**Universität Mannheim**

HWS 2019/2020

M.A. Sociology

**Seminar “Online Experiments“**

**Ph.D. Stefano Balietti**

**The-Elusive-Green-Experiment**

By

Anastaiia Kurdydyk (1607009),

Anina Jauris (1688322) and

Meike Selbach (1455454)

10. January 2020

Content

[Summary - 3 -](#_Toc28073754)

[Description of your problem that you are investigating. - 3 -](#_Toc28073755)

[Why is it important? - 3 -](#_Toc28073756)

[What is the state-of-the-art in academic research for your problem? - 3 -](#_Toc28073757)

[Description of your proposed investigation. How does it improve the state-of-the-art? - 3 -](#_Toc28073758)

[High-level description of your software implementation. - 3 -](#_Toc28073759)

[What problems did you encounter and how did you solve them? - 3 -](#_Toc28073760)

[Are there some open problems in your implementation that you were not able to code? Say what and why you could not code them. - 3 -](#_Toc28073761)

[Conclusions - 3 -](#_Toc28073762)

[How can your implementation be extended to test future/related problems. - 3 -](#_Toc28073763)

[Honestly assess the reliability, robustness, and validity of your implementation - 3 -](#_Toc28073764)

[Lessons Learnt - 4 -](#_Toc28073765)

[References - 4 -](#_Toc28073766)

[Statutory Declaration - 5 -](#_Toc28073767)

# Summary

In the last months together with social movements like “Fridays for future” and political debates about the future of our environment, environmentally friendly behaviours became a hot topic. However not everyone who says that he/she behaves environmentally friendly actually does that. Often, people use a small thing as excuse for other non-environmentally friendly behaviour. Our experiment aims to find a way on how to reduce such an attitude-behaviour gap.

To do that, we created an online experiment of a fictitious online purchase scenario. Our outcome is the choice of a fast one day delivery or a more environmentally friendly and longer delivery time of 5-7 days. The participants in two treatment groups are additionally confronted with one stimulus that is expected to evoke thoughts or feelings that lead to a more environmentally friendly behaviour. The stimulus is either a social influence saying that “…” or an informational influence including a graph on how much CO2 can be saved by a 7-day delivery option.

# Description of your problem that you are investigating.

In recent years the rise of social movements and political parties, concerned with climate protection, indicate a change in the awareness of environmental issues. This greater awareness is reflected in an increase in environmentally friendly behaviour. People start caring more often about waste recycling or using environmentally-friendly mobility.

However, not everyone is indeed doing that. There is a notable gap between people saying that they want to act sustainable and how they truly behave as a consumer (REFERENCE consumer attitude-behaviour gap). Customers performing in an environmentally friendly way may use previous environmentally-friendly acts as a justification for subsequent unethical decisions (Mazar & Zhong, 2010).

One example is the purchase of eco-friendly products like recycled clothes in an online store instead of buying it in a local store. Especially in the context of online purchase, a non-environmental friendly behaviour of people who might be environmentally conscious becomes visible.

Thus, the current environmental trend does not only affect customers but also suppliers of services and goods. The present online experiment should, therefore, uncover whether specific stimuli can convince a customer to use a more eco-friendly delivery choice. In order to test whether social influences or informational influences are more effective in increasing environmental friendly behaviour, we conducted an experiment about online purchase decisions. The experiment contains two treatments and one control group.

**Research question:** Is there a preference-action gap in green consumption and if so, can this gap be reduced by specific stimuli?

Table 1. An overview of hypotheses, related theoretical constructs, and subsequent treatments

| **HYPOTHESES** | **UNDERLYING THEORY** | **TREATMENT** |
| --- | --- | --- |
| H1. External influences have an effect on the delivery decision. Without external influences participants are more likely to choose a 1-day delivery. |  |  |
| H1a. The probability of choosing a 7-day delivery increases when individuals are facing social influences. | Herd behaviour (White et al. (2019); Chen (2008); Salazar et al. (2013); Tsarenko et al. (2013) | A chart indicating that most of their peers choose an eco-friendly delivery. |
| H1b. The probability of choosing a 7-day delivery increases when individuals are facing informational influences. |  | A chart indicating of how much CO2 could be saved. |
| H2. Informational influences are reducing the preference-action gap to a greater extent than social influences. | Chen (2008) |  |

