Effects of Eating in Virtual Reality

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Effects of Eating in Virtual Reality
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Hintergrund

Virtual Reality (VR) immerses users in virtual worlds. VR has been steadily growing more and more popular, especially in the video game industry thanks to its immersive nature. Through headsets and controllers, users' real life movements can be translated into the virtual world. VR carries a lot of potential in many areas, including entertainment and science. Because of this, along with the growing popularity of VR, it can be expected, that humans will spend a considerable amount of time in the virtual world that will likely be modeled after the real world, which will include food and eating.

Many studies have used virtual reality in connection with treating eating disorders (Riva 2011, Riva et. al. 2021). Others showed that virtual disgust cues elicit behavioral changes in response to food in VR (Ammann et. al. 2020). VR was also used as a tool to study the influence of the eating environment on the food intake of participants (Oliver 2021). It is unclear, however, if seeing virtual food and the act of virtual eating is only consciously processed or if it also has physiological effects.

Zielsetzung der Arbeit

The aim of this thesis is to determine if eating in VR, meaning pretending to eat in VR but not in real life, causes physiological effects on the digestive system. In particular, we aim to determine effects on saliva production and muscle movement of the stomach. Saliva production is increased when presented with food cues (Keesman et. al. 2016), thus making individuals swallow more frequently . One approach to determine saliva production is to measure the electrical activity of skeletal muscles which are activated when swallowing (Nederkoorn et. Al. 1999) using Electromyography (EMG) sensors. The human digestive system is moving food by regularly contracting muscles, also called "peristalsis" . There are several types of slow waves, however, for this study, only the ones in the stomach, called "gastric slow waves", are important. These gastric slow waves can be recorded with an Electrogastrography (EGG) sensor and are relevant in a variety of assessments.

Previous work showed that EGG, together with an electrocardiogram and respiratory signal can be used to measure mental stress (Kim et. al. 2020) or to assess motion sickness in simulated driving environments (Gruden et. al. 2021), showing that it is a viable tool for measuring stomach activity.

We will conduct a within-subject study with all participants being observed in an idle state and a state where they will be seeing and/or “eating” presented food in VR. Merely seeing food in VR has been shown to have a physical reaction (Harris et. al. 2023), however, research where the virtual food is being “eaten” is yet to be found.

Konkrete Aufgaben

- Research and analyze how related works have used EGGs and EMGs
- Work out an experiment and build the environment in Unity
- Search for Questionnaire(s)
- Analyze the acquired data
- Collect the results and write thesis

Erwartete Vorkenntnisse

- Statistical analysis
- Basic programming knowledge and skills
- Creating and evaluating questionnaires

Weiterführende Quellen

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