

Purdue University

Purdue e-Pubs

ITSA 2022 Gran Canaria - 9th Biennial Conference: Corporate Entrepreneurship and Global Tourism Strategies After Covid 19

Measuring the Emotional Impact of Climate Change Images on Tourists: a Neuromarketing Study.

Carmen Kraaijkamp

Maastricht University, c.kraaijkamp@student.maastrichtuniversity.nl

Patricia Picazo Peral

Universidad Las Palmas de Gran Canaria, patricia.picazo@ulpgc.es

Sergio Moreno Gil

Universidad Las Palmas de Gran Canaria, sergio.moreno@ulpgc.es

Follow this and additional works at: <https://docs.lib.purdue.edu/itsa>



Part of the [Neuroscience and Neurobiology Commons](#), and the [Social and Behavioral Sciences Commons](#)

Kraaijkamp, Carmen; Picazo Peral, Patricia; and Moreno Gil, Sergio, "Measuring the Emotional Impact of Climate Change Images on Tourists: a Neuromarketing Study." (2023). *ITSA 2022 Gran Canaria - 9th Biennial Conference: Corporate Entrepreneurship and Global Tourism Strategies After Covid 19*. 58. <https://docs.lib.purdue.edu/itsa/ITSA2022/ITSA2022/58>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Measuring the Emotional Impact of Climate Change Images on Tourists: a Neuromarketing Study.

Abstract

Nowadays there is a lack of marketing regarding climate change and the impact of the tourist sector. This research dives into what type of images and factors create a higher emotional response to improve tourist behaviour. Neuromarketing tools like facial emotional recognition and eye tracking were used to determine the reaction of 60 participants in the lab and 30 online to 20 carefully selected images. A correlation was found between the location the stimuli presents and the subject. Moreover, independent variables were evaluated, resulting in a clear difference between females and males, and under 25 years and above 25 years old. Furthermore, the testing location of the person clearly influences the rate of reaction. Being at home allows the person to freely express the emotion felt compared to the artificial setting at the lab. This research tried to use neuromarketing to effectively spread awareness and therefore avoid risk normalization.

Keywords: *Climate Change, tourism, emotions, neuromarketing, facial expressions, eye tracking and risk normalization*

INTRODUCTION

There has been a demand in the last decades to target behaviour towards climate change and its general recognition. Specially in the area of tourism an improvement and awareness is needed. To achieve total awareness in tourists, global and clear communication techniques need to be employed. Hereby, marketing is one of the areas that can influence the most as it tackles a big number of receptors simultaneously (Oliveira et al., 2017). In the field of marketing, we can find a research area named neuro-marketing, also called consumer neuroscience. Primitive thoughts, decision making and the working of the brain are utilized to improve the effectiveness of the marketing advertisements (Oliveira et al., 2017).

Therefore, the main Research Question is, "How can we create the highest emotional response in tourists with the use of neuro-marketing surrounding the theme of climate change?" Followed with several hypotheses determined with the help of the literature research. First of all, the text attracts most attention. Moreover, faces and animals attract high levels of attention and cause a rise in emotional intensity. Hence, negative images having a more intense emotional impact than positive images. Furthermore, several aims were developed to find the perfect climate change advertisement. Find out which factors create a higher emotional response, if text influences emotion and to see what type of images are best to avoid risk normalization.

LITERATURE REVIEW

An in-depth literature research was performed with the aim of finding gaps in the subject of neuro-marketing and climate change. This was done by reading through databases such as Google scholar, Elsevier, PubMed and Libsearch. Initially, topics such as climate change, sustainability and tourism were evaluated. Followed by research of neuromarketing, what it is, how it works and how to apply on tourists. Followed by an in depth research of emotions, micro expressions, micro saccades and other physiological data. Finally, several webinars were followed which discussed topics such as how to measure emotions and the use of Tobii Pro Lab.

