

Master degree course „Innovation Management & Change Management:
Nadine Bischof - Lukas Fröhlich - Denise Kilian - Gianina Kratzat - Astrid Laufkötter - Patrick Pfeiffer - Melina Schmiedt - Silas Zischka

1. Introduction

There is a general problem of research done at the sensory laboratory — a constant problem between internal and external validity. As we have the chance to use the laboratory at our university, we decided to work on this problem. This is where our project partner xymatic GmbH becomes important. The challenge between internal and external validity at the sensory laboratory we have an extremely high internal validity, which means that we are most likely able to control all confounders that might interfere our research procedure and therefore our results. In some cases it might be better to think of a „home-use-test“, instead, where participants consume the product, which is being tested, at home or in a more authentic consuming situation (e.g. in a Café). This helps to increase the external validity, which ensures, that the results are better transferable to the population, because of the results from a more realistic test situation. How to overcome the problem? n times of the digitalization, virtual reality becomes a more and more popular topic as technical solution, not for entertainment business only but many different fields as well. As we were thinking on how to increase our external validity at the laboratory without losing the internal one, we considered virtual reality as a possible solution. To show the potential of this computer based technology, we tried to combine virtual reality glasses with the sensory product research. Luckily enough we were able to win xymatic as a project partner to contribute not only the equipment but also the technical knowledge. We decided to plan a conventional product test at the laboratory, where we can control the situation with all its confounders, but combined with virtual reality glasses. By this the subjects were able to see a computer generated scenario, showing a more authentic situation of the product being tested. Combining the laboratory with virtual reality glasses we expected to increase the external validity without losing the internal one and show the potential of virtual reality for future research.

2. Main Objectives

As we discussed many possible products to tested for our research, it needs some theoretical input to understand the decision taken. As we are talking about virtual reality in product research, there are 3 effects which are possible to occur.

To show these effects we have chosen a beverage product: cooled coffee from Müller. We tested two different types of this coffee brand - Latte Macchiato and Espresso Macchiato - which differ considering the intensity of caffeine and therefore the intensity of strong coffee taste.

But not only the product was important. We had to think of two virtual reality scenarios to create a different consuming experience depending on what was shown. We decided for scenario 1 to be at a typical café, so it would remind the participant of low energy relaxation and free time (hypothesis: fits to Latte Macchiato). Scenario 2 instead was at a library, which conveys a setting of concentration and work (hypothesis: fits to Espresso Macchiato).



Level Effect

The sensory stimulus is rated better if the environment stimulus is fitting to the impulse. Means the stronger coffee should be rated better in a strong, concentrated environment (e.g. Espresso Macchiato should be rated better at the library).

Order Effect

The ranking of sensory rating is depending on the scenario being shown. (e.g. Espresso Macchiato should be rated better than the Latte Macchiato when scenario 2 is shown)

Engagement Effect

Sensory stimuli are rated better if the context of the situation is fitting to the product in a realistic way. (e.g. our coffee products are rated better, if participants are seeing one of the scenarios)

