



DIGITAL GAME FOR STUDENTS WITH AUTISM SPECTRUM DISORDER

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Abstract

Apart from technical skills, people must also be educated in social values. This is pertinent in developing well-rounded, socially-aware students. Autism Spectrum Disorder (ASD) is a heterogeneous developmental disability characterized primarily by atypical, repetitive, routinary behavior, as well as impairments in socialization and communication. Despite comprising approximately 1-2% of the world's population, people with ASD are greatly stigmatized, leading to an overall lower quality of life for them. In order to address this stigmatization, awareness and empathy must be induced in non-autistic, neurotypical people. The rise of serious games or games with a purpose has provided a different avenue for spreading awareness to an audience whose primary interest lies in digital games. Multiple games have been created to spread awareness for issues such as war, cultural discrimination, and mental illness. This study aims to determine whether serious games can also be used to increase autism awareness and lessen the stigma against people with autism. This study makes use of the digital game *In Someone Else's Shoes*, which simulates some behaviors of a college student with High-Functioning Autism Spectrum Disorder. For this study, 30 participants were asked to answer a survey on their perceptions on people with autism before playing the game. After which, they answered the same survey again to see if their perceptions had changed, and answered an additional self-report on how the game affected them. While there is minimal change in the perceptions of the players before and after playing the game, the self-report shows that majority of the players expressed feeling more informed about autism, showing a positive cognitive response. However, players reported that the game was not as effective at eliciting an emotional response from them, though they still expressed a willingness to aid someone with autism.

Keywords: games for empathy, autism spectrum disorder, serious games

Introduction

Autism spectrum disorder (ASD) is a heterogeneous group of neurological disorders generally characterized by impairments in social communication and interaction, as well as restrictive, repetitive behavior and interests (American

Psychiatric Association, 2013). Because cases of ASD are rarely exactly the same, there is a tendency for society to have conflicting ideas and perceptions of what autism is (Huws and Jones, 2010; Scior, 2011). This leads to stereotypes that are not only inaccurate, but also promote a stigma against them and their families (Milačić-Vidojević et al., 2014).

In recent years, the Center for Disease Control and Prevention has noted a rise in the diagnoses of ASD. A collection of studies across countries from 1966 to 2016 have shown that ASD has slowly risen, with a current average prevalence of 1-2% of the population. This shows that there are millions of people who are identified as being part of the ASD spectrum, with no geographical, ethnic, or socioeconomic discrimination (Centers for Disease Control and Prevention, 2016). Within the Philippines, the cases of ASD are more difficult to determine due to the lack of a formal census. Estimations across the years approximate the incidences of ASD to be at around 500,000-570,000 sometime during 2008-2009 (Carandang, 2009; Kopetz and Endowed, 2012), with news reporting the estimation to have risen to a million in 2014 (Jaymalin, 2014).

Given that a significant part of the world's population has ASD and that the identified cases have risen in the past few years, it is important to dissuade the stigma against them. A way to reduce this stigma is to foster empathy among neurotypical people (that is, those not afflicted with a developmental disability) towards those with ASD. This becomes more imperative, considering that those who are unfamiliar with or know less about ASD have been found to be more likely to perpetuate the stigmatization (Milačić-Vidojević et al., 2014). Moreover, studies have found that increased empathy towards those in stigmatized groups can improve perceptions against those groups (Batson et al., 1997) and even motivate to help those (Batson et al., 2002).

The rise of serious games in recent decades has shown that video games are not just for entertainment, but can also be used for other prosocial purposes. Playing prosocial games has been found to not only increase empathy but also increase prosocial behaviors across different ages and cultures (Gentile et al., 2009).

While there have already been numerous applications of games to address various social and cognitive impairments associated with ASD (Beaumont and Sofronoff, 2008; Kandalaft et al., 2013; Whyte et al., 2015), there is limited literature on the reverse. Almost no studies focus on games that mimic autism to educate a neurotypical player, instead of having autistic players play games that teach neurotypical behavior. This field-game for autism empathy—is what this study aims to explore.

This study, then, aims to determine to what extent a game is effective in inducing empathy in neurotypical players. This study also aims to contribute to the limited body of literature on games for autism empathy. In order to achieve this objective in a limited span of time, however, this study will focus on measuring only immediate or short-term empathy.

Empathy

Empathy is “a multifaceted construct that includes emotion recognition, vicarious feeling, and perspective taking” (Calvo and Peters, 2014). While

numerous models for empathy have cropped up in the past years, one of the more basic yet widely-scoped ones comes from Stephan and Finlay. According to them, empathy can be categorized into 2 subgroups: cognitive empathy and affective empathy. Cognitive empathy refers to the intentional experience of taking someone else's perspective. This includes being aware of and understanding the situation of the target. On the other hand, affective empathy focuses on being able to share in the feelings of others and reacting appropriately. Affective empathy can be further divided into parallel empathy and reactive empathy. Parallel empathy is when one experiences emotions similar to that of their target (e.g. a person experiencing secondhand embarrassment). Reactive empathy is experiencing an emotion different to that of the target's (e.g. feeling pity at someone's suffering) (Stephan and Finlay, 1999).