## EXPERIMENTAL DESIGN:

The abovementioned hypotheses are tested using experimental methodology (see Table 1). The respondents are presented with a situation when they are to become a customers of an online shop. At first, they are asked to complete a short survey about their preferences to use environmentally friendly products. Afterwards they chose a product category that they are most interested in. This choice is included because we expect that the whole experiment gets more realistic when having a scenario that could actually happen. A participant chooses one out of four product categories that he/she is most interested in. They have the chance to choose between "Clothing", "Electronics", "Home and Kitchen" or "Health and Beauty". Independent of their product category choice, they will move to the next stage of the experiment. Here, everyone will get to see 6 products. Three products are exactly the same, they have the same price and the same appearance. They only differ slightly in two things. The description indicates that one is environmentally friendly and the other is not and the photo of the product contains a leaf which is the sign for being eco-friendly. For instance, a person who chooses the "Clothing" category sees two sweaters, two sunglasses and two T-shirts with the same picture and price. One of each is more environmentally friendly than the other. Especially in the clothing category, we took care that the products are unisex products which are relevant for all sexes.

On the next page each participant is randomly assigned to the control or experimental group. In total, there are two experimental groups and one control group. While the controlgroup merely decides for a usual delivery or a fast delivery, the two experimental groups also face a stimuli to influence their decision. The first experimental group will be confronted with a social-influence stimuli. Here, fictions customer comments are displayed that show the feedback about customers who are happy with the product and the environmentally friendly delivery choice. The second experimental group will instead be confronted with an informational-influence stimuli. We came up with facts about the saved amount of CO2 and other negative effects on the environment. For the present purpose, both experimental stimuli are faked information. After seeing the stimuli, the experimental groups have the same chance as the control group to decide for an environmentally friendly (7 day delivery) or a fast delivery. At last, finishes the experiment with a thank you page and has the chance to share feedback about the experiment.

Experimental stages:

For our experiment we included six stages. Each stage contains of at least one webpage.

At first, participants read a short introduction about the experiment and the subsequent tasks. Next, they are asked to complete a survey regarding their environmental preferences. This survey consists of a 15 questions in total and is a commonly used and tested scale (REFERENCE - ANINA).

Afterwards, the participants are taking their product choices. Even though they are informed that they are not actually buying something, we asked them to choose a product that they would also buy in real life. They have a chance to decide for one out of four product categories and choose one product of this category on the next stage. The four product categories are clothing, electronics, home supplies, and cosmetics. Here, they face six products in total, however, the price and the picture of two products is always the same. The picture only includes a leaf, as a commonly known label for being organic, vegan or simply more environmentally friendly. Besides that, the product name changes slightly (e.g. “Hoodie ‘Kate’” versus “Hoodie ‘Kelly”) and the company name of the product differs (e.g. “Clothing Prod. Inc.” versus “Green Planet Prod. Inc.”) as well. When deciding for a product name, we made sure that the names do not indicate any superiority or inferiority like having a higher number for the laptop name.

Based on the survey answer and their decision for the eco-labelled or non-eco labelled product, we calculate a preference-action gab. The outcome variable is the decision of the next stage. Here, participants decide for a delivery option which is either very fast or more eco-friendly and longer. Before moving to this page all participants are randomly distributed to the control group or an experimental group.

Finally, in a last step we are asking for a few more information such as gender, year of birth or country of residence of the participant. At last they can indicate their contact details to participate in the lottery and they further have a chance to share any feedback about the survey.

The participants of the study will be rewarded for their efforts with a lottery participation. We also thought about asking for environmental preferences after the measurement of the outcome (delivery choice). We decided to risk a possible priming effect of the dependent variable instead of having a possible effect of the treatment on the main dependent variable. Furthermore, we prefer measuring the independent variable (environmental preferences) first, before measuring the outcome (environmental action – delivery choice).

## Why is it important?

Our research is a great contribution to a modern and highly relevant research area. Previous research in this area is found to be extremely young and published in recent years. As we said, not only science and research focus on that topic but also in everyday life, pro-environmental behavior is a hot topic.

However, even though most people state to care about the environment (REFERENCE), there are people who state being environmentally friendly but are self-contradictory in their statements and behavior. In some areas, such as online shopping, self-contradictory action and behavior differences can become visible. Even though online-shopping with long delivery routes, is less environmentally friendly than a delivery of multiple products to one store in the town or city, it will still be done in the future.

