulfur fuels High negative impact on the environment

Table A 2 Conjoint analysis attributes and attribute levels

**Table A3: T-test for the conjoint results**

<b>One-Sample Test</b>						
<b>Test Value = 0</b>	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>	<b>Mean Difference</b>	<b>95% Conf. Int. of the Dif</b>	
					<b>Lower</b>	<b>Upper</b>
SERVICE_1	116.678	9	.000	.958	.940	.977
SERVICE_2	-16.803	9	.000	-.139	-.157	-.120
SERVICE_3	-110.123	9	.000	-.820	-.837	-.803
DEST_1	-82.836	9	.000	-.630	-.648	-.613
DEST_2	82.836	9	.000	.630	.613	.648
SHIP_1	10.359	9	.000	.082	.064	.100
SHIP_2	-23.891	9	.000	-.233	-.255	-.211
SHIP_3	18.992	9	.000	.151	.133	.169
CONSTANT	2081.227	9	.000	5.210	5.204	5.216

Table A 3 T-test for the conjoint results

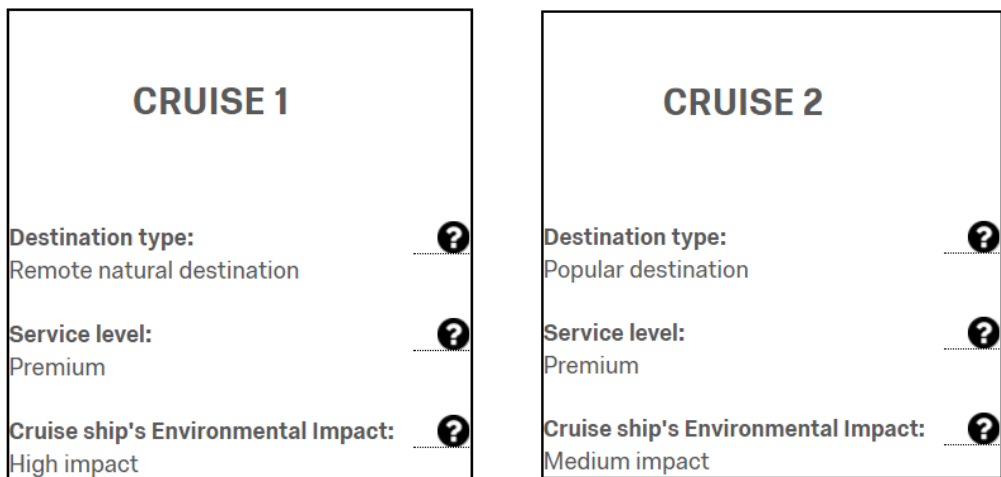
**Table A4: Determinants of the Cruise Ship Environmental Impact Grade**

<b>Sewage Treatment</b>	Has the cruise line installed on its ships the most advanced sewage and wastewater treatment systems available instead of dumping minimally treated sewage directly into the water? In determining a cruise line’s Sewage Treatment grade, we compared the number of cruise ships in the cruise line that have installed advanced sewage treatment systems against the total number of ships in the cruise line.
<b>Air Pollution Reduction</b>	Has the cruise line installed scrubbers or were capable of plugging into shoreside power. Cruise ships that installed both technologies and docked in ports with shore power received an A, while ships that only installed scrubbers or only installed shore power capability but did not dock at ports with shoreside power were given a C. In addition, ships were given credit if they only utilize low sulfur fuels continuously at levels lower than required by international and U.S. law.
<b>Water Quality Compliance</b>	To what degree cruise ships violated water pollution standards designed to better protect the Alaskan coast. In determining the Water Quality Compliance grade for cruise ships operating in Alaska, we used the notices of violation issued to each cruise line by the Alaska Department of Environmental Conservation from 2010 to 2014 for individual cruise ships.

*Table A 4 Determinants of the Cruise Ship Environmental Impact Grade*

*Source: <http://www.foe.org/cruise-report-card>*

**Figure A1: Examples of conjoint cards**



*Figure A 1 Example of conjoint cards*

**Table A5: Descriptive statistics**

Descriptives	Segment	N	Mean	Std. Dev	Std. Err	95% Conf. Interval	
						Lower Bound	Upper Bound
<b>Coefficients (conjoint)</b>							
Constant	Most green	37	5.292	0.226	0.037	5.216	5.367
	Moderate green	35	5.295	0.226	0.038	5.217	5.373
	Least green	55	5.100	0.234	0.032	5.036	5.163
	Total	127	5.209	0.247	0.022	5.166	5.253
Service: Luxury	Most green	37	0.476	1.228	0.202	0.066	0.885
	Moderate green	35	0.676	1.245	0.210	0.248	1.104
	Least green	55	1.524	1.086	0.146	1.230	1.817
	Total	127	0.985	1.259	0.112	0.764	1.206
Service: Premium	Most green	37	0.499	0.669	0.110	0.276	0.723
	Moderate green	35	-0.377	0.709	0.120	-0.621	-0.134
	Least green	55	-0.442	0.571	0.077	-0.597	-0.288
	Total	127	-0.150	0.761	0.068	-0.284	-0.016
Service: Eco	Most green	37	-0.975	0.943	0.155	-1.289	-0.660
	Moderate green	35	-0.299	1.272	0.215	-0.736	0.138
	Least green	55	-1.082	1.000	0.135	-1.352	-0.812
	Total	127	-0.835	1.110	0.098	-1.030	-0.640
Destination: Popular	Most green	37	-0.874	0.677	0.111	-1.100	-0.649
	Moderate green	35	-0.887	0.679	0.115	-1.121	-0.654
	Least green	55	-0.299	0.702	0.095	-0.488	-0.109
	Total	127	-0.629	0.742	0.066	-0.759	-0.498
Destination: Remote	Most green	37	0.874	0.677	0.111	0.649	1.100
	Moderate green	35	0.887	0.679	0.115	0.654	1.121
	Least green	55	0.299	0.702	0.095	0.109	0.488
	Total	127	0.629	0.742	0.066	0.498	0.759
Ship's env. impact: Low	Most green	37	0.947	0.526	0.086	0.772	1.123
	Moderate green	35	-0.325	0.527	0.089	-0.506	-0.144
	Least green	55	-0.263	0.444	0.060	-0.383	-0.143
	Total	127	0.073	0.746	0.066	-0.058	0.204
Ship's env. impact: Medium	Most green	37	-0.270	0.654	0.107	-0.488	-0.052
	Moderate green	35	1.034	0.654	0.111	0.809	1.259
	Least green	55	-1.029	0.635	0.086	-1.201	-0.858
	Total	127	-0.239	1.064	0.094	-0.426	-0.052
Ship's env. impact: High	Most green	37	-0.678	0.776	0.128	-0.937	-0.419
	Moderate green	35	-0.710	0.804	0.136	-0.986	-0.433
	Least green	55	1.292	0.598	0.081	1.130	1.454
	Total	127	0.167	1.215	0.108	-0.047	0.380
<b>PMT – Threat Appraisal</b>							
Vulnerability	Most green	37	5.716	0.787	0.129	5.454	5.979
	Moderate green	35	5.386	0.993	0.168	5.045	5.727
	Least green	55	5.309	1.021	0.138	5.033	5.585
	Total	127	5.449	0.959	0.085	5.280	5.617
Severity (1)	Most green	37	5.243	1.362	0.224	4.789	5.698
	Moderate green	35	5.743	0.886	0.150	5.439	6.047