3. Test Design

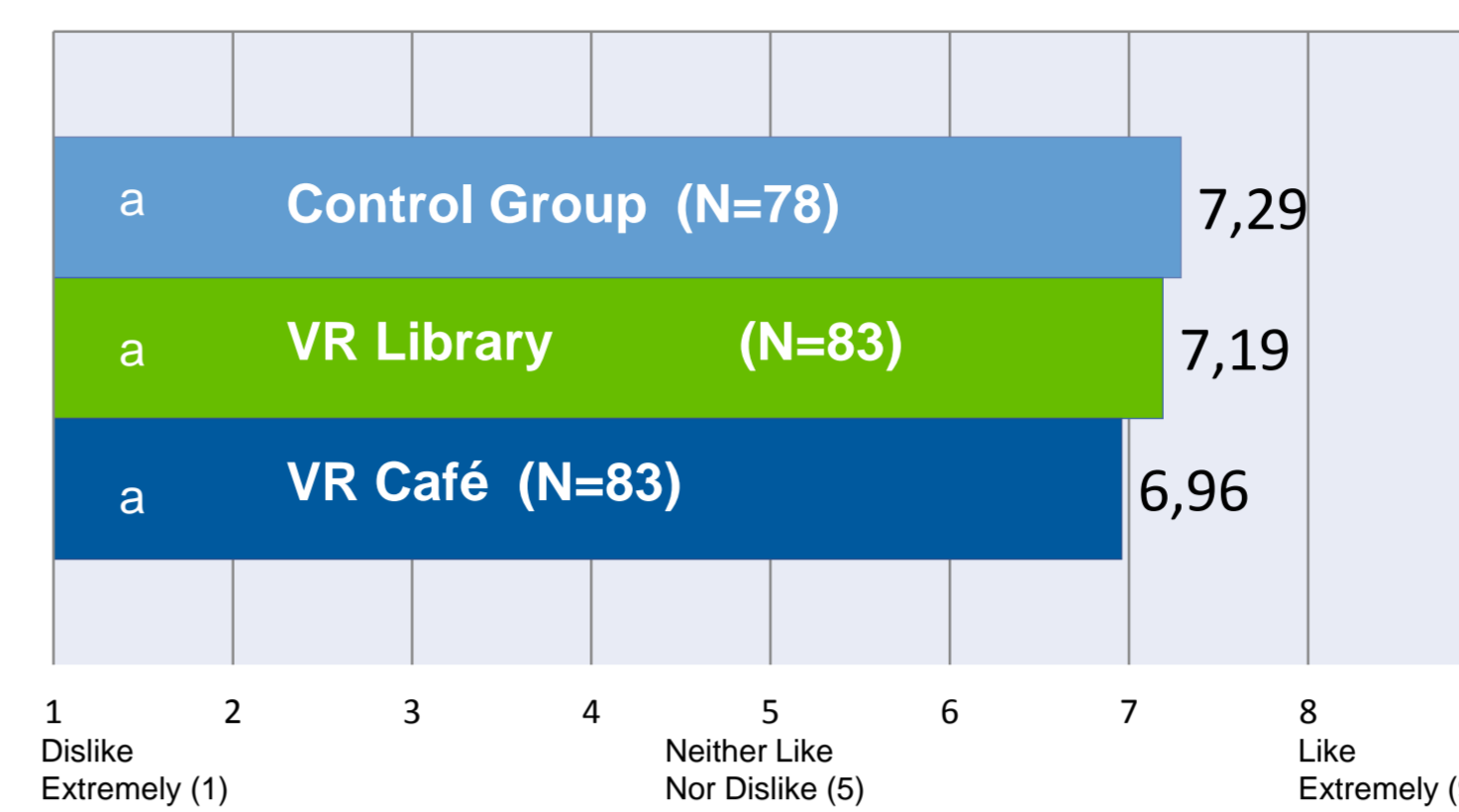


For comparison reasons we allocated our participants into 3 different groups, 80 people each in the age between 18 - 40 years old. The first group acted as our control group, as they had to test the coffee in a standard situation at the sensory laboratory without any virtual reality glasses. This group was acting as base, to find out, if virtual reality is affecting the product rating and how. Members of Group 2 were shown the café scenario. Members of group 3 were watching a library video. The first group had to fill out the survey conventionally on the computer in front of them, while the other participants had to navigate with eye motion control through their survey. They had to answer questions about the taste, the liking of the product, about the test situation and glasses as well as some short demographic questions. The coffee was always served in fully closed cups, so participants were not able to see the brand or to know which sample was given. Furthermore we changed the order of the coffee samples, which the participants had to try, to avoid any bias when interpreting the results.

