

Play to Win Over: Effects of Persuasive Games

Ruud Jacobs, MSc

Erasmus Research Center for Media, Communication and Culture

Erasmus University Rotterdam

E-mail: jacobs@eshcc.eur.nl

Phone: +31104089131

Address: Burgemeester Oudlaan 50

3062PA, Rotterdam

The Netherlands

Play To Win Over: Effects of Persuasive Games

Abstract

Persuasive games are a subset of serious games that are getting increased attention from the gaming industry as well as researchers. Although their title implies they can be intuitively defined as having the primary intention of changing or reinforcing players' attitudes on certain topics, only a handful of studies have provided evidence that these games actually influence attitudes. After presenting a summary of previous studies' results, the current article expands on this evidence by reporting on a controlled online experiment that compared a currently playable persuasive game (*My Cotton Picking Life*) to a mobilizing YouTube clip covering the same topic. The study included a pre- and post-test and two media conditions. 237 individuals (mean age of 23) from an international population participated in this study. Since the persuasive game and comparable movie clip were concerned with forced labor in Uzbekistani cotton fields, attitude scales on empowerment, the workload of cotton picking, and denial of the issue, were composed for this study and subsequently validated. Results showed a greater increase on workload attitudes for individuals who played the game than for those who watched the clip. Enjoyment of the game as well as awareness of the game's intent also increased the attitude change from pre- to post-test. The paper offers insight into how persuasive games can be further validated with different methods, and concludes that there is mounting evidence for the viability of games as a medium for persuasive communication.

Keywords: persuasive games; attitudes; impact; serious games; effects; players

Games are not always meant to simply be enjoyed. So-called serious games are intended to educate, train, or persuade their players. This does not mean they are inherently not enjoyable. Rather, serious games recognize that enjoyment fits with certain uses of games, and guiding the players' experiences towards games' subjects is prioritized over offering a purely entertaining diversion. Persuasive games are a subset of serious games that are created with the primary intention of changing or reinforcing certain attitudes. Though the term 'persuasive game' was coined by Ian Bogost (2007) to denote games that mount procedural rhetoric – embedding a message into the systems and rules of games – games can employ many persuasive strategies to get their message across (De la Hera, 2015). Despite the proliferation of the genre and the notability of games like *September 12th* and *Darfur is Dying*, only a handful of researchers have paid attention to attitude-changing effects of persuasive games (e.g. Gerling, Mandryk, Birk, Miller, & Orji, 2014; Peng, Lee, & Heeter, 2010; Ruggiero, 2015; Soekarjo & Oostendorp, 2015). This is because most research on this topic did not categorize persuasive games as a distinct genre. By specifically focusing on persuasive games, games can be grouped by their common goal of changing attitudes, facilitating rigorous studies into their effects. When seen in this way, a gap in the research is unmistakable: persuasive games need to be validated, their efficacy and effects determined through diverse studies.

The current article builds towards validation by investigating the effects of a persuasive game that is currently playable. An online experiment was conducted where a persuasive game was compared to a YouTube clip with a similar message. Two research questions guided this study: Firstly, can a persuasive game change attitudes of players more effectively than other persuasive media? Also, how does the player's experience of the game impact its effects? To ensure the results of this study add to the current knowledge base, published studies into attitude-changing effects of persuasive games are discussed in the next section.

Previous research into the effects of persuasive games

As one of the most well-known exemplars of persuasive games, *Darfur is Dying* has garnered some attention from mainstream press as well as academia through its portrayal of Sudanese refugees collecting water and farming crops while they are being attacked by militias. Peng, Lee & Heeter

(2010) showed that the game *Darfur is Dying* had a more pronounced effect on players' willingness to help with the situation in Darfur than reading a text or watching a clip of the game did for participants in two control groups. By separating gameplay from watching footage of a game, these researchers demonstrate that the interactive nature of the game caused the increased role-taking, rather than its other persuasive elements (like sound and visuals). Although the authors did not draw this conclusion, it can be said that procedural rhetoric was responsible for the effect, as this element relies on the persuadee having agency in the experience. The importance of interactivity for this particular game's impact was later corroborated by Steinemann, Mekler, and Opwis (2015); they found a positive relation between playing *Darfur is Dying* and the appreciation of the experience, encouraging charity donating behavior.

Another element of Peng, Lee & Heeter's (2010) study deserves mention: enjoyment of the content was inversely related to its persuasive impact. Playing the game was considered to be less enjoyable than watching it, and both were less enjoyable than reading a text. Since the significance of these differences was not discussed, conclusions cannot yet be drawn. On the face of it, the finding goes against the notion that enjoyment is essential for a game to be effective, especially when its subject matter is as grim as it is in *Darfur is Dying*.