	Least green	55	5.164	1.151	0.155	4.853	5.475
	Total	127	5.347	1.171	0.104	5.141	5.552
Severity (2)	Most green	37	5.757	1.342	0.221	5.309	6.204
	Moderate green	35	5.714	1.202	0.203	5.301	6.127
	Least green	55	5.291	1.286	0.173	4.943	5.639
	Total	127	5.543	1.289	0.114	5.317	5.770
Rewards	Most green	37	3.261	1.408	0.231	2.792	3.731
	Moderate green	35	4.038	1.379	0.233	3.565	4.512
	Least green	55	3.412	1.561	0.210	2.990	3.834
	Total	127	3.541	1.491	0.132	3.279	3.803
<b>PMT – Coping Appraisal</b>							
Self-efficacy	Most green	37	5.149	0.904	0.149	4.847	5.450
	Moderate green	35	5.314	1.051	0.178	4.953	5.675
	Least green	55	5.000	0.928	0.125	4.749	5.251
	Total	127	5.130	0.958	0.085	4.962	5.298
Response Efficacy	Most green	37	6.054	0.806	0.133	5.785	6.323
	Moderate green	35	5.800	0.815	0.138	5.520	6.080
	Least green	55	5.836	0.856	0.115	5.605	6.068
	Total	127	5.890	0.831	0.074	5.744	6.036
Costs	Most green	37	3.689	1.376	0.226	3.230	4.148
	Moderate green	35	4.114	1.572	0.266	3.574	4.654
	Least green	55	4.027	1.207	0.163	3.701	4.354
	Total	127	3.953	1.365	0.121	3.713	4.192
<b>Dependent variables</b>							
Int. to perform env. friendly behavior	Most green	37	5.667	0.839	0.138	5.387	5.946
	Moderate green	35	5.733	0.722	0.122	5.485	5.981
	Least green	55	5.436	0.902	0.122	5.192	5.680
	Total	127	5.585	0.842	0.075	5.437	5.733
Expected price premium from high to low env. imp.	Most green	37	0.370	0.276	0.045	0.278	0.462
	Moderate green	35	0.069	0.340	0.057	-0.048	0.186
	Least green	55	-0.329	0.206	0.028	-0.385	-0.274
	Total	127	-0.016	0.400	0.035	-0.086	0.055

Table A 5 Descriptive statistics

**Table A6: Analysis of Variance (ANOVA)**

ANOVA		Sum of Sq.	df	Mean Sq.	F	Sig.
Constant	Between Groups	1.173	2	0.587	11.120	0.000
	Within Groups	6.540	124	0.053		
	Total	7.713	126			
SERVICE1	Between Groups	28.910	2	14.455	10.503	0.000
	Within Groups	170.661	124	1.376		
	Total	199.571	126			
SERVICE2	Between Groups	22.097	2	11.049	26.940	0.000
	Within Groups	50.854	124	0.410		
	Total	72.952	126			
SERVICE3	Between Groups	14.122	2	7.061	6.209	0.003
	Within Groups	141.020	124	1.137		
	Total	155.143	126			
DEST1	Between Groups	10.562	2	5.281	11.134	0.000
	Within Groups	58.812	124	0.474		
	Total	69.373	126			
DEST2	Between Groups	10.562	2	5.281	11.134	0.000
	Within Groups	58.812	124	0.474		
	Total	69.373	126			
SHIP1	Between Groups	40.037	2	20.018	82.663	0.000
	Within Groups	30.029	124	0.242		
	Total	70.066	126			
SHIP2	Between Groups	91.078	2	45.539	109.229	0.000
	Within Groups	51.697	124	0.417		
	Total	142.775	126			
SHIP3	Between Groups	122.937	2	61.468	121.009	0.000
	Within Groups	62.988	124	0.508		
	Total	185.924	126			
Protection Motivation Theory_TA_VUL	Between Groups	3.859	2	1.929	2.135	0.123
	Within Groups	112.059	124	0.904		
	Total	115.917	126			
Protection Motivation Theory_TA_SEV_1	Between Groups	7.732	2	3.866	2.905	0.058
	Within Groups	165.024	124	1.331		
	Total	172.756	126			
Protection Motivation Theory_TA_SEV_2	Between Groups	6.213	2	3.106	1.895	0.155
	Within Groups	203.299	124	1.640		
	Total	209.512	126			
Protection Motivation Theory_TA_REW	Between Groups	12.458	2	6.229	2.887	0.059
	Within Groups	267.527	124	2.157		
	Total	279.984	126			
Protection Motivation Theory_CA_SE	Between Groups	2.131	2	1.066	1.164	0.316
	Within Groups	113.475	124	0.915		
	Total	115.606	126			
Protection Motivation Theory_CA_RE	Between Groups	1.438	2	0.719	1.042	0.356
	Within Groups	85.519	124	0.690		
	Total	86.957	126			
Protection Motivation Theory_CA_CO	Between Groups	3.789	2	1.894	1.017	0.365
	Within Groups	230.928	124	1.862		
	Total	234.717	126			

	Total	234.717	126			
DV_Protection Motivation Behavioral Intention	Between Groups	2.232	2	1.116	1.590	0.208
	Within Groups	87.038	124	0.702		
	Total	89.270	126			
Expected Price Premium	Between Groups	11.172	2	5.586	77.288	0.000
	Within Groups	8.962	124	0.072		
	Total	20.133	126			

Table A 6 Analysis of Variance (ANOVA)

**Figure A2: Average air pollution in Beijing and Shanghai**

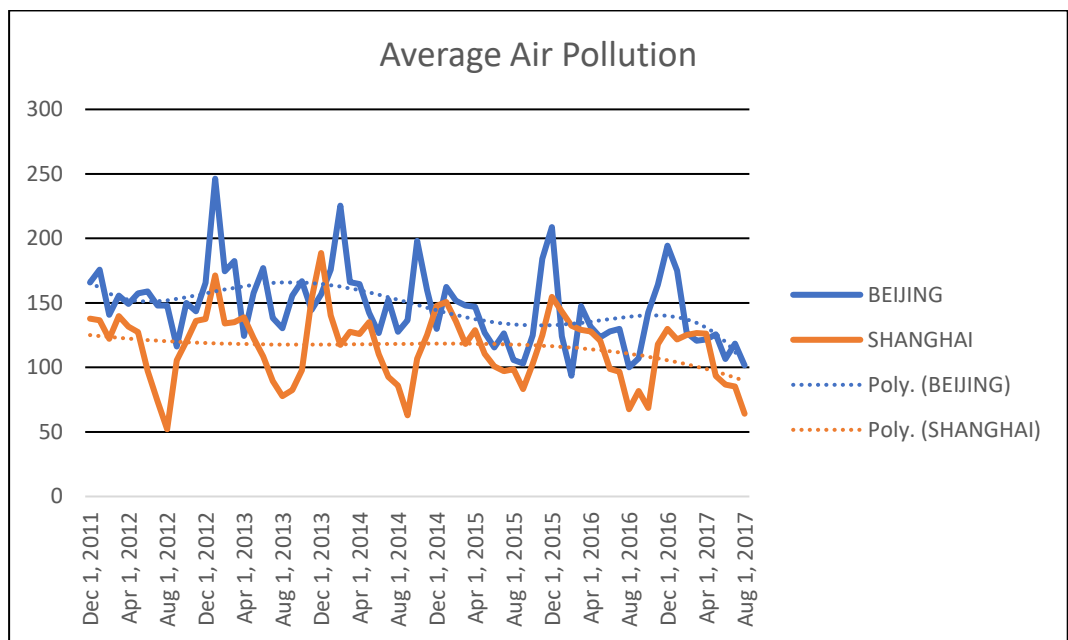


Table A 7 Average air pollution in Beijing and Shanghai (data from: <http://young-0.com/airquality/charts.php>)