Ever since the mid-20th century, one subject has constantly been prevalent and in the background within society and daily life. The threatening closeness of climate change consequences is a constant reminder that changes need to be implemented to avoid the already happening natural disasters all over the globe. Clear signs are the global temperature rise, warming oceans, melting ice sheets and extreme natural disasters (NASA, 2020). Climate change is defined as statistical changes in certain variables such as the water cycle, atmosphere and ice concentration (Nunez, 2021). Scientists have determined that the global average temperature is rising faster and without any future break since the industrial revolution (Lindsey, 2020). The main cause of this temperature rise is the Greenhouse effect. Simply, this

Greenhouse effect leads to the warming of the earth's surface and troposphere by blocking the reflection of infrared radiation back into space by greenhouse gases (GHG), (Baum et al., 2011, p. 394). The increase of GHG can be clearly attributed to an anthropogenic cause, as only 25% of the 20th century temperature increase can be linked to natural causes (Crowley, 2000, p. 274), (Pang et al., 2013, p. 5).

The presence of the threatening consequences of climate change leads to a prolonged risk awareness. This transforms in most cases into risk normalization, which is defined as the denial and ignorance of the subject due to constant presence and lurking in the future. It is a natural reaction to avoid feelings like fear, guilt and helplessness (Luís et al., 2018, p. 76). When the risks have less clear and tangible consequences it is defined as risk perception normalization (Luís et al., 2018, p. 76). It causes a higher rate of ignorance, without future changes or a decrease of GHG. Therefore, it is important to avoid risk normalization through communication and spread awareness about the consequences of being a tourist in a foreign country.

METHODS

An experiment was performed with the use of FaceReader 8.1, FaceReader online, Observer XT 15 and Tobii Pro Lab Eye tracker as one co-working system. In addition, the experiment was divided into 2 main sections, the online experiment and physical section of the experiment. In which 30 and 60 subjects participated respectively. Furthermore, 20 images were selected. Firstly, a search for images was done all over google images, personal maps and other photography websites to find positive and negative valence images about climate change which could create a high emotional response in the participant. Finally, it was decided to divide the images in two main groups, one in which the tourist action could actively change the situation (e.g. picking up trash) and one that represented future consequences if no change is implemented (e.g. flooding and extreme weather conditions). The first group contains mostly images presenting trash contamination and wildfires. The second group of images focused on future and current catastrophes caused by climate change. Many images were located on the Canary Island as it is the location of the experiment or other popular tourist destinations. In addition, several images were edited to contain texts. These texts included informative and imperative sentences and were in the Spanish or English language. Other images did not have any text at all. Each one of them shown for 7 seconds except for 1 image which was shown 9 seconds. Between each image, there was a blank screen with a cross in the middle for 1 second, to refocus the attention of the subject back to the centre of the screen. The total duration of the images is 2 minutes and 42 seconds. In addition, a questionnaire was set up in Qualtrics. These data were analysed with the FaceReader built in analysis tool and visualized in Excel.

FINDINGS

The highest fixation rates were around the text, no matter the language. In other words, the first reaction when seeing an image was to focus attention on the text. In addition, bigger text or bold text attracted most attention when longer sentences. When the text presented shocking information, the emotional response was stronger than when imperative texts were used. Hereby, short texts are necessary to give context and sense to the image. Moreover, regarding the images itself, a negative overall valence of the image had a higher chance of sticking and avoiding risk normalization compared to a positive overall valence. Hence, negative emotional images create a higher response and are therefore more effective than positive inciting images. Therefore, a higher arousal is equal to higher efficiency. Finally, one of the most surprising results was the correlation between the presented location and the subject. Specifically, when recognizing the location, the emotional reaction was clearly higher, this is probably due to an empathic reaction.

IMPLICATIONS

This research could have a great impact scientifically and practically. In the scientific world, this research is new and untouched. There has been a lot of research in the area of neuromarketing and image presentation; however, specifically regarding climate change and tourism, there is still much to research. Therefore, this research is an important step to create awareness among tourists and in general, consumers. Moreover, this research can be used to facilitate the selection of climate change advertisements and determine the most effective images to use. The final goal of course is to spread

awareness and improve decision making surrounding climate change, to all work towards a cleaner and better planet.

CONCLUSIONS

In summary, the most surprising finding was the correlation between the experimental subject and the location/content of the image. Moreover, the differences between males and females in emotional expression were presented again. In addition to a difference between older and younger participants. Furthermore, the content of the image does not only need to feel close and relatable to the tourist, the image needs to be direct and leave no margins to wrong interpretations. The performed research was effective and sets the stage for further attention in science. Higher effectivity is expected in future climate change marketing.

