

# A serious game for promoting sustainable food choices

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## Abstract

A type of persuasive technology that has gained popularity over the last decade is gamification. We aimed to influence people's sustainable food choices by letting them buy ingredients for a dish in two Virtual Reality supermarkets; a gamified one and a regular one. In the gamified supermarket, a point system was added to all the ingredients that could be bought. Also, we used olfactory feedback to enhance the effect of gamification. Results showed an effect of gamification on people's behavior during the experiment, as well as their self-reported food choices in the week after the experiment. Implications of these findings are discussed in light of how we can persuade people into making healthy and sustainable food choices.

## Keywords

Gamification, Sustainable food choices, Virtual Reality.

## 1. Introduction

The current study was designed with three aims. The first aim was to investigate whether gamification through a point system is effective in influencing people's behavior in terms of food choices in a Virtual Reality supermarket. The second aim was to explore whether the addition of olfactory feedback would enhance the persuasive effect of the gamification element. The third aim was to explore whether the experience of being in a gamified supermarket in which sustainable food choices are promoted also made people make more sustainable food choices in the week after the experiment.

## 2. Method

A total of 16 participants (5 males, 10 females, 1 unknown; age  $M = 21.36$ ,  $SD = 1.60$ , Range = 20 to 25) participated in a lab experiment about people's behavior in a virtual supermarket. The experiment had a 2(Gamification: non-gamified vs gamified) X 2 (Olfaction: no olfactory feedback vs olfactory feedback) mixed design. Gamification was manipulated within-subjects; all participants first experienced the non-gamified condition, followed by the gamified condition. Olfaction was manipulated between-subjects; half of the participants were exposed to olfactory feedback during the second shopping task. This was done by diffusing the smell of melon using

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a blend of sauna extract and hot water in a thermos. In addition, participants were asked to report their eating behavior one week prior to, and week after the experiment.

Our most important measure was participants' behavior inside the virtual supermarkets, more specifically the products they bought. Even though participants only were presented with the points of the products in their last shopping task, we calculated the average number of points for both the shopping tasks in which participants had to buy ingredients for a main dish.

We also asked people to self-report their eating behavior one week prior to, and one week after the experiment. This was done by having people indicate twice a day from which of the presented food groups they had consumed food in their most recent meal. Participants were reminded to complete this short survey at 13:30 and at 20:00. We calculated an average score of points belonging to the food groups that were reported to be eaten by participants for each time they completed the survey.

### 3. Results

The first aim of this study was to investigate whether gamification through a point system would make people make more sustainable food choices in a virtual supermarket. A paired-samples t-test showed that after a participant completed shopping in a gamified supermarket, they had a higher average number of points per product ( $M = 6.95$ ,  $SD = 0.64$ ) than after shopping in a non-gamified supermarket ( $M = 5.98$ ,  $SD = 0.73$ ),  $t(15) = 4.53$ ,  $p < .001$ , Cohen's  $d = 1.13$ .

The second aim was to explore whether olfactory feedback enhanced persuasive effects of gamification. An independent samples t-test showed no significant effect of olfactory feedback on the difference in points obtained between the non-gamified and gamified supermarket,  $t(14) = 0.45$ ,  $p = 0.66$ , even though the difference in points was slightly higher when olfactory feedback was present ( $M = 1.08$ ,  $SD = 1.01$ ) than when it was not ( $M = 0.88$ ,  $SD = 0.74$ ).

The third aim was to explore whether the experience of being in a gamified supermarket in which sustainable food choices are promoted also made people make more sustainable food choices in the week after the experiment. Results showed that participants scored a higher average number of points for the food they consumed in the week after coming to the lab ( $M = 5.76$ ,  $SD = 0.79$ ) compared to the week before coming to the lab ( $M = 5.36$ ,  $SD = 0.68$ ),  $F(1, 214) = 5.02$ ,  $p = 0.026$ . No additional effect of olfaction on the difference in scores before and after the experiment were found,  $F(1, 149) = 2.05$ ,  $p = 0.154$ .

### 4. Discussion

Results showed that gamification did affect people's behavior in the virtual supermarket, while olfactory feedback did not. In addition, a small difference in people's self-reported food choices was found between reports prior to and after participation in the experiment.

Applying gamification in a virtual supermarket seems to be successful in changing people's sustainable food choices, both during and after the experiment. These effects were found while focusing on sustainability scores of all foods, and not only on reducing meat consumption. This means that taking away this focus on meat as being unsustainable, and instead shifting towards promoting food types that are more sustainable than other ones could be more successful in persuading people to change their eating behavior. Insights from this study can be used to inspire both healthy and sustainable lifestyles.