**Table A7: Significant differences in green and less green segments**

Descriptives	N	Mean	Descriptives	N	Mean		
Constant	1	26	5.287	SERVICE1	1	26	-0.523
	2	24	4.933		2	24	1.241
	3	79	5.269		3	79	1.360
SERVICE2	1	26	0.252	SERVICE3	1	26	0.271
	2	24	-0.513		2	24	-0.729
	3	79	-0.153		3	79	-1.207
DEST1	1	26	-0.861	DEST2	1	26	0.861
	2	24	0.200		2	24	-0.200
	3	79	-0.807		3	79	0.807
SHIP1	1	26	0.624	SHIP2	1	26	0.665
	2	24	-0.425		2	24	-1.074
	3	79	0.057		3	79	-0.273
SHIP3	1	26	-1.290				
	2	24	1.498				
	3	79	0.216				
PMT_TA_SEV_1	1	26	5.423	PMT_TA_SEV_2	1	26	5.808
	2	24	5.292		2	24	4.875
	3	79	5.354		3	79	5.608
PMT_DV_2	1	26	5.923	PMT_DV_3	1	26	6.115
	2	24	5.792		2	24	5.542
	3	79	5.354		3	79	5.456
Price premium, High to Low impact	1	26	6815.830	Price premium from Eco to High service	1	26	-1141.840
	2	24	-7342.980		2	24	7710.370
	3	79	-747.080		3	79	10518.820

*Table A 8 Significant differences in green and less green segments*



## Appendix B – Survey

### *B-1 English translation*

This survey is designed by Sondre Hellen and Gregor Falkner, Master students at BI Norwegian Business School, in cooperation with Hurtigruten ASA.

The purpose of our questionnaire is to gain insights into attitudes and behaviour of relevant consumers. It takes about 5-10 minutes to complete.

This survey is distributed through online channels and through Hurtigruten ASA's customer database.

We highly appreciate your participation in this study. It will give you a chance to express your opinion on important topics and will help advance our research.

Your answers will be treated with full anonymity.

Again, thank you for your participation!

(这项调查也可以用普通话，你可以改变右上角的语言。)

#### Demographics

Which city do you live in?

- Guangzhou
- Shanghai
- Chongqing
- Beijing
- Hangzhou

Please indicate your age.

\_\_\_\_\_

Please indicate your gender.

- Male
- Female

Please indicate your annual income.

- below CNY 100,000
- CNY 100,000-200,000
- CNY 200,000-300,000
- CNY 300,000-400,000
- CNY 400,000-500,000
- above CNY 500,000

Please indicate the likelihood for the following

	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)
I intend to go on a vacation abroad within the next year. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend go on a cruise abroad within the next year. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How many cruises have you been on during the last 5 years?

\_\_\_\_\_

In the following section, you will be asked to evaluate different cruises. They will differ in three attributes:

**DESTINATION TYPE**

REMOTE DESTINATION:

Cruise goes to remote and pristine natural areas such as the Arctic or Alaska.

POPULAR DESTINATION:

Cruise goes to popular ports such as major European or Asian cities.

**SERVICE LEVEL**

PREMIUM SERVICE:

The service is designed to provide a luxurious experience comparable to a 4 star hotel. The ship offers large cabins and spacious public areas, and a wide variety of high quality amenities (food, services, entertainment, etc.).

MEDIUM SERVICE:

The service is designed to provide a comfortable experience comparable to a 2/3 star hotel.

The ship offers medium sized cabins and moderate sized public areas, and a moderate amount of comfortable amenities (food, services, entertainment etc.).

ECO SERVICE:

This service is designed to minimize the environmental footprint of the passengers. The ship offers smaller cabins and moderate sized public areas, and eco-friendly amenities (organic foods, décor made from recycled materials, eco-friendly services and entertainment, etc.).

**ENVIRONMENTAL IMPACT OF THE CRUISE SHIP**

LOW ENVIRONMENTAL IMPACT SHIP:


Ship is designed to have very little impact on the environment (i.e. very clean burning engines, and maximum levels of waste/trash recycling and/or safe disposal of trash/waste).

MEDIUM ENVIRONMENTAL IMPACT SHIP:

Ship does have some negative impact on the environment (i.e. moderately clean engines, and some waste/trash recycling and/or safe disposal of trash/waste).

**HIGH ENVIRONMENTAL IMPACT SHIP:**

Ship is designed to provide lowest operating costs (i.e. engines burn the cheapest and dirtiest fuels, and waste/trash is disposed directly into the water whenever allowed).

To read this description again, please hover the cursor over the  on each cruise description card.

**CRUISE 1**  
**Destination type:**  
 Remote natural destination  
**Service level:**  
 Premium  
**Cruise ship's Environmental Impact:**  
 High impact

Please indicate the price (CNY) you would expect to pay for a 7-day cruise with these characteristics.

	Extremely unlikely (15)	Moderately unlikely (16)	Slightly unlikely (17)	Neither likely nor unlikely (18)	Slightly likely (19)	Moderately likely (20)	Extremely likely (21)
If you were going on a cruise, how likely would you be to choose this cruise?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*[This is repeated for the remaining 8 cruise card combinations.]*

Thank you!

In the following part, you will be presented with different statements. Please indicate the extent to which you agree with the following statements.

Please indicate the extent to which you agree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I am vulnerable to the harmful effects by the polluted environment. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that my children's life will be negatively affected by the poor environment. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My health is threatened by environmental deterioration. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel pressure to behave in an environmentally friendly way. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It feels good not having to think about pollution and environmental problems. (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I typically buy the best value for money product, even if it is not very environmentally friendly. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I frequently do what is most convenient or comfortable even when I know it is bad for the environment. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PMT identifiers - Coping appraisal

Please indicate the extent to which you agree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I know how to take precautions against environmental pollution in everyday life. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to find ways to deal with air pollution in everyday life. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am sure that our environmentally friendly behaviors can have a positive effect on the environment. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that together we can save the natural resources. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behaving in an environmental friendly way puts an extra burden on my life. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is a hassle to recycle garbage. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate the extent to which you agree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
It is important to me that the products I use do not harm the environment. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am concerned about wasting the resources of our planet. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would describe myself as environmentally responsible. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Previous experience of environmental problems

Please indicate which of these environmental occurrences you have experienced.