References

1. Baum, S. D., Haqq-Misra, J. D., & Karmosky, C. (2011). Climate Change: Evidence of Human Causes and Arguments for Emissions Reduction. *Science and Engineering Ethics*, 18(2), 393–410. <https://doi.org/10.1007/s11948-011-9270-6>
2. BBC News. (2020, 18 november). What is climate change? A really simple guide. <https://www.bbc.com/news/science-environment-24021772> (BBC News, 2020)
3. Britannica, T. Editors of Encyclopaedia (2020, May 27). Greenhouse effect. Encyclopedia Britannica. <https://www.britannica.com/science/greenhouse-effect>
4. Climate Change. (2020, 21 december). United Nations. <https://www.un.org/en/sections/issues-depth/climate-change/>
5. Crowley, T. J. (2000). Causes of Climate Change Over the Past 1000 Years. *Science*, 289(5477), 270–277. <https://doi.org/10.1126/science.289.5477.270>
6. Ekman, P. (1992). Are there basic emotions? *Psychological Review*, 99(3), 550–553. <https://doi.org/10.1037/0033-295x.99.3.550>
7. Ekman, P., Levenson, R., & Friesen, W. (1983). Autonomic nervous system activity distinguishes among emotions. *Science*, 221(4616), 1208–1210. <https://doi.org/10.1126/science.6612338>
8. Greenhouse Gases. (2020, 19 maart). US EPA. <https://www.epa.gov/reportenvironment/greenhouse-gases>
9. Gudi, A., & Ivan, P., (2018). Validation Action Unit Module of Face Reader. White paper from Noldus IT.
10. Harrison, T. (2020, 27 augustus). Tourism responsible for 8% of global greenhouse gas emissions, study finds. Carbon Brief. <https://www.carbonbrief.org/tourism-responsible-for-8-of-global-greenhouse-gas-emissions-study-finds>
11. He, S. I. V. (2020, 13 februari). On Climate Crisis: Are We Doing Too Little, Too Late? | Boston Hospitality Review. © 2021 Boston University. <https://www.bu.edu/bhr/2020/02/13/onclimate-crisis-are-we-doing-too-little-too-late/>
12. Lewinski, P., Fransen, M. L., & Tan, E. S. H. (2014). Predicting advertising effectiveness by facial expressions in response to amusing persuasive stimuli. *Journal of Neuroscience, Psychology, and Economics*, 7(1), 1–14. <https://doi.org/10.1037/npe0000012>
13. Li, S., Scott, N., & Walters, G. (2014). Current and potential methods for measuring emotion in tourism experiences: a review. *Current Issues in Tourism*, 18(9), 805–827. <https://doi.org/10.1080/13683500.2014.975679>
14. Lindsey, R. L. (2020, 14 augustus). Climate Change: Global Temperature | NOAA Climate.gov. <https://www.climate.gov/news-features/understandingclimate/climate-change-global-temperature>
15. Luís, S., Vauclair, C.-M., & Lima, M. L. (2018). Raising awareness of climate change causes? Cross-national evidence for the normalization of societal risk perception of climate change. *Environmental Science & Policy*, 80, 74–81. <https://doi.org/10.1016/j.envsci.2017.11.015>
16. Nunez, C. (2021, 10 februari). What Is Global Warming? Environment. <https://www.nationalgeographic.com/environment/article/global-warming-overview>

17. Pang, S. F. H., McKercher, B., & Prideaux, B. (2013). Climate Change and Tourism: An Overview. *Asia Pacific Journal of Tourism Research*, 18(1–2), 4–20. <https://doi.org/10.1080/10941665.2012.688509>
18. Peeters, P. (2007, januari). The impact of tourism on climate change. ResearchGate. https://www.researchgate.net/publication/228423777_The_Impact_of_Tourism_on_Climate_Change
19. Oliveira, J. H. C., & Giraldi, J. D. M. E. (2017). What is Neuromarketing? A Proposal for a Broader and more Accurate Definition. *Global Business and Management Research: An International Journal*, 9(2), 19-29.
20. The Causes of Climate Change. (2020). Climate Change: Vital Signs of the Planet. <https://climate.nasa.gov/causes/>
21. Universal Emotions | What are Emotions? (2021, 16 februari). Paul Ekman Group. <https://www.paulekman.com/universal-emotions/>