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Does Pokémon Go lead to a more physically active life style?

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ABSTRACT

Previous research suggests that Pokémon Go can be employed as an intervention for promoting healthy behavior on a large scale. In contrast, some scholars expressed concerns about the long-term effects of this mobile game, indicating that the impact of the app on exercise is just moderate. We hypothesized that Pokémon Go users are more active, but this tendency is mainly driven by the greater physical activity needed to level up in the game and does not extend to physical activities in general. In the present study, 981 individuals completed a web survey, in which participants' frequency of Pokémon Go usage, overall physically active behavior, and amount of Pokémon Go related physical activity were measured. Regression analyses revealed that Pokémon Go related physical activity significantly reversed the positive effects of the app on participants' overall physically active behavior, suggesting that the mere adoption of the app does not reliably change people's behavior in general. The increase in physical activity levels is rather explained by the exercise required by the game.

Pokémon Go makes everyone walk until our battery runs out.

-Anonymous, via Twitter.

1. Introduction

1.1. Theoretical background

Physical activity helps people maintain a healthy weight and reduces the risk for cardiovascular diseases, diabetes, obesity, high blood pressure, lipid disorders, and depression. Although this is widely recognized, many adults and children do not practice the recommended amounts of daily physical activity (World Health Organization, 2002). Previous research suggests that mobile technologies can spur people in becoming more active by providing an opportunity to engage in physically active behaviors (Fjeldsoe, Miller, O'Brien, & Alison, 2012; Kirwan, Duncan, Vandelanotte, & Mummery, 2012). More recently, a strategy for introducing physical activity into mobile technologies has been delineated by the development of mobile active video games (Barnett, Bangay, McKenzie, & Ridgers, 2013). They allow the game play to become pervasive through continuous tracking (Arteaga, Kudeki, & Woodworth, 2010) and encourage multiple physical activities on an ongoing basis thanks to the introduction of new technologies such as augmented reality (Anderson et al., 2007), where game developers can combine virtual and real-world elements.

The first attempt in mixing virtual elements with real world physical activities was represented by the mobile game Ingress, in which virtual objects overlay a map of real geographical spaces via Google Maps. More recently, the mobile game Pokémon Go introduced great potential of mixing real-world activities with virtual worlds elements. Pokémon Go players use a mobile device's GPS to locate, capture, battle, and train virtual creatures, called Pokémon, appearing on the smartphone screen as if they were in the same real-world location as the player. The game uses a real-world map of streets and landmarks to help players locate Pokemon, Pokémon eggs (which will hatch once players have walked a specific distance, between 2 and 10 km), Pokestops (for collecting special items), and Gyms (for challenging other players). The app has become a global phenomenon and was one of the best-selling apps in 2016, having been downloaded more than 650 million times worldwide and with 5 million daily active users globally (Smith, 2017). Due to its massive penetration and mix of virtual elements with real-world physical activities, Pokémon Go has been described as an intervention for promoting healthy behavior on a large scale (Althoff, White, & Horvitz, 2016).

Indeed, some studies suggested that Pokémon Go leads to

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significant increases in physical activity (Meschtscherjakov, Trösterer, Lupp, & Tscheligi, 2017), increasing users' steps by an average of 25% per day, across men and women of all ages, weight status and prior activity levels (Althoff et al., 2016). On the other hand, some scholars expressed concerns about the long-term effects of Pokémon Go on active behavior (Howe et al., 2016), indicating that the impact of Pokemon Go on exercise might be just moderate. They reported an increase in steps during the first week of installation and then a gradual decrease over the subsequent five weeks. By the sixth week, the number of daily steps had gone back to pre-installation levels (Howe et al., 2016). Given these mixed findings, we felt it an important endeavor to further examine the impact of Pokémon Go on physical activity. In particular, we were interested in whether this game can indeed trigger stable behavioral changes toward a more physically active life-style or whether any increases in physical activity reported in the existing literature are tied to the context of the game and do not translate into a stable behavioral change (Baranowski, 2016).

1.2. Research goal

It is worth noticing that Pokémon Go was not designed with the aim of increasing physical activity (see also Meschtscherjakov et al., 2017). Rather, moving around was a side-effect of playing the game successfully. Starting from these assumptions, the main goal of this study was to test whether the daily use of the Pokémon Go mobile app would increase people's physically active behaviors in general or whether the effects of the app were indeed limited to the physical activities needed to level up in the game (e.g., walk more to catch new Pokémon). To address this research question, in the present study, participants reported their frequency of Pokémon Go usage, the specific physical activity related to the use of Pokémon Go, and the level of their overall physically active behavior. Moreover, research on health-related interventions has pointed out that attitudes are one of the most important predictors of physical activity. Indeed, people who take benefits of physical activities usually have positive attitudes toward sports, whereas inactive individuals report negative beliefs about sports, leading to avoid exercise and its positive effects (Salehnia, Mizanj, Sajadi, & Rahimizadehd, 2012). Thus, in order to control for possible individual differences on beliefs about physical activity, we also assessed participants' propensity to engage in physically active behaviors in terms of attitudes toward physical activities.