- Air pollution
- Water pollution
- Flood
- Severe storms
- Drought

-End

*B-2 Mandarin translation*

这项调查是由 Sondre Hellen 和 Gregor Falkner BI挪威商学院的研究生与海达路德游轮公司联合发起的，其宗旨在于了解有关客户对度假和游轮的偏好。

问卷填写需要5-10分钟。

所有答案均以匿名方式提交。问题没有正确或错误的答案。我们只是希望您能根据自己的经历和喜好如实地回答问题。感谢您参与本次问卷调查！

(The survey is also available in English, you can change the language of the survey in the upper-right corner)

您居住在哪座城市？

- 广州
- 上海
- 重庆
- 北京
- 杭州

请说明您的年龄（可选的）

\_\_\_\_\_

请说明您的性别（可选的）

- 男
- 女

请说明您的年收入多少（可选的）

- 低于100,000 元人民币
- 100,000至200,000元人民币
- 200,000至300,000元人民币
- 300,000至400,000元人民币
- 400,000至500,000元人民币
- 高于500,000元人民币

请选择以下情况发生的概率：

	绝对不可 能 (1)	八成不可 能 (2)	不太可能 (3)	不确定 (4)	有可能 (5)	八成可能 (6)	非常可能 (7)
今后一年 内,我打 算在国外 度假。 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我打算明 年之内安 排一次海 外游轮度 假 (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

过去5年中您坐过几次游轮？

下面这部分请您对不同的游轮进行评价。它们的区别主要体现在以下三点：目的地类型

**偏远目的地：**游轮去往远程原始的大自然地区，比如北极或阿拉斯加。

**热门目的地：**游轮去往热门的港口，比如欧洲和亚洲的大型港口城市。

**服务水平**

**高端服务：**这类服务旨在为您提供相当于4星酒店的奢华体验。游轮提供大型客舱和宽敞的公共区域，以及选择多样的高品质设施（包括食物、服务、娱乐等）。

**中端服务：**这类服务旨在为您提供相当于3星酒店的舒适体验。游轮提供中型客舱和中等大小的公共区域，以及一些舒适的设施选择（包括食物、服务、娱乐等）。

**环保服务：**这类服务旨在降低游客的碳足迹。游轮提供小型客舱和中等大小的公共区域，以及环保低碳的设施（有机食物、回收材料内饰、环保服务和娱乐设施等）

**游轮对环境的影响**

**低碳环保游轮：**游轮在设计上把对环境的影响降到了最低（比如高清洁燃油发动机，最大程度地回收垃圾和废物，以及环保处理垃圾和废物）

**一般环保游轮：**游轮对环境没有负面影响（比如较清洁燃油发动机，一定程度地回收垃圾和废物并环保处理垃圾与废物）

**非环保游轮：**游轮在设计上主要考虑将运营成本最小化（比如游轮用的是最便宜的、最不清洁的燃油，并且垃圾和废物在允许排放区域直接排放到水中）。

欲再次阅读此说明，请将光标移至每个游轮说明卡上方。



<h2 style="margin: 0;">巡航 1</h2> <p style="margin: 5px 0;"><b>目的地类型</b> 偏远目的地</p> <p style="margin: 5px 0;"><b>服务水平</b> 高端服务</p> <p style="margin: 5px 0;"><b>游轮对环境的影响</b> 非环保游轮</p>
--

请注明您认为具有这些特征的7天游轮之旅应该是多少钱? (元)

	绝对不可 能 (15)	八成不可 能 (16)	不太可能 (17)	不确定 (18)	有可能 (19)	八成可能 (20)	非常可能 (21)
假设您计划一次游轮旅行，您选择这种游轮的可能性多大? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***[This is then repeated for the remaining 8 cruise card combinations]***

谢谢!

在接下来的内容里，请您根据自己的感受说明您对一些陈述的态度，是否同意及同意或不同意的程度。

请说明您与下面的语句一致的程度。

	强烈反对 (1)	不同意 (2)	有点不同意 (3)	既不同意 也不反对 (4)	有点同意 (5)	同意 (6)	非常同意 (7)
我很容易受到污染环境的有害影响。 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我觉得，环境污染会影响我孩子的生活水平。 (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
由于环境污染影响，我身体健康越来越有问题。 (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我越来越感到得环保生活。 (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
不需要考虑污染和环境问题的感觉很好 (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
无论产品不符合环保标准，我一般买最便宜的产品。 (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
无论我知道我会影响环境，我常常做最方便的。 (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

请说明您对以下陈述的认同程度

	非常不同意 (1)	不同意 (2)	有点不同意 (3)	既不同意也不反对 (4)	有点同意 (5)	同意 (6)	非常同意 (7)
我知道如何在日常生活中做到预防环境污染。(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我有能力在日常生活中找到处理空气污染的方法。(2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我相信我们的环保行为会对环境产生积极的影响。(3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我相信我们一起可以节约自然资源。(4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
以环保的方式行动给我的生活增添了额外的负担。(5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
回收垃圾很麻烦。(6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

请说明您对以下陈述的认同程度

	非常不同意 (1)	不同意 (2)	有点不同意 (3)	既不同意也不反对 (4)	有点同意 (5)	同意 (6)	非常同意 (7)
对我来说使用不破坏环境的产品很重要。(6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我担心我们会浪费地球的资源。(8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我自己认为我是一个对环境负责的人。(7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

请说明下面的环境事件中有哪些是您经历过的？（符合条件的都选）

- 空气污染
- 水污染
- 洪水
- 强风暴
- 干旱

## **Appendix C – Preliminary Thesis Report**

### **Preliminary Master Thesis**

Program:

**MSc in Strategic Marketing Management**

Thesis title:

**Sailing green - A protection motivation analysis of green consumption choices  
in China**

Supervisor:

**Erik Olson**

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## **Abstract**

A significant number of the Chinese population is faced with environmental challenges like air and water pollution. Based on protection motivation theory, this research examines Chinese consumers' perception of threat and coping mechanisms regarding environmental problems and investigates their predictive power for intention and behavior to make green consumption choices. In cooperation with the Norwegian cruise company Hurtigruten, a conjoint analysis measures the relevance and actual price tag consumers put on green product attributes in a choice-situation with multiple product attributes. Analysis of variance will be used to determine whether differences between segments exist. We expect the effects of threat and coping appraisal on intention to occur in line with predictions of protection motivation theory and the effect of intention on monetary value of environmental friendliness to be moderated by the presence of tradeoffs. High levels of threat perception among consumers may therefore create demand for green products. Further implications, limitations and suggestions for future research are discussed.

## **Introduction**

There exist a number of behavioral choices consumers can make to reduce the impact of their consumption on the environment. However, previous research has identified a significant Value-Action Gap. Consumers report that they are environmental-conscious, but do seldom make corresponding green choices. (Barr 2006; Olson, 2012) When consumers actually feel the impacts of environmental change themselves, will this give the much-needed push in the right direction to finally make green consumption choices?

Environmental challenges are very real in many parts of the world today. In particular, pollution is an increasing problem in low and medium income countries where as many as 98% of cities with above 100,000 inhabitants do not meet air quality guidelines set by the World Health Organization. Despite improvement in some regions such as high income countries where only 56% of cities fail to meet

air quality standards, global air pollution has increased by 8% from 2008 to 2013 (WHO, 2016).

To gain a deeper understanding of how people perceive and react to environmental threats, we apply protection motivation theory (Rogers, 1975; Maddux & Rogers, 1983). This theory dictates that different variables of fear appeal can predict how people will try to defend themselves against the perceived threat. Consumers' attitudes towards green consumption should vary with the degree of environmental threat they perceive.

