Digital Behavior Interventions in Augmented Reality Versus Non-Augmented Reality Contexts: A Randomized Controlled Trial

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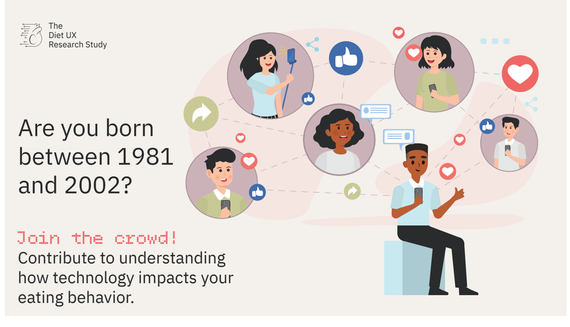
Introduction

The digital media infodemic of health and nutrition constitutes a global challenge. We must understand what factors influence our digital behavior interventions upon exposure to digital information on a smartphone for improving global health and nutrition. The use of Augmented Reality (AR) technology is a trending challenge in today's world. It constitutes an innovative solution to supporting favorable digital behavior response to digital information on smartphone in a health promotive way that would encourage greater adoption of healthier lifestyles. The focus of current studies is centered around mobile user experience without accounting for an individual's current mental well-being, propensity to technology adoption, and the perceived persuasiveness of digital messages within the user's experience journey on a smartphone. The purpose of this randomized controlled trial is to understand how millennial and generation-Z (gen-Z) mobile users change their digital behavior intervention statistically significantly over time upon exposure to digital nutrition information in AR when compared with non-AR contexts. The study was officially launched on 3 July 2020.

Method

1. Screening Criteria

Participants must meet the inclusion criteria for being an adult born between 1981 and 2002, speaking good English, and having daily access to a Smartphone and using it for at least two hours a day.



2. Participants

A statistical power analysis was performed. It is estimated that 50 subjects would be needed in each of the control (Non-AR) and experimental (AR) groups (P=0.05, power 90%) in order to detect a statistically significant difference in digital behavior interventions between the two groups at baseline (T1) and end line = T2 (T1 + 28 days) if it exists. Given the nature of snowball subject recruitment, and the elevated likelihood for increased skewness of results, the recruitment plan is developed to attract a large sample size of up to 300 participants from different parts of the world. Sampling limitations should also be considered as recruitment is restricted to participants with good digital access. As of 13 July 2020, 120 participants were recruited through a snowball subject recruitment, who voluntarily responded to the study announcement on nine social media platforms (Facebook, LinkedIn, Twitter, Instagram, SnapChat, YouTube, WhatsApp, Pinterest, and Reddit) that are mostly used by the targeted population of millennials (1981-1994) and gen-Z (1995 to 2002).

3. Materials and Procedure

After inclusion, participants are directed to provide consent after which they will be anonymously randomized to either the control (Non-AR) or the experimental (AR) groups and will be prompted to answer a 23-item mobile-based online survey at T1 (See Figure 1), and to answer up to 25-item mobile-based online survey at T2 (See Figure 2) using Qualtrics. Upon survey completion, participants are automatically enrolled in three experiments and are asked to answer a 10-item survey in response to each digital information exposure at T1 and T2 (T1 + 28 days).

4. Research Design

The study is a randomized controlled trial comparing digital behavior interventions at T1 to T2 (T1 + 28 days) following 50 seconds exposure to each of three digital messages containing neutral, correct, and incorrect nutrition information, in augmented and non-augmented reality contexts on a smartphone. The end line is specifically marked at four weeks following the popular 28-day rule that the self-help culture promotes for habit change.

Figure 1: Baseline (T1) = up to 15 minutes

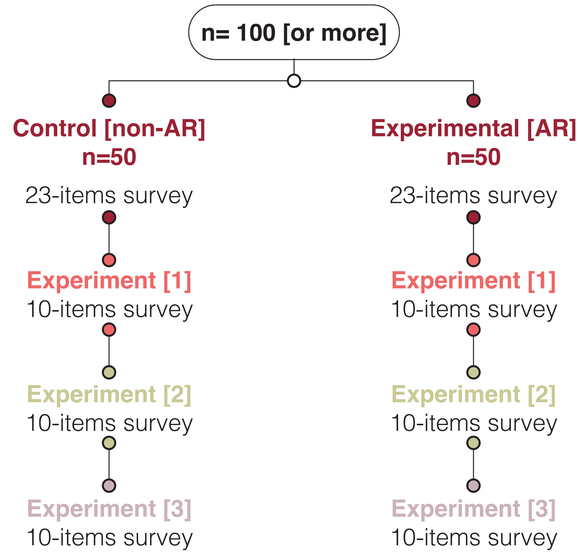
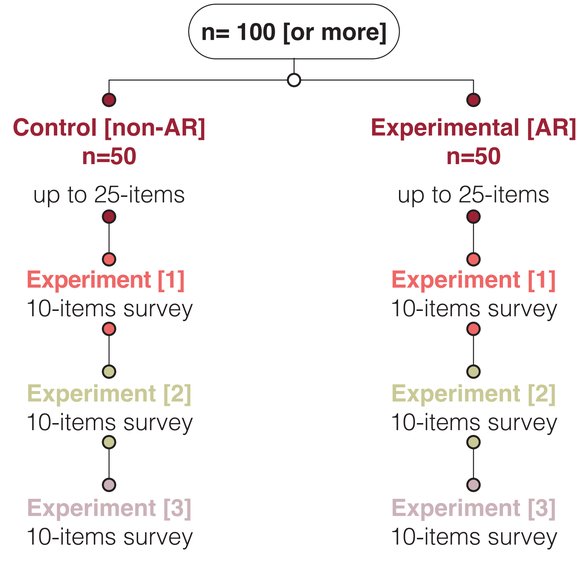


Figure 2: End line (T2= T1 + 28 Days) = up to 10 minutes



End: on behalf of each participant, USD 5 is donated to a charity of choice

5. Research Analysis

The study will use descriptive statistics and a paired-samples t-test to determine whether there was a statistically significant mean difference between the control (Non-AR) and the experimental (AR) groups in digital behavior interventions at T1 and T2 (T1 + 28 days). The dependent variable is the digital behavior intervention (defined as a continuous variable based on the average score of the validated five stages of behavior change theory model and the 9-item validated scale of perceived persuasiveness), with and without AR, at T1 and T2. The independent variables are demographics, WHO-5 mental well-being, and the Technology Adoption Propensity (TAP) scores. Data will be analyzed for demographics (Age, Gender, Education, and Geographic Location) using multivariate regression analysis. Data will also be analyzed to measure statistically significant differences of digital behavior change interventions by WHO-5 scores, and TAP scores using multivariate regression analysis at T1 and T2 for each of the control and experimental groups to study which factors influence digital behavior interventions when exposed to neutral, correct and incorrect digital nutrition messages in AR and non-AR contexts.

Acknowledgement

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Keywords

Augmented reality, smartphone, digital nutrition information, digital behavior interventions, technology adoption, mental wellbeing, behavior change, and perceived persuasiveness.

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