By means of our research we find out a technique that will save money for the supplier who does not have to send each package separately and further reduce the carbon-dioxide emissions.

## What is the state-of-the-art in academic research for your problem?

# Description of your proposed investigation. How does it improve the state-of-the-art?

# High-level description of your software implementation.

The implementation of our experiment was done using Node.Js. It is an open source, a JavaScript runtime built on Chrome's V8 JavaScript engine [(*Nodejs/node*, 2014/2019)](https://www.zotero.org/google-docs/?w67jN9).

* Using Nodejs
* Express app
* Created multiple pages of the experiment, including filters (depending on the product category) and randomization of the treatment
* Before and afterward the main part of the experiment, we included questions to get more information about the persons characteristics and environmental preferences

## What problems did you encounter and how did you solve them?

Adding information on the slide via HTML was not that difficult after our seminar. However, we encountered tree other issues that took quite some time. At first, since we included leaf-stickers on the product images we could not easily use the URL link for all images. Therefore, we stored all pictures locally within the folder and needed to include a link for the respective path. Due to different sizes of the pictures we also had to adjust the size of the containers.

Second, we needed a randomization method in order to randomize all participants into control or treatment groups of equal size (????). Once each person had the ID, the imbedding of the treatment specific content should be dependent on the randomized ID-number.

For the randomization of the control and experimental group …

* Including images from a folder instead of a website
  + Creation of cards and containers and find out a way to include the folder path into the HTML code
* Saving data of the survey

## Are there some open problems in your implementation that you were not able to code? Say what and why you could not code them.

* Meike: I think we have to write that part at the end. I hope that we will still fix some of the small things that are still problematic

# Conclusions

Before starting with the conclusion, we would like to highlight again that our study only focusses on a very specific group of people who have a preference-action gab in environmental matters. Hence we are only focusing on the group of people who state being environmentally friendly but then decide for a non-environmentally product. We are not interested in using information of those who buy an environmentally friendly product and also not interested in those who state being non-environmentally friendly and also behave accordingly.

For that group, we assume that even without the survey about the environmental awareness, customers who see a social or informational influence are more willing to choose a longer and therefore more eco-friendly delivery time.

After running our experiment, we are planning to test our hypotheses by means of the following analysis.

* Our plan for the data analysis (preference-action gab)

# How can your implementation be extended to test future/related problems.

Our experiment could also be implemented on a real product platform to be sure that our environmental questionnaire did not have a priming effect on the results. However, usually online stores do not have environmentally friendly and non-environmentally friendly products that are equal besides that. Therefore, our research is a great starting point before validating the results in a real scenario.

# Honestly assess the reliability, robustness, and validity of your implementation

Considering the internal validity, special attention had to be put on the measurement of environmental orientation and the product choice.

For the measure of environmental orientation, we use the Revised New Environmental Paradigm Scale. This scale has been frequently used over the last decades and proved to have high internal consistency and great predictive power. (p. 427  / p.434 Quelle in Zotero) Based on this prior research the internal validity and reliability of the measurement can be presupposed.

For the product choice we wanted to make sure, that the product decision is not influenced by external stimuli. In order to achieve that we used the same picture and the same prize for every pair of products. This way the product choice isn’t biased by design or monetary preferences. The selection was meant to only be based on the intended stimuli (green leaf and different description) pointing to the fact that one product is more eco-friendly than the other.

A crucial aspect that has to be mentioned is that a person’s real or reported product and delivery decision may be biased due to priming, caused by the environmental questionnaire. We considered changing the order so that the product choice and delivery will be prior to the environmental questionnaire, but we figured that there would be a priming effect either way. Either on the product and delivery choice (from the questionnaire, what we do have now) or on the questionnaire (induced from the “green” stimuli of the product choice and the treatments). Since the environmental attitude is supposed to be the independent variable, we figured priming would be a greater problem here, causing biased effect sizes. That’s why we decided for the order that we have now. Additionally, since everyone has to answer the same questionnaire and therefore everyone has the same priming, we still expect to see differences between the control and the treatments’ group delivery decision.

Regarding the external validity of our experiment there are some limitations one has to consider. Since our research question is only focusing on people who show an attitude-action gap, our results can only be generalized to this restrictive group. Additionally, the way participants access the experiment is another big factor influencing the external validity. If the experiment is accessible online, everyone with access to the internet is a possible participant. If the experiment is only accessible on a local computer using GitBash, for instance at a computer at the university, the generality of the results would further decrease to that respective group, in this example the group of university students.