China is a very suitable country for this kind of research for various reasons. There has been limited research on green consumption in China and it is the largest contributor to global CO<sub>2</sub> pollution (IPCC, 2014). Also, China struggles with a number of serious environmental challenges, with air pollution being the best known and, arguably, most serious (Chan et al., 2008). In what is defined as megacities by Chan and Yao (2008) such as Beijing, Shanghai and Guangzhou there is a significant problem with low air quality and between 10 and 30 percent of days the air quality falls below the Grade II standards, a threshold for the amount of micrograms of certain particles in the air set by Chinese authorities. Compared to European standards, Grade II is equivalent to what is defined as the 'alert threshold' (Amfic, n.d.). Although measures have been taken to increase air quality in China, air pollution remains an issue, especially during summertime (Streets et al., 2007). Consequently, many of China's citizens directly feel the impact of air pollution.

One of today's sinners when it comes to air pollution is the ever growing fleet of massive cruise liners emerging around the globe. Cruise ships release massive amounts of carbon dioxide, nitrogen oxide and particles. One large cruise ship can release the equivalent amount of CO<sub>2</sub> as just above 83,000 cars. The environmentally harmful gas which cruise ships release the most disproportionate amount of, at least compared to cars, is sulfur dioxide (SO<sub>2</sub>) where one large cruise ship can release an equivalent amount to 376 million cars. The higher amount of sulfur released can largely be attributed to differences in the quality of the fuel burned. While normal cars burn refined gasoline or diesel, ships often use heavier



fuels such as marine fuel oil which can contain up to 3,500 times more sulfur than road-diesel. (The Guardian, 2016). This sulfur is deliberately not distilled from the marine fuel as a cost saving measure from the company's' side. (Kittiwake.com, n.d)

This research project is supported by the Norwegian cruise ship operator Hurtigruten. Hurtigruten operates 15 cruise ships (Hurtigruten.no) along the Norwegian coast, the Arctic and Antarctica. Although the ships operated are smaller than conventional massive cruise ships, they contribute to a total of 1% of Norway's net emissions of CO<sub>2</sub>. The numbers are even higher on SO<sub>2</sub> and NO<sub>x</sub> where the numbers are six and four percent of Norway's national emissions respectively (NRK, 2008).

As such, we are interested to see if protection motivation theory in any way could help predict cruise trip purchases based on the environment around the consumer at the time of purchase. Comparable research has been done on the adoption of electric vehicles by Bockarjova & Steg (2014). Should it be shown that consideration of environmental issues can predict how consumers choose or value cruise trips, this could be valuable information for Hurtigruten when conducting their marketing. Considering that the Chinese cruise market is among those with the highest growth worldwide (CLIA 2016). According to Cruise Lines International Association (2016) there were 986,000 cruise passengers stemming from China in 2015. With modern developments such as hybrid cruise ships (Hurtigruten, 2016), cruise companies can start offering more environmentally friendly options, enabling the consumers to make this choice.

Our specific research question is then:

How do green product attributes affect Chinese consumers purchase intentions? And how does this affect the price they are willing to pay for those attributes, controlling for different levels of perceived threat severity and vulnerability?

In the remainder of this article, we review the literature on environmental product attributes, the Value-Action Gap and protection motivation theory. From this, the

conceptual model and hypotheses are developed. The methodology gives detailed descriptions about research and survey design, sampling, data collection as well as dependent and independent variables. We conclude with a discussion of expectations, implications, limitations and suggestions for further research.

**Literature review**

We will now present an overview of previous literature on green product attributes, Value-Action Gap and protection motivation theory.

**Green products / attributes**

What is considered to be green by consumers and what actually contributes the most to reduce environmental impact may differ. According to Gershoff & Frels (2015), the centrality of the “green” product advertised can affect how green a product feature is perceived. For instance, improvements in the engine of a ship could be considered as having a higher benefit to the environment than improvements in e.g. the marine paint or hull design. In their research on adoption of electric vehicles, Bockarovja and Steg (2014) use measures such as air pollution, CO<sub>2</sub> and climate change as measures for environmental risks but also apply some energy security risks such as exhaustion of our petroleum resources, price changes and dependency on import of fossil fuels.

For cruise liners, green attributes can for instance be measured in the amounts of harmful gases and waste released by the ship. For instance, heavy fuel oils or marine gas oil such as those often used by cruise liners are much more damaging to the environment than regular fuel such as gasoline or diesel used in automobiles. Some different ways to measure the green characteristics of a cruise ship are summarized in Table 1 below.

<p><b>Type of Bunker Fuel</b>                  Marine Gas Oil                  Marine Diesel Oil                  Intermediate Fuel Oil</p>	<p><b>Scrubber technology</b>                  Yes                  No</p>	<p><b>Land power while docked?</b>                  Yes                  No</p>
---	--	---

Marine Fuel Oil Heavy Fuel Oil		
<b>Ship attributes</b> Hull design Propellers Paint	<b>Environmental actions</b> Treatment of flora & fauna	

*Table 1. Examples of green attributes of a cruise ship*

How considerate are they to flora and fauna in the environments they operate in? One example can be the way Hurtigruten conducts stress tests on penguins in order to ensure sustainable contact with the animals and disinfects tourists before entering fragile arctic environment (Internal source, Hurtigruten).

### **Value action gap**

The concept of the value action gap can be described as the missing link between feeling that something should be done and actually doing it. One can for instance have a personal value that one should not pollute, but still feel incapable to find the motivation required in order to walk 20 meters to find the nearest trash can when disposing of a used soda bottle. Likewise, one can feel that sustaining air quality is an important effort, but still disregard environmental attributes of the goods or services that one consumes, for example a trip on a cruise ship. Some research has been done on this phenomenon, amongst others Kollmuss & Agyeman (2002) who describe the underlying complexities of the Value-Action Gap with a range of models from economics, sociology and psychology. Each has some degree of validity under certain circumstances. Bamberg (2003) argues that environmental concern should not be seen as a direct, but as an indirect determinant of behavior. Further evidence of the existence of a Value-Action Gap in the population can be inferred from the lack of significant increases in reported pro-environmental behavior, in spite of an increase in information about these issues that should have generated awareness. This is further exemplified by Olson (2012) who shows that the link between intention and behavior is significantly weakened in trade-off

situations and by Barr in his 2006 work explaining that a range of other factors may be barriers between our attitudes and our intentions.

### **Protection Motivation Theory**

Protection motivation theory (PMT) is part of expectancy-value theories and was first proposed by Rogers (1975) and Maddux & Rogers (1983). It aims to predict intentional and behavioral responses to a threat based on how individuals perceive different aspects related to both the threat itself and possible coping behavior.

Threat appraisal consists of three components. The assessment of perceived severity relates to the seriousness of the threat at hand. Perceived vulnerability is an assessment of how susceptible one is to the threat. The rewards which are connected to current behavior, such as the pleasure, are assessed under this category as well. An increase in perceived severity and vulnerability will increase the likelihood of adaptive behavior whereas an increase in the rewards of mal-adaptive behavior will work in the opposite direction.

