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**Seminar “Online Experiments“**

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**The-Elusive-Green-Experiment**

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# 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 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 (PROVE 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:

* Introduction to the experiment;
* Survey to measure the environmental-behaviour/preferences of a participant;
* Product category choice (-> Clothing, Electronics, Home Supplies, Cosmetics);
* Product choice (3x2 products per category);
* Delivery choice (either 7 or 1 day delivery but two treatment groups get a stimuli);
* Survey to ask for persons characteristics and to ask for feedback.

The participants of the study will be rewarded for their efforts with a lottery participation.

## Why is it important?

* Modern topic (everyone cares about it)
* Even though everyone cares, there are still people who tell being environmentally friendly but they are actually not
* Some things like online shopping will still be done even though people know that they are harmful for the environment
* We find out a technique that will save money for the suppliers and also reduce the carbon-dioxide emissions – at least slightly

## 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 were held using Node.Js – 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?

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

* Our plan for the data analysis (preference-action gab)
* Very selective group that we focus on but this is the problematic group that we are interested in

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

The test could 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.

Nonetheless, we assume that even without the survey about the environmental awareness, customers who see a social or informational influence are more willing to

# 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 treatment group in their 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 nodejs 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.

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# 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.

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