# Lessons Learnt

We have not had any prior knowledge in using Java Script, CSS or HTML and only worked with statistical programs such as Stata or R before. Hence, we learned a lot about the functionalities and possibilities of those new languages and how they interact.

For us it was even though it was fun making progress in small steps and see how our project became real, it was challenging to fix some issues that we encounter. The very first challenge was finding out how the Node.Js express server actually works. Afterwards, it was less of a problem filling pages with content and create a kind of experiment flow that redirects from one page to the other. Our biggest challenges were the integration of locally stored pictures within HTML-containers of equal size, the randomization of the participants into three groups with delivery pages and the storing and saving of all the clicks. We’re glad that we could solve (all/most) of those issues and create a code that has all necessary functionalities which were necessary.

Overall, for the whole seminar, we would have wished having more time for the course. Learning and applying everything in one month was tough. Even though Stefano did a great job in teaching, we think it would be beneficial, not having the seminar twice a week and only for one month. There was not much time between the sessions to repeat the content of the previous class. Maybe it would be an option for next time to have one or two weeks between the sessions but having small exercises/homework to practice in between. This would also help us identifying issues and challenges in between to have more questions throughout the class.

Another small thing is the creation of groups. It may have been helpful to ask at the very beginning of the class whether someone has a project idea already. All other students could create groups and then find and develop a project together. By that, everyone can contribute to the development of the group project and the formation of groups takes less time. Besides those small things, we all agreed that the classes and slides were very well prepared. Also the atmosphere in class was nice and Stefano encouraged us to ask questions. In sum, we would recommend this course to everyone interested in creating online experiments. However, some prior knowledge in programing or coding is definitely beneficial.

# References

Yi-Fen Chen, "Herd behavior in purchasing books online", Computers in Human Behavior, Volume 24, Issue 5, 2008

Aaron M. Garvey, Lisa E. Bolton, "Eco-Product Choice Cuts Both Ways: How Pro-Environmental Licensing versus Reinforcement is Contingent upon Environmental Consciousness", Journal of Public Policy & Marketing, Volume 36(2), 2017

Yatish Joshi, Zillur Rahman, "Factors Affecting Green Purchase Behaviour and Future Research Directions", International Strategic Management Review, Volume 3, Issues 1–2, 2015

Helen Arce Salazar, Leon Oerlemans, Saskia van Stroe-Biezen, "Social influence on sustainable consumption: evidence froma behavioural experiment", International Journal of Consumer Studies, Volume 37, Pages 172–180, 2013

Katherine White, David J. Hardisty, Rishad Habib, "The Elusive Green Consumer", Harvard Business Review Home, July-August Issue, 2019

Yelena Tsarenko, Carla Ferraro, Sean Sands, Colin McLeod, "Environmentally conscious consumption: The role of retailers and peers as external influences", Journal of Retailing and Consumer Services, Volume 20, Issue 3, 2013

Michael P. Hall, Neil A. Lewis, Phoebe C. Ellsworth, "Believing in climate change, but not behaving sustainably: Evidence from a one-year longitudinal study", Journal of Environmental Psychology, Volume 56, 2018

Caroline L. Noblet, Shannon K. McCoy, "Does One Good Turn Deserve Another? Evidence of Domain-Specific Licensing in Energy Behavior", Environment and Behavior, Volume 50(8), 2018

Joanna Goplen, "Dedicated vs. Coerced: Internal and External Motivations to Be Proenvironmental", Electronic Theses, Treatises and Dissertations; Florida University, 2014

Nina Mazar & Chen-Bo Zhong, "Do Green Products Make Us Better People?", Psychological Science, Volume 21(4), 2010

# Statutory Declaration

We hereby declare that the paper presented is our own work and that we have not called upon the help of a third party. In addition, we affirm that neither us nor anybody else has submitted this paper or parts of it to obtain credits elsewhere before. We have clearly marked and acknowledged all quotations or references that have been taken from the works of other. All secondary literature and other sources are marked and listed in the bibliography. The same applies to all charts, diagrams and illustrations as well as to all Internet sources. Moreover, we consent to our paper being electronically stored and sent anonymously in order to be checked for plagiarism. We are aware that the paper cannot be evaluated and may be graded “failed” if the declaration is not made.

Mannheim, 10.01.2020