Coping appraisal also consists of three psychological evaluations. Perceived self-efficacy refers to an assessment of whether one is able to actually perform the protective action. In other words, “Can I do what it takes?” Perceived response efficacy is an evaluation to which extent the protective action actually will reduce the risk. The perceived cost of the protective action covers both monetary costs as well as time, effort and inconvenience. Increases in self-efficacy and response-efficacy will increase motivation to perform an adaptive action while an increase in perceived cost will lower such behavioral intention. The final behavioral intention and outcome will be determined by a trade-off between threat and coping appraisal, which may happen both consciously or subconsciously. The original theory proposed multiplicative relationships among the variables, but those interaction effects lack empirical support (Norman et al., 2005). As most other PTM-studies, we assume the model to be additive and consider only main effects. (Bubeck et al., 2012)

Threat and coping appraisals are based on how an individual perceives their underlying elements. This has two important implications. Behavioral intentions and outcomes will differ among individuals as their perceptions are not only driven by environmental inputs such as facts or arguments, but also by top-down processes from individual experiences, attitudes and beliefs. In order to change behavior, one can specifically try to change how one or more elements of PMT are perceived in people's' minds. For example, anti-smoking campaigns have recently employed social risk messages to increase perceived severity and vulnerability among young smokers (Pechmann et al., 2003).

At first glance, PMT might seem like an individual-focused theory. However, it can take into account an individual's social relations. In the special circumstance of slow-onset risks such as environmental threats, vulnerability and seriousness typically increase over time and reach higher levels for each new generation. Campis, Prentice-Dunn & Lyman (1989) extended PMT to include respondent's children. We too will measure how respondents perceive severity and vulnerability for future generations and how this might affect threat and coping appraisal factors. Another social aspect of PMT is that of interpersonal risk which may serve as a powerful motivator in addition to self-protection goals. (Maddux & Rogers 1983, Mahler et al. 1997; Schoenbachler and Whittler 1996) For example, smoking has developed from being socially desirable to highly undesirable in many Western cultures. Likewise, aspects of green behavior have become a trend in some societies, putting social pressure on members to perform adaptive behavior. (Griskevicius et al., 2010; Mazar & Zhong, 2010)

Protection motivation theory was primarily used to study health-related topics such as preventing diseases by engaging into a healthy lifestyle (Miller & Sanchez 1994, Rippetoe & Rogers 1987, Plotnikoff & Higginbotham 2002). Two meta studies published in 2000 by Floyd et al. and Milne et al. summarized the first two decades of PMT research and found satisfactory results for its predictive power.

Already in 1983, Rogers acknowledged that protection motivation theory could be applied in a wide field of other research topics as well. But only in recent years has

a new stream of literature emerged in which PMT is applied to measure people's motivation to engage in green behavior when faced with an environmental threat. When studying chronic exposure to an environmental hazard, Vaughan (1993) established the link for PTM from health to environment, laying the basis for its application for different environmental topics. Keshavarz & Karami (2015) studied how environmentally farmers behaved when faced with the threat of drought. Bubeck et al. (2012) applied PMT to better understand underlying motivations of citizens located in flood areas, finding that response- and self-efficacy were the most important determinants of coping intention and behavior.

Few other researchers have utilized PTM to research environmental behavior of Chinese consumers or tourists. Zhao et al. (2015) studied base-of-the-pyramid consumers' green behavior and found that they engage in such behavior to a great extent, motivated primarily by self-protection and care for environmental quality. Horng et al. (2013) examined energy saving and carbon reduction behavior of Asian tourists and identified a significant Value-Action Gap between intention and behavior.

There remain several gaps in the current literature which our research project aims to close or narrow. First of all, we want to contribute to the young and still scarce stream of literature applying PTM to predict environmental behavior and demonstrate the applicability of PTM for this important research topic.

Second, the majority of PTM studies are survey-based measuring behavioral intentions or experiments measuring actual behavior. As previously mentioned, there exist a significant Value-Action Gap in our research area which can compromise validity when drawing conclusions from intentions to behavior. Experiments, on the other hand, are by their very nature a compromise between decreased ecological validity and increased control. With our research project, we aim to address both shortcomings. Values for threat and coping appraisal will be collected through a survey, but we introduce *monetary value of environmental impact* as an independent variable in addition to *behavioral intention*. Measured by

a conjoint analysis, this will provide us with a price tag consumers put on the “greenness” of their product. Although this does not constitute an actual behavior, it should be highly predictive of such as respondents are forced to make realistic tradeoffs. The gap between both our independent variables can be conceptualized as the Value-Action Gap.

Third, our study applies PTM to understand the environmental values and behaviors of potential outbound tourists in China, a group that to the best of our knowledge has not received such scientific attention .

### **Theoretical Background, conceptual model and hypotheses**

Previous research on environmental behavior has utilized a number of different theories, of which theory of planned behavior (Ajzen, 1985) is among the most common. It is an extension of the theory of reasoned action (Ajzen & Fishbein, 1975). Attitude, perceived social pressure and perceived behavioral control lead to behavioral intention which results in behavior. We acknowledge the empirical support of the theory of planned behavior (Ajzen, 1991, Riebl et al., 2015) and its explicit mentioning of social pressure which seems to be a powerful factor especially in Asian outbound tourism. (Sparks & Pan, 2008) However, we believe that protection motivation theory has superior predictive power for our research setting as it is specifically designed to predict behavior in the presence of a threat. Although the aspect of social pressure is less obvious, it is still incorporated in the theory in terms of social risk. We therefore develop our hypotheses from PMT. (Figure 1)

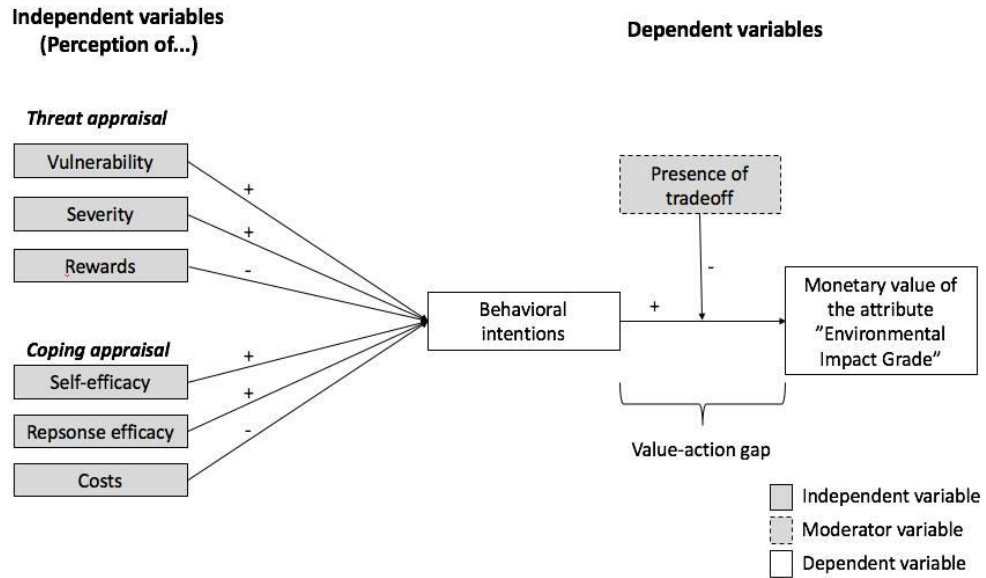


Figure 1: Conceptual Model

*Hypothesis 1:* Perceived vulnerability to environmental problems has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 2:* Perceived severity to environmental problems has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 3:* Perceived rewards of maladaptive behavior has a direct negative effect on intention to pursue coping behavior.