4. Key findings

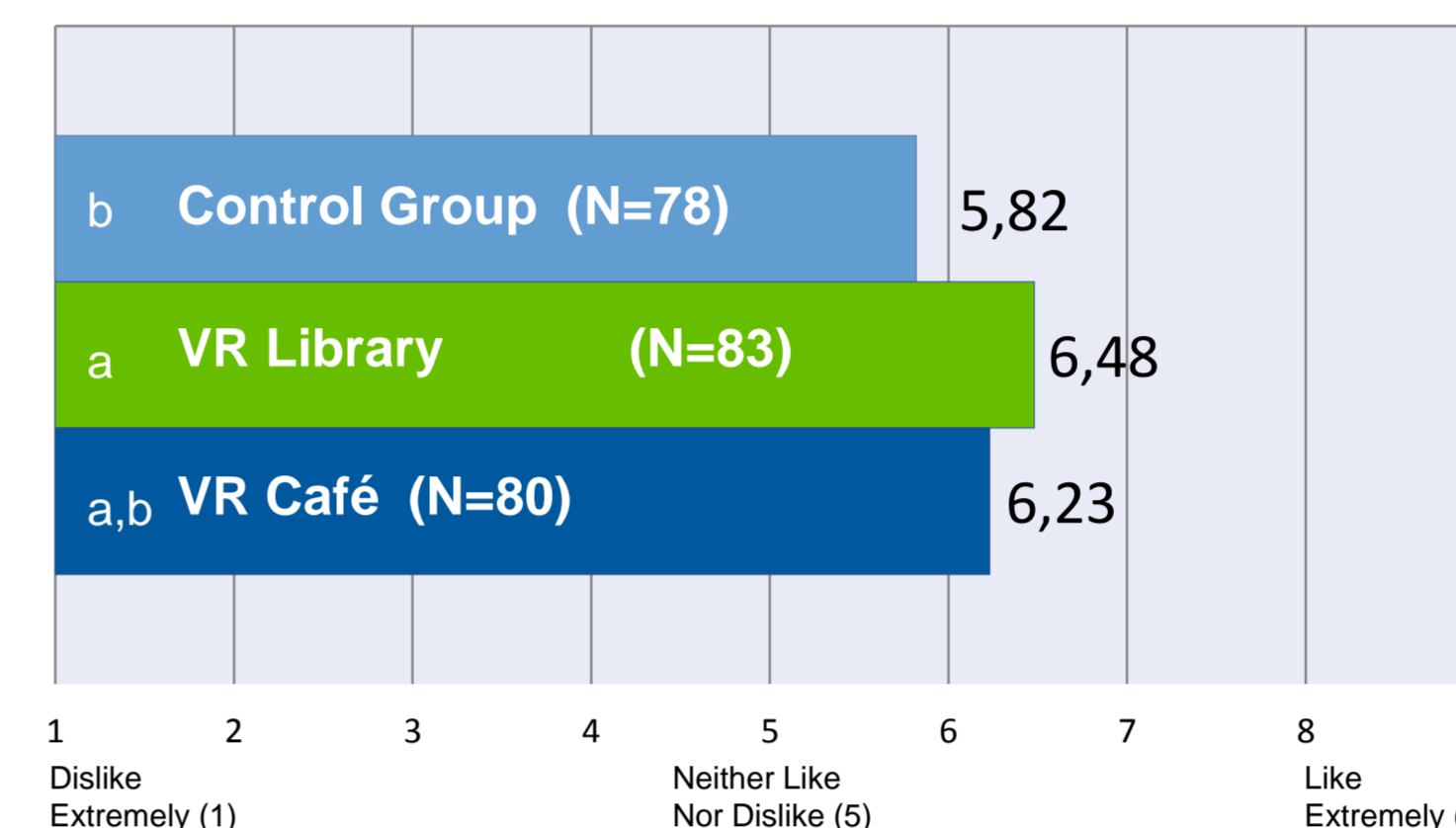
As we look at the statistics from the survey results, we can get back to the 3 effects we want to take a closer look at.

Level Effect



The sample with **Latte Macchiato** was rated in every group almost the same.

