

# The promise of an augmented reality game—*Pokémon GO*

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Provenance: This is a Guest Editorial commissioned by Section Editor Jianrong Zhang, MD (Department of Thoracic Surgery, First Affiliated Hospital of Guangzhou Medical University, Guangzhou Institute of Respiratory Disease, Guangzhou, China).

Comment on: Howe KB, Suharlim C, Ueda P, *et al.* Gotta catch'em all! *Pokémon GO* and physical activity among young adults: difference in differences study. *BMJ* 2016;355:i6270.

Submitted Feb 17, 2017. Accepted for publication Feb 25, 2017.

doi: 10.21037/atm.2017.03.12

View this article at: <http://dx.doi.org/10.21037/atm.2017.03.12>

Recent advances in technology facilitate the promoting of physical activity (1-8). This is important due to the health effect of physical activity and the reach and disseminability of technology based programs/interventions. Specifically, *Pokémon GO* (released in 2016) may promote a higher degree of activity than many previous exergames such as *Nintendo Wii Fit* (released in 2007). *Pokémon GO* uses augmented reality (AR), which is similar to virtual reality but the key concept for it is 'utility' instead of 'presence'. *Pokémon GO* encourages players to walk around, to socialize, and even to make friends. AR is a promising concept in that it allows for another type of tailoring of interventions, namely geographic tailoring to an individual's environment.

According to recent studies, *Pokémon GO* increased physical activity and decreased sedentary behaviors (1-3); however, its long-term effect is unknown at this point. In one of the studies, players had gone back to their baseline physical activity levels within six weeks of their first installing the game (2). The real test of the technology based AR game for promoting physical activity is whether participants continue to engage in the game over longer periods of time. It only took 19 days to reach 50 million downloads and in September, 2016 *Pokémon GO* reached 500 million downloads. However, since September, 2016 player numbers are on the decline which raises the question if this game is following the trajectory of most technology games and only be maintained by those who are hard core gamers.

Data show that respondents were somewhat more likely

to be younger, white, and female; however, there were no significant demographic interactions for any behavioral indicator (1-3). At least one study indicated that *Pokémon GO* may be more beneficial for more obese individuals (3). It was noted that if *Pokémon GO* players would increase 1,000 steps daily, and this behavior change would be sustained, about 41 days of additional life expectancy would be assumed (1). So the public health impact potential is substantial.

It is recommended that researchers apply theoretical constructs of health behavior theory (HBT) for behavior change to promote physical activity (6,7). For example, *SuperBetter* includes tailored educational elements based on HBT, such as individualized assistance and feedback on each player's achievement/improvement. Systematic reviews report that the most prevalent theoretical constructs of health intervention games were self-monitoring, goal setting, and self-reward (6,9). Health interventions, which are designed based on theoretical frameworks, are likely to lead to longer behavior change (7). Therefore, there is a need for researchers to assess theoretical contents and gamification elements of *Pokémon GO* (4,5).

There are many games developed in academia incorporating theoretical constructs for health behavior change interventions; however, very few become popular. Limited funding for development budgets and speed of implementation including testing, publishing, and implementing in a real-world make it challenging (10). Therefore, it is worth while studying which, either

entertainment-based games or educational elements-based games, is more popular, engages long-term behavior change, and elevates player's motivation (7).

In addition, in order to increase the level of scientific evidence for the interventions, it is important to develop and adopt standardized protocols in terms of interventions, populations, and outcomes. This effort eventually will allow further comparison between differently designed experimental studies to translate evidence-based interventions to gaming-based approaches (10). Collaborations between game developers, app designers, and content experts in behavior health are necessary (7).

It is also recommended that researchers explore the potential benefits of applying *Pokémon GO* to other areas such as depression, heart disease, type 2 diabetes, etc. and to diverse study subjects such as children, elders, and people with disabilities (1,2,8,10). It has been reported that older adult players have an awareness in playing games for favorable health outcomes (8). Further research, therefore, should be conducted to identify end user's needs assessment and specific GUI (graphical user interface) elements, develop human-centered gaming design guidelines, and evaluate usability issues.

Considering the characters (the Pokémons) of *Pokémon GO* appear to be "on top of" the real world, not "in" the real world, players may expect another stage of mixed reality (combining AR and virtual reality) with the concept of 'flexibility' where their illusion is not easily broken. In other words, when we lean in close the Pokémons get larger, and when we walk around the virtual landscape changes with respect to the position in the way a real object would (like *Minecraft*—latest update released in 2016—as an example of an interactive virtual world). This natural and intuitive way of interaction simplifies the communication between players and *Pokémon GO*, especially for players who have no previous experience. Therefore, with a mixed reality interface, it is expected that *Pokémon GO* would have the potential to be more sustainable and effective.

Even though larger robust longitudinal studies employing rigorous methodologies and further research on negative effects such as injuries, road traffic incidents, game addiction, etc. are still needed (1-3,10,11), *Pokémon GO* is emerging as a potentially useful tool for motivational and behavioral impacts on physical activity (12).

## Acknowledgements

None.

## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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**Cite this article as:** An JY, Nigg CR. The promise of an augmented reality game—*Pokémon GO*. *Ann Transl Med* 2017;5(Suppl 1):S11. 10.21037/atm.2017.03.12