*Hypothesis 4:* Perceived self-efficacy has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 5:* Perceived response efficacy has a direct positive effect on intention to pursue coping behavior.

*Hypothesis 6:* Perceived costs of pursuing adaptive behavior have a direct negative effect on intention to pursue coping behavior.



*Hypothesis 7:* Intention to pursue an adaptive behavior has a direct positive effect on the monetary value of “Environmental Impact Grade”.

In the domain of environmental behavior, previous research has established that the effect of behavioral intention on actual behavior is weaker in the presence of tradeoffs. (Olson, 2012) The majority of people is willing to make green consumption choices as long as those choices do not involve sacrifices on other product attributes. We expect this Value-Action Gap to be present in our data and hypothesize its occurrence as follows:

*Hypothesis 8:* The effect of intention to pursue an adaptive behavior on the monetary value of environmental impact grade is weaker in the presence of negative trade-offs on other product attributes.

## **Methodology**

### **Research design**

The present research is confirmatory as it is using theory to develop and test hypotheses. We choose a survey-based quantitative research approach. More specifically, we perform an online survey in two parts. In the first part, we measure the dependent variable *behavioral intention* and perform a conjoint analysis in which respondents are asked to rate different cruises. Its output is the independent variable *monetary value of the cruise’s environmental impact grade*. The second part employs well-established PMT scales to measure our independent variables.

### **Sampling**

The data will be sampled from relevant Chinese citizens in a number of major cities in China. In order for the respondents to be relevant they should be current or potential cruise tourists. This is presumed to limit the sampling pool to the growing (upper) middle class as well as the rich in China. For the purposes of the paper it is also important that a sufficient amount of respondents are sampled in different

locations and preferably, that some of these locations have measurable differences in air-quality. Ensuring randomization in the samples will also be paramount as this is one of the conditions of performing an ANOVA analysis.

### **Data collection**

The survey will be administered to target samples through either the use of Hurtigruten's agent in China or a market research company. Communication with the agent has shown that they have a willingness to help out with the project but it is yet to be determined whether they have the reach required to spread the survey to enough respondents over a large enough diversity of areas.

A second option is to employ a market research firm with an existing pool of respondents in China. Key considerations will then be the agency's reach and possibilities of customising the target respondents. Unless Hurtigruten is willing to sponsor this part of the project price is also likely to be a consideration.

### **Survey design**

Respondents are asked to fill in an online questionnaire. As warm-up questions, respondents are asked to disclose whether they have intentions of going on a cruise or travelling abroad some time in the future. We also collect data on previous travel experience. Respondents are then presented with conjoint cards displaying cruises with varying attribute levels. (Appendix, Figure 1) For each card, they are asked to give a score from 0 ("Would not consider buying") to 100 ("Would definitely buy") based on their overall preference and attribute evaluation. For some conjoint cards, we will keep all attributes constant except for environmental impact. This way, we temporarily remove the tradeoff situation and respondents are not forced to weigh environmental impact against other attribute levels. This allows us to measure the link from intention to behavior also when our binary moderator variable *presence of tradeoff* is inactive. In the following, questions about intentions to make green consumption choices and cruises in particular are presented to measure behavioral intention. We then measure the independent predictor variables suggested by protection motivation theory using well-established scales from previous

research. (Appendix, Table 1) Each construct is measured on multiple dimensions using a five-point Likert scale, from “1 (strongly disagree)” to “5 (strongly agree).” The questionnaire finishes with questions about first-hand experiences of environmental problems and demographical questions.

The measurement of dependent variables is positioned before the measurement of the dependent PTM variables to avoid possible priming effects. Questions about environmental threats might make respondents more sensitive to the environmental attributes than they would normally be.

A pretest will be used to identify any problems with the survey. Hurtigruten’s marketing agency in China will translate the survey to Mandarin Chinese. An independent translator will then translate back to English to identify and resolve any problems which occurred during the translating process.

### **Conjoint Analysis**

Conjoint analysis is a very informative form of regression analysis. (Green et al., 2001) Respondents are presented with various hypothetical products with different attributes. The products differ on attribute levels and respondents are asked to rate their attractiveness based on those descriptions. Coefficients can then be estimated from those ratings. In the data analysis, we can determine the relative importance of each attribute and the most preferred level of each.

Conjoint analysis is highly applicable in environmental choice situations in which value action gaps are likely to occur. When consumers are confronted with a tradeoff, they often behave differently from their intentions. (Olson, 2012) A conjoint analysis forces respondents to make such a tradeoff by evaluating several attributes combined and creates thus a more realistic environment for evaluation.

To the best of our knowledge, there is no research on which attributes are most important for consumers in a process of choosing and purchasing a cruise. Attributes and attribute levels were therefore developed together with Hurtigruten management. (Appendix, Table 2). Our focal attribute, the cruise’s “Environmental Impact Grade”, is adopted from the environmental organization Friends of the Earth (FoE). FoE has developed a Cruise Ship Record Card, a system in which cruise

ships and cruise companies are given scores from A (very good) to F (fail) on three environmental dimensions. (Appendix, Table 3) “Service level” and “destination type” are two attributes which Hurtigruten uses as points of difference in their marketing and therefore seem suitable to include in product evaluation. “Price” is a natural attribute for any product and allows us to estimate the monetary value of each of the other attribute levels. SPSS software will be used for generation of conjoint cards and data analysis.

### **Analysis of Variance**

In addition to the conjoint analysis an ANOVA will also be performed in order to measure differences between the measured groups. The main idea here is to test whether or not significant differences can be found between groups with different exposure levels from pollution suggesting that protection motivation theory can affect valuation of cruises. It can also be used to identify differences between for instance age groups or income groups.

It is essential for the ANOVA analysis that the sampling is done correctly, amongst others ensure normally distributed data and homogeneity. N-way analysis of variance can also be performed in order to identify and measure possible interaction effects between the measured factors in the surveys.

### **Expectations**

Based on the relationships and directions suggested by PTM, we expect all our hypotheses to be confirmed. We also expect threat appraisal to be positive due to the scope and size of environmental challenges China is facing. Values will vary depending on the respondent’s location, situation and exposure to environmental problems. We are less certain about the mean value of coping appraisal - considering the size of the population, do Chinese consumers think that their individual choices matter and can protect them to a certain degree? As a collectivistic culture (Hofstede, 1986), the answer is probably yes as each individual can imagine his or her place and role in the big picture. As such, positive threat and coping appraisal should motivate respondents to make green choices and

put a positive price tag on the environmental friendliness of a cruise. In line with previous research, we expect the presence of trade-offs to significantly reduce the effect of intention on behavior.

### **Implications**

The most obvious managerial implication of this research project is for Hurtigruten and other companies to know whether it is worthwhile to market green product attributes as competitive points of difference in China. If so, those companies which succeed at developing green products and communicating their (absence of) environmental impact will enjoy a competitive advantage. Also, detailed knowledge about how Chinese consumers evaluate environmental threats and coping behavior presents an opportunity for companies and entrepreneurs. For example, high levels of vulnerability perceptions signal demand for protective products such as advanced air filters.

Academic implications reach back to the literature gaps identified earlier. This study contributes to a young stream of literature arguing for the applicability of PTM to environmental behavior research. Measuring behavioral output through a conjoint analysis shows a road to more realistic and predictive results.