We expected frequency of Pokémon Go usage to be positively associated with both specific physical activity related to the use of Pokémon Go as well as their overall physically active behavior. Crucially, we predicted that the frequency of Pokémon Go usage would no longer be positively associated with the overall physically active behavior when controlling for attitudes toward physical activity and for the impact of specific physical activity related to the use of Pokémon Go. In other words, we reasoned that Pokémon Go users are more active, but this tendency is completely driven by the greater physical activity related to the use of Pokémon Go and does not extend to general physical activities.

2. Method

The study was carried out in accordance with the code of ethics of the world medical association (Declaration of Helsinki) for experiments involving humans. Data collection was performed through Amazon Mechanical Turk (MTurk), an internet-based platform that provides an online participant pool (Buhrmester, Kwang, & Gosling, 2011; Paolacci & Chandler, 2014) and represents a method of rapid and inexpensive data collection (Johnson & Borden, 2012).

Participation in our study was voluntary and all participants were informed that responses were anonymous and no foreseeable risks were involved in participating in the study. Written informed consent was obtained from participants by requiring them to click on an "agree" button at the beginning of the survey. As a cover story, participants were told that the first part of the survey was related to their fitness and physical exercise habits, whereas the second part was composed of a few questions for a future study regarding the use of mobile games.

Since we had no previous research to rely on for estimating the size of our effects, we decided to run a large number of participants. Nine-hundred and ninety-nine individuals from the United States (617 females, 382 males; mean age = 32.51 years, $SD = 10.20$) participated in our study and received $0.60. One potential drawback of Mechanical Turk experiments is that unsupervised participants tend to be less attentive than participants in a lab with an experimenter present (Oppenheimer, Meyvis, & Davidenko, 2009). Thus, to identify subjects who failed to pay close attention, we included one "catch-trial" in our online survey (i.e., "please answer 2 to this question"). Eighteen participants failed the attention check. Thus, the final sample consisted of 981 individuals (610 females, 371 males; mean age = 32.55 years, $SD = 10.16$).

After providing demographic data, participants' attitudes toward physical activity were assessed[1]. We adapted the Attitude Regarding Physical Activities for Health and Fitness Scale (Khan, Abbass, Islam, Khan, & Din, 2012; six items; $\alpha = .68$). Sample items were "Participation in physical activities reduces the risk of heart diseases" and "To promote better health conditions, people may take part in the sporting activities", measured on a scale from 1 = "*completely disagree*" to 7 = "*completely agree*".

Participants' overall physically active behavior was assessed by measuring both recency and frequency of their physical activity during the month preceding the study ($\alpha = .77$). The six items adopted for measuring recency of participants' physical activity were "When was the last time you had (1) a walk for more than 30 min/(2) had a run/(3) had a bike ride to get some exercise?" on a scale anchored with 1 = "*more than one month ago*", 2 = "*about four weeks ago*", 3 = "*about three weeks ago*", 4 = "*about two weeks ago*", 5 = "*about one week ago*", 6 = "*during the last week*" and 7 = "*yesterday*". Frequency of past behavior was measured adopting the following items: "How many times have you had (1) a walk for more than 30 min/(2) had a run/(3) had a bike ride to get some exercise during the last month?" (anchored with 1 = "*never*", 2 = "*two times*", 3 = "*from three to five times*", 4 = "*from six to eight times*", 5 = "*from nine to eleven times*", 6 = "*from twelve to fourteen times*" and 7 = "*every day*").

Adopting one item, participants were then asked to report their frequency of Pokémon Go app usage. The item was "How often do you use the new Pokémon Go mobile app on your smartphone?" (on a scale from 1 = *never* to 7 = *very often*).

On an exploratory basis, we also assessed the extent to which people share their achievements on social media by adopting the following item "Do you usually share your Pokémon Go achievements on social networks with other friends in the Pokémon Go network?" (anchored with 1 = "*never*" to 7 = "*very often*").

Finally, the amount of specific physical activity related to the use of Pokémon Go was assessed adopting three items[2] ($\alpha = .73$). The items were "How many times have you walked more than 30 min/had a run/had a bike ride with the intent of searching for Pokémon Go during the last month?" anchored with 1 = "*never*", 2 = "*two times*", 3 = "*from three to five times*", 4 = "*from six to eight times*", 5 = "*from nine to eleven times*", 6 = "*from twelve to fourteen times*" and 7 = "*every day*".