Cognitive empathy and affective empathy can be developed independently of each other (Belman and Flanagan, 2010); someone can understand what autism is, but may not be able to completely empathize or share in the feelings of someone with autism. Some studies, though, suggest that for empathy to be truly taught, both aspects must be developed. This study will explore.

Games for Empathy and In Someone Else's Shoes

Games for empathy are games which allow the player to be placed in a situation that he/she would otherwise be unable to experience, with the goal of being able to empathize with the situation brought on by the game. These games encourage empathetic play, which makes use of both cognitive empathy (where players attempt to understand the thoughts and emotions of the protagonists) and affective empathy (where players attempt an emotional response, such as identifying similarities between themselves and the target group (Belman and Flanagan, 2010). There is reason to believe in the feasibility of these games, as it has been found that empathy can be taught (Bachen et al., 2012). Multiple games for empathy have been created for different causes.

The game used in this study is called In Someone Else's Shoes, and features a college-aged protagonist with High-Functioning Autism Spectrum Disorder. The player plays as this protagonist as he/she navigates a typical day. This involves activities such as getting ready in the morning and going to class, on which the 2 levels of the game are centered.

A number of ASD behaviors are distributed throughout the game. The first level of the game focused on repetitive, unusual behavior while the protagonist gets ready in the morning. This portion of the game will involve the player moving around the protagonist's house as he/she completes certain tasks such as taking a shower and eating breakfast. The level is considered complete when the player has successfully finished all tasks and has left the house.



Figure 1. Screenshot of the Gameplay of in Someone Else's Shoes

The second level, on the other hand, focused on impairments in communication and socialization that the protagonist encounters while completing a group activity in school. Unlike the first level, this level will not involve the protagonist moving within the environment. Rather, this level will be text- and dialogue- heavy. Every time an NPC requires a response, 1 or 3 replies will appear on screen, which the player will have to choose amongst as a response to the NPC.

Lastly, whenever an ASD behavior comes into play, a message will appear on screen, explaining to the player what is going on in the game and why it is happening. This is so that the player will not misconstrue the behavior being portrayed in the game, and further makes the player aware that they are playing a protagonist who has autism.

Method

For this study, 30 participants aged 18-25 with a university background (either a current college student or a recent graduate) were recruited. This demographic was chosen because the protagonist of the game is a college student.

Before playing the game, each participant will answer a screening questionnaire to determine their initial attitudes towards ASD. This will be based on Power's Attitudes to Disability Scale (ADS) (Power et al, 2010), which is a multidimensional scale with items on inclusion/exclusion, discrimination, gains, and hope toward those with disabilities. This scale has been chosen due to its validity (Cronbach $\alpha = 0.76-0.80$).

Each participant will then play the game in its entirety and will answer a questionnaire afterwards. Participants will also retake the Power's ADS before answering the questionnaire to see if their perceptions had changed. The

questionnaire for this evaluation will have quantitative questions being evaluated on a Likert scale of 1-5, and will consist of items focusing on cognitive empathy (with a focus on awareness and understanding), parallel affective empathy, and reactive affective empathy towards the game as a whole. Items will not be explicitly grouped in the questionnaire; instead, items for cognitive and affective empathy will be mixed. Items will be based on previous studies which measured empathy.

In order to determine the extent to which the game is effective in inducing empathy in neurotypical players, the results of Power's ADS before and after the participants play the game will be compared to see if there is a significant difference. This is to determine if the participants' initial negative perceptions of ASD (if there were any) were alleviated by playing the game.

Additionally, each participant will be classified into 1 of 4 levels of empathy based on their answers in the questionnaire. These 4 levels of empathy are: (1) Understands the situation of ASD with no emotional component; (2) Can feel the same emotions as that of those with ASD; (3) Can feel emotions of compassion for those with ASD; and (4) Is motivated to take action for those with ASD. The differences in the number of participants per classification will then be analyzed to see if there is a particular level of empathy that stands out.

Findings and Discussion

Table 1 shows the results of the pre-test and post-test taken by the players. For each participant's evaluation, items under the same group were added together. Afterwards, the average of all participants' evaluations was calculated. A higher score on this scale indicates higher stigma towards autism. The highest possible score on this scale (indicating extreme stigma towards autism) is 80, while the lowest is 16.

Table 1. Average Power's ADS Scores.

<i>Category</i>	<i>Pre-Test</i>	<i>Post-Test</i>
<i>Inclusion</i>	10.909	11.061
<i>Discrimination</i>	14.727	13.515
<i>Gains</i>	9.545	9.030
<i>Prospects</i>	6.576	6.515
<i>Total</i>	41.758	40.121

From the table, it can be seen that there was a drop in the total score after playing the game, indicating less prejudice against autism. However, a paired t- test reveals that there was no significant difference in the results of the pre-test and post-test of the game group ($t = 1.34$, two-tailed $p = 0.189$, $\alpha = 0.05$), which means the players did not feel significantly less prejudiced towards people with autism.