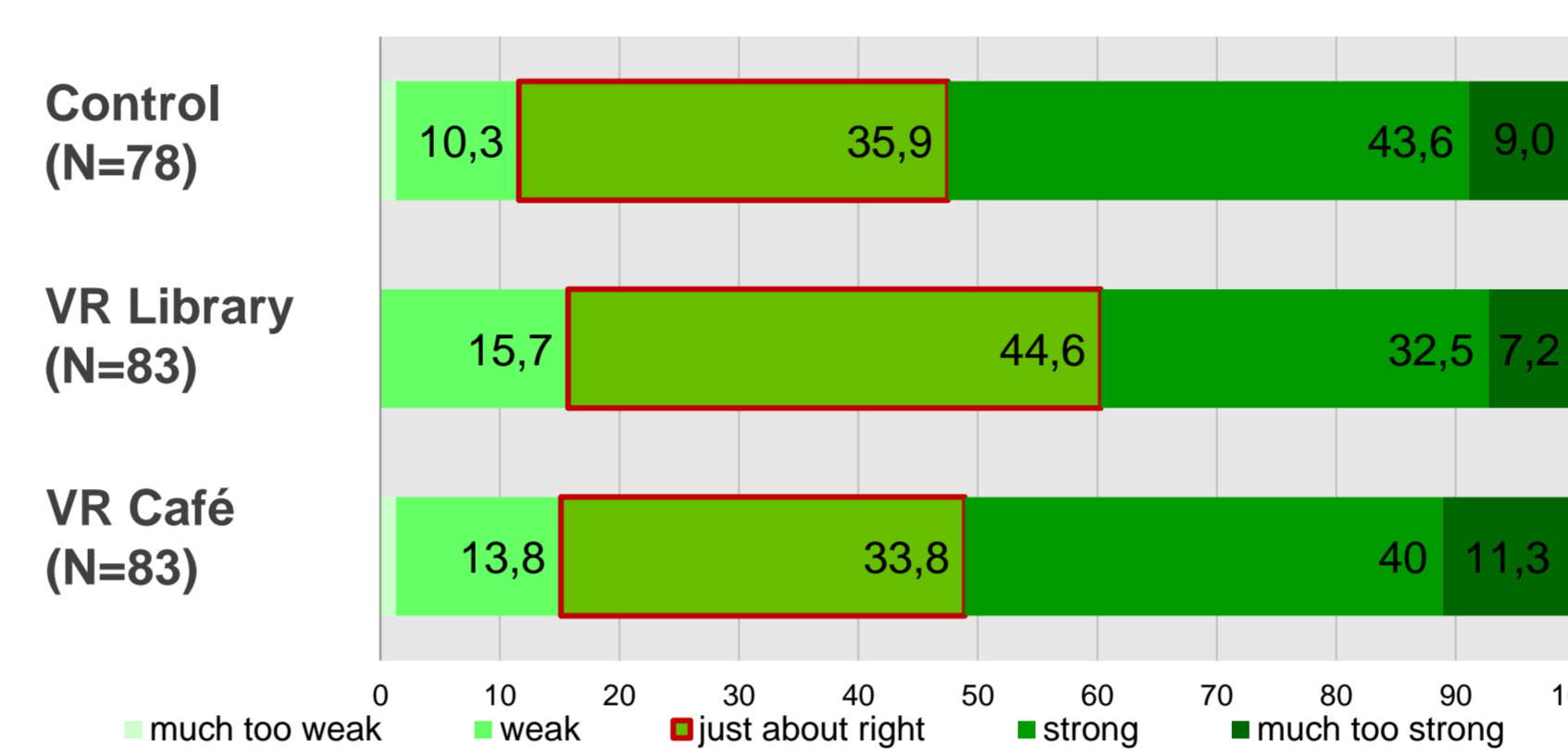
Accordingly there was no level effect for this product verifiable.



Nevertheless the **Espresso Macchiato** was rated differently and, which is exactly what we have been thinking all along: participants who watched the library video scenario liked it best. This tend to be an effect in higher levels of sensory rating in case of matching VR-stimulus.

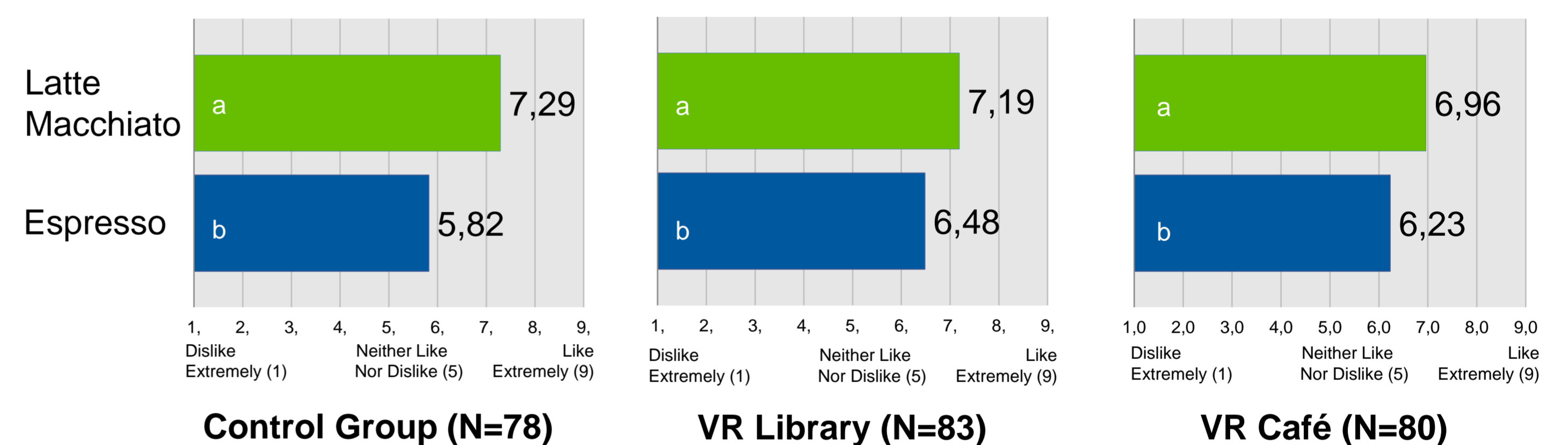
Mostly, the Espresso-sample was perceived as little to strong regarding the intensity of coffee taste.