### **Limitations and Suggestions for Future Research**

This research project tries to strike a delicate balance between broad scientific contribution and the specific measures our supporting company Hurtigruten is interested in. We acknowledge two threats to its external validity. The sample composition might be highly homogenous as only a small percentage of the Chinese population can afford cruise holidays today. However, China's middle class is growing rapidly (McKinsey, 2013). It is therefore crucial to understand the underlying motivations of Chinese outbound tourists today to prevent damaging mass-tourism from developing in the future. Also, the setting of cruises might be too specific, thereby limiting external validity. Again, growth makes a solid counter argument. Since 2012, the number of Chinese cruise travellers has increased by a

66 percent compound annual growth rate, indicating that cruises will soon constitute a major share of the Chinese holiday market. (CLIA, 2016) To make the setting more relevant for today's broad public, upcoming research can adopt our model and apply it to mass products like airline tickets instead of cruises.

The nature of this study is descriptive, which is a necessary first step to understand Chinese tourists' underlying motivations. Future research might take on a prescriptive approach, trying to manipulate the six PTM variables through marketing communication to maximize the monetary value of the highest green attribute level. In other words, what is the most effective message to make consumers value green product attributes?

From a global perspective, when high levels of threat and coping appraisal evoke stronger intentions and behaviors to make green consumption choices, that could be interpreted as a "last-minute hope" for our planet. As more and more people experience environmental problems first-hand, the cognitive mechanism suggested by PMT might lead to a rapid change towards greener consumption patterns. Future research might shed more light on whether high enough intention levels would lead to behavioral change in spite of the Value-Action Gap. When consumers are willing to pay high prices for green product attributes, they constitute a profitable segment for any company able to satisfy this demand. Then it is no longer government regulations, but market forces driving mass consumers' green choices and producers' development of new sustainable products.

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## Appendix

**Table 1. Construct Indicators and Measurement Items**

Measure	Items	Score
<i>Threat appraisal</i>		
<i>Vulnerability</i>	<p>I am vulnerable to the harmful effects by the polluted environment.*</p> <p>I feel that I am a victim of environmental deterioration.*</p> <p>I feel that my children's life will be negatively affected by the poor environment.*</p> <p>The social pressure to behave in an environmentally really affects me.</p> <p>My friends and family would disapprove if they heard that I polluted the environment.</p>	
<i>Severity</i>	<p>My health is threatened by the environmental deterioration.*</p> <p>My life is getting worse due to the poor environment.*</p> <p>The air and water pollution is a serious problem in my area.*</p> <p>The quality of my children's life will be negatively affected by environmental problems.</p> <p>I feel very much pressure to behave in an environmentally friendly way.</p> <p>My friends and family would react strongly if they heard that I polluted the environment.</p>	
<i>Rewards</i>	<p>I have to choose between convenience and eco-friendly behavior.</p> <p>It feels good not having to think about pollution and environmental problems.</p> <p>Travelling by car is a much more convenient way of travelling than other modes of transport.</p>	
<i>Coping appraisal</i>		
<i>Self-efficacy</i>	<p>I know how to take precautions against environmental pollution in everyday life.*</p> <p>I am able to find ways to deal with air pollution in everyday life.*</p> <p>I know how to deal with new types of environmental pollution.*</p> <p>I believe I can even manage unexpected environmental problems.*</p>	
<i>Response efficacy</i>	<p>I am sure that our environmentally friendly behaviors can have a positive effect on the environment.*</p> <p>I am confident that together we can save the natural resources.*</p> <p>We can do nothing to help control pollution of the environment.*</p>	
<i>Costs</i>	<p>Behaving in an environmental friendly way puts an extra burden on my life.</p> <p>It is a hassle to recycle garbage.</p> <p>I would have to make large sacrifices if I wanted to live a more sustainable lifestyle.</p>	

<i>Dependent variable</i>		
<i>Behavioral Intention</i>	<p>It is important to me that the products I use do not harm the environment.**</p> <p>I consider the potential environmental impact of my actions when making many of my decisions.**</p> <p>My purchase habits are affected by my concern for the environment.**</p> <p>I am concerned about wasting the resources of our planet.**</p> <p>I would describe myself as environmentally responsible.**</p> <p>I am willing to be inconvenienced in order to take actions that are more environmentally friendly.**</p> <p>When choosing a cruise, its environmental impact is important to me.</p> <p>I refuse to travel on cruise ships which pollute the environment more than necessary.</p>	

\* Scale items adopted from Zhao et al. 2016

\*\* Scale items adopted from Haws et al. 2014

**Table 2. Conjoint analysis attributes and attribute levels**

Attribute	Description	Attribute levels	Description
<b>Price</b>	Total price per person for a 7-day cruise including taxes and meals. Excluding drinks, tips and land excursions.	\$1,500	-
		\$3,000	-
		\$4,500	-
<b>Service level</b>	Range of facilities, personalization of services, design quality and attention to detail	Luxury	Comparable to five-star hotel Formal atmosphere Formal dress code
		Premium	Comparable to four-star hotel Relaxed atmosphere Casual dress code
<b>Destination type</b>	Type of destinations the cruise ship calls at during the cruise	Remote natural area	E.g., Arctic or Alaska

		Major cities	E.g., European capitals
<b>FoE Environmental Impact Grade</b>	Score of the cruise ship's environmental Impact based on sewage treatment, air pollution and water quality compliance	A - very good	Very good - low negative impact on the environment
		C - medium	Medium - some negative impact on the environment
		F - very poor	Very poor - high negative impact on the environment

**Figure 1. Examples of conjoint cards**

<p><b>Price:</b> \$3,000</p> <p><b>Service level:</b> Luxury</p> <p><b>Destination type:</b> Remote natural area</p> <p><b>FoE Environmental Grade:</b> A – very good</p>
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<p><b>Price:</b> \$1,500</p> <p><b>Service level:</b> Premium</p> <p><b>Destination type:</b> Major cities</p> <p><b>FoE Environmental Grade:</b> F – very poor</p>
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**Table 3. Determinants of the Cruise Ship Environmental Impact Grade**

<b>Sewage Treatment</b>	Has the cruise line installed on its ships the most advanced sewage and wastewater treatment systems available instead of dumping minimally treated sewage directly into the water? In determining a cruise line's Sewage Treatment grade, we compared the number of cruise ships in the cruise line that have installed advanced sewage treatment systems against the total number of ships in the cruise line.
<b>Air Pollution Reduction</b>	Has the cruise line installed scrubbers or were capable of plugging into shoreside power. Cruise ships that installed both technologies and docked in ports with shore power received an A, while ships that only installed scrubbers or only installed shore power capability but did not dock at ports

	with shoreside power were given a C. In addition, ships were given credit if they only utilize low sulfur fuels continuously at levels lower than required by international and U.S. law.
<b>Water Quality Compliance</b>	To what degree cruise ships violated water pollution standards designed to better protect the Alaskan coast. In determining the Water Quality Compliance grade for cruise ships operating in Alaska, we used the notices of violation issued to each cruise line by the Alaska Department of Environmental Conservation from 2010 to 2014 for individual cruise ships.

Source: <http://www.foe.org/cruise-report-card>

**Figure 2. Gantt chart with project progress**