This could be due to a number of reasons. First, it is possible that the participant pool already partially empathized with people with autism prior to the game, given their initial average score of 41.578 (which, on the scale, is 40.247% prejudiced against autism, less than half). Further studies could be performed with different participants to see if this result holds true.

During the experiment phase, one participant stated that he was unsure of what to empathize with in the first level. This game was originally designed with situations similar to what a player would typically experience in order to lessen the otherness that the player may feel when playing the game. However, based on the last player's statement, it is possible that the given situation was too familiar to the player. This could have caused players not to empathize as much because (and affected the results of the Power's ADS), in their perspective, there was nothing to empathize with.

Moreover, while playing the game, one participant stated that she "felt like [she] was playing mechanics meant to emulate someone with autism, but not actually playing as someone with autism." There was a humanizing aspect lacking in the game which possibly caused the player to feel disconnected with the protagonist.

This disconnect could be linked to Lankoski's theory on player engagement. According to Lankoski, empathetic engagement involves a recognition component, which "describes aspects of character interpretation." (Lankoski, 2011) There has to be a portrayal of the protagonist that makes players believe that the protagonist is real. In his paper, Lankoski cites *Doom*, which "[offer] almost no basis for recognition of the [playable character] of the game; hence, *Doom* does not afford empathetic engagement." (Lankoski, 2011) Although *Doom* is not necessarily a game primarily aimed at inducing empathy, the idea of not being able to establish a solid basis of recognition for the protagonist (shown in his limited interaction with NPC's) could be the reason why some participants were not able to significantly empathize with the character they were playing.

Lastly, a number of clinicians noted that the game felt too short, ending "just as [they were] starting to immerse [themselves] in the game." Although it was the clinicians who noted this, this comment may also possibly explain the results of the player test. Going back to Belman and Flanagan's study, a game's "impact on participants is limited by its brevity and probably also its remoteness from participants' day-to-day lives and concerns." (Belman and Flanagan, 2010) While the second concern was addressed by making the situation in the game relatable to the target player, the game in itself was very short, with most players completing the game in under 15 minutes. Longer exposure to the game is important as this is where the induction of empathy occurs. That said, making the game longer or improving it for long-term play may improve its potential in inducing empathy, as it "encourages far greater cognitive or emotional involvement." (Belman and Flanagan, 2010).

Apart from the participant pool, the perception of the items on Power's ADS may have also affected the results. While answering Power's ADS, one participant asked, "Does this refer to me personally, or what I think society thinks?" It is possible that other participants experienced the same confusion, which could have impacted the results of the ADS.

Table 2. Questionnaire Evaluations

<i>Level</i>	<i>Game Group</i>
<i>Level 1</i>	4.057
<i>Level 2</i>	3.800
<i>Level 3</i>	3.671
<i>Level 4</i>	4.057

Despite the results of the ADS, the self-report Likert evaluation in Table 2 shows that players reacted positively to the game in terms of whether it was able to induce empathy in them. An interesting point to note in the results of the self-report is that after playing the game, players rated themselves more positively in Level 1 (Knowing and understanding autism) and Level 4 (Willingness to help someone with autism) of empathy, as opposed to Level 2 (Feeling the same emotions as someone with autism) and Level 3 (Feeling different emotions as a reaction to someone with autism). This implies that this prototype of the game was slightly more effective in inducing cognitive empathy rather than affective empathy.

In line with these results, one participant noted that the game “was very informative but didn’t really make [her]...feel [anything].” Another participant echoed this sentiment, stating that the game was “more informative than immersive.” It is possible that these impressions also affected how much the player was able to empathize with someone with autism, which could be the reason why there was no significant difference in the results of the Power’s ADS before and after playing the game.

Despite the limitations of the game in inducing affective empathy, it can be seen from the results that inducing cognitive empathy (i.e. spreading autism awareness) is already sufficient for some participants to be willing to aid those with autism.

Conclusions

This study makes use of the digital game In Someone Else’s Shoes, which simulates some behaviors of a college student with High-Functioning Autism Spectrum Disorder. For this study, 30 participants were asked to answer a survey on their perceptions on people with autism before playing the game. After which, they answered the same survey again to see if their perceptions had changed, and answered an additional self-report on how the game affected them. While there is minimal change in the perceptions of the players before and after playing the game, the self-report shows that majority of the players expressed feeling more informed about autism, showing a positive cognitive response. However, players reported that the game was not as effective at eliciting an emotional response from them, though they still expressed a willingness to aid someone with autism.

Future studies should consider testing the game on long-term empathy. As this study was limited to studying effects on short-term empathy, it is possible that the game is more suited for inducing long-term empathy. It is highly recommended that the game be enhanced before doing this, as it increases

playability and can expose the neurotypical player to more varied cases of ASD during the longer testing phase involved in studying long-term empathy.

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