Except during the library video they tend to rate it as just about right. According to the mentioned motive „discipline“ (awake, performance-based, intently/ concentrated) This can be a possible impact of the level effect.

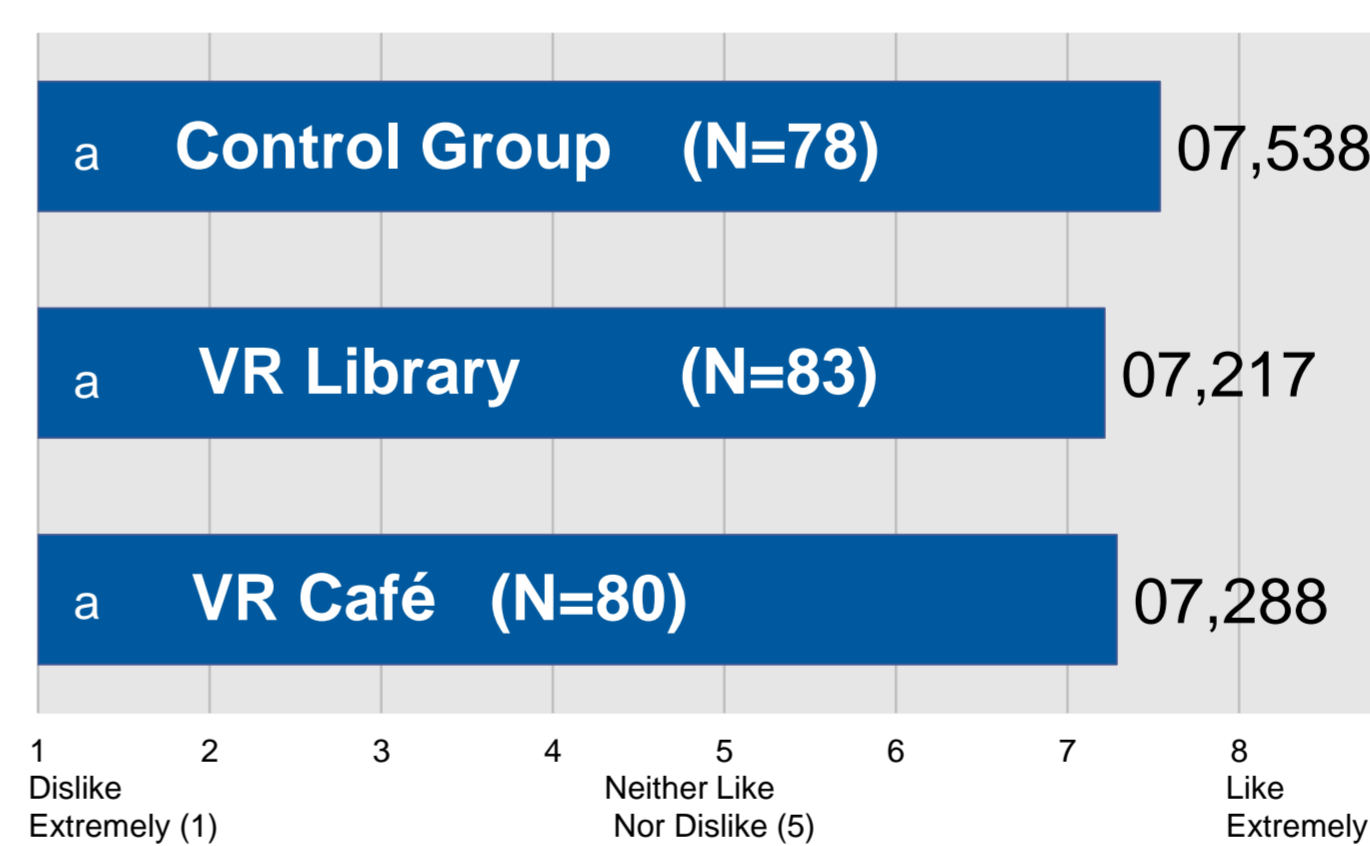


Order Effect

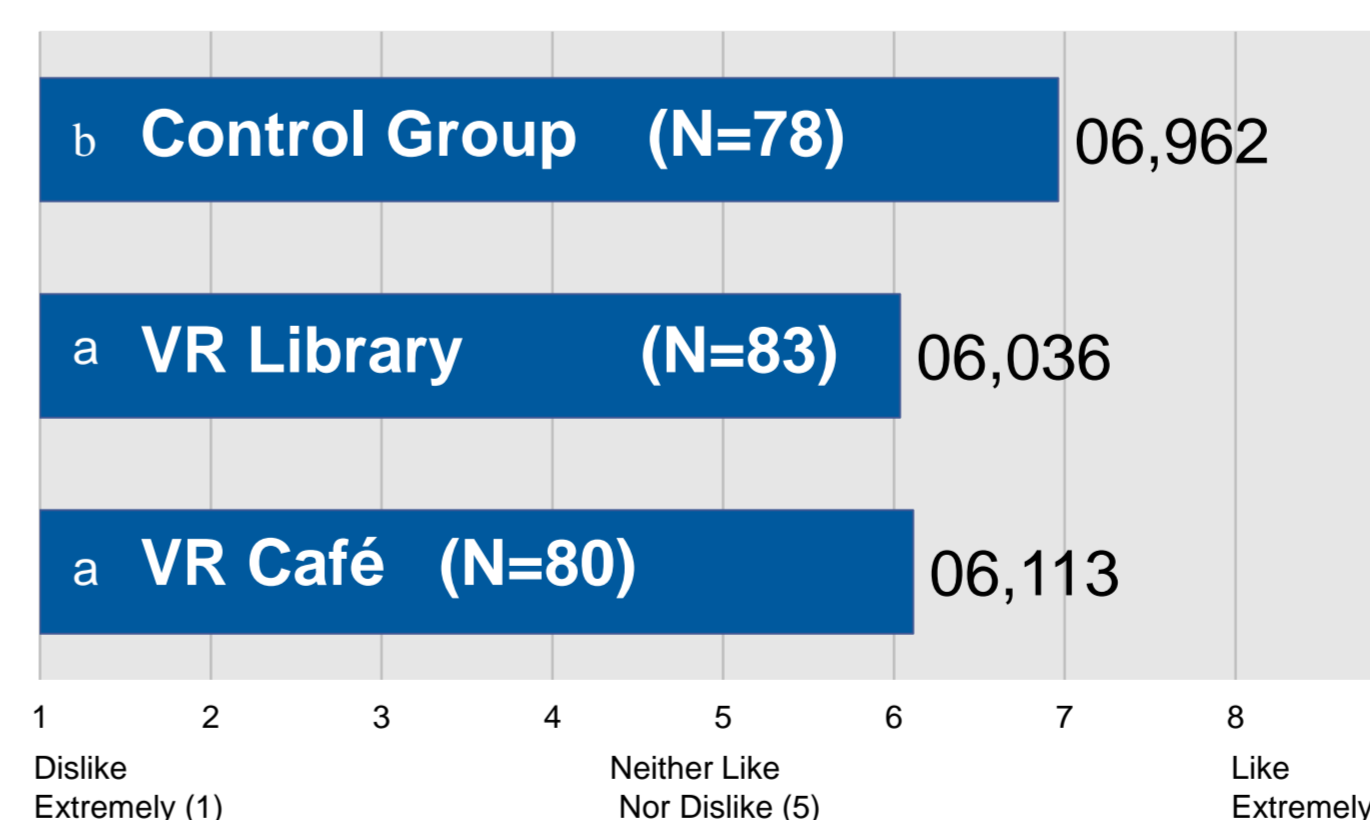
We could not find any indication of an order effect, as the situation has no influence to ranking of the given samples.



Engagement Effect



The overall liking of the situation was not significant varying.



The testing situation without virtual reality glasses was rated more realistic than the others, but the technology affinity of the subjects or the understanding of the question might be two possible reasons for that result.

5. Conclusion/Discussion

Retrospective we might say our project was a first step for upcoming research. The potential of combining new digital possibilities with empirical research is huge. Moreover the acceptance and interest in virtual reality is profound — which seems like a big chance. The feedback, which we got from the participants about the use of virtual reality scenarios, was consistently positive. With our project, we were able to show the structure of how a research at the laboratory combined with new technology might look like. We came across a huge potential but as well there is room for improvement — not only considering some steps of our survey and test situation, but also when it comes to introduce the virtual reality gear to subjects. If all our learnings are realized in an improved research project, there might be a big chance to combine external and internal validity, and, by this, to make research more and more applicable to the world, which it is trying to describe.