Most studies published on the topic support the notion that persuasive games change attitudes of players. When the game *Power Explorer* challenged teenagers to turn off electrical equipment in their homes in order to win multiplayer battles, attitudes towards domestic energy saving became more positive for players while the opposite was found for non-players for the same time period (Gustafsson, Bång, & Svahn, 2009). More recently, Gerling et al. (2014) researched how playing a game about disabilities (*Birthday Party*) influenced relevant attitudes, finding a more powerful influence when the game was played with a specialized wheelchair-based input device. Lastly, Ruggiero (2014, 2015) investigated attitudes towards homelessness in over 5,000 teenaged players of the game *Spent* in what is very likely the largest study on the effects of a persuasive game.

Immediately after the exposure no significant difference was found between a group that played the game compared to a group that did not on their attitudes towards homelessness. However, when the

participants were tested again three weeks later, those who played the game held more favorable attitudes towards homelessness than those who had not. The game therefore had a sleeper effect, wherein reflections on the game over time had likely caused the change.

However, not all published studies found significant differences. In the most recent study of the effectiveness of the notable *Energities*, Soekarjo and Van Oostendorp (2015) concluded that this game did not increase micro-level or macro-level attitudes about energy conservation in their players. This is reflected both in non-significant differences between a pre-test (administered a week before the experiment) and an immediate post-test as well as in a lack of differences between the game and the control group. However, there are indications that this study did not have enough participants (N=46) to consistently find significant differences. The small effect size (Cohen's $d = .29$) for the change in macro-level attitudes means this study had insufficient statistical power ($1 - \beta = .25$). In the same article's literature review, one out of six studies reporting on attitude change did not find significant effects (i.e. Lavender, 2008). The study in question also had few respondents (N=70 across 3 conditions) and reported small effects. These null results from small studies underline the notion (also voiced by Ruggiero, 2015) that the field of persuasive games research would benefit from adhering to rigorous and well-established methodologies that offer suitable power for picking up on small to moderate effects that such games have on attitudes.

These few recent examples indicate that persuasive games can have different and sometimes more lasting impacts than other media. Though effects are not guaranteed in every case, a clear trend towards efficacy is apparent. The first hypothesis (H1) for the current study is thus: Playing a persuasive game affects attitudes more than watching a mobilizing movie clip about the same topic.

Apart from studying attitude-changing effects, the current study also incorporates player experience elements to assess whether such elements can moderate effects found. Because the delivery of persuasive messages through games has not been studied extensively, there are no clear indications for the effects of experiential factors on attitude change. Looking specifically at enjoyment, previous results suggest that this link might be negative; the presentation type that was found by Peng, Lee, & Heeter (2010) to be the least enjoyable had the strongest effect on attitudes.

The answer to this seemingly paradoxical finding likely lies with dual process theories of persuasion, such as the elaboration likelihood model (Petty & Cacioppo, 1986). For example, a persuadee's positive mood can reduce attitude change as caused by a message with strong arguments when the persuadee has limited cognitive resources available, because such a positive mood causes persuadees to process a message peripherally, rather than giving message arguments their full attention (Mackie & Worth, 1991; Schwarz, Bless, & Bohner, 1991). Under the same circumstances, messages with weak arguments do lead to improved attitude change when persuadees are in a good mood, as they would then pay less attention to badly supported arguments. The likeability of message sources further complicates this chain of effects, as high source likeability is linked to central processing routes when mood is high and cognitive load is low (Sinclair, Moore, Mark, Soldat, & Lavis, 2010). The degree to which the persuader is candid about persuasive intent can also affect the influence of experiential factors (Reinhard, Messner, & Sporer, 2006). Specifically, being explicit about persuasive intentions promotes attitude change when likeability (and attractiveness) of sources are high, while it dampens effects when likeability is low.

The studies discussed in the previous paragraph were all concerned with more traditional forms of persuasion, such as presentations, sales pitches, and written texts. Because persuasive games have their message embedded in multi-modal interactive experiences, it is currently unknown how each of these experiential factors need to be taken into account, nor is it known which of the two processing routes are triggered by these factors. It is beyond the scope of the current article to provide an account of the elaboration likelihood model in persuasive games. To still be of aid to future research that does investigate this issue, the following hypothesis (H2) is tested here: Players who enjoy the game more consequently show greater attitude increases. This hypothesis is supported by current knowledge either under the assumption that mood, source likeability, and source attractiveness are related to enjoyment, or when only mood is linked and the game's message is processed peripherally (Mackie & Worth, 1991; Schwarz et al., 1991; Sinclair et al., 2010). The transparency of the game's persuasive intent could also help to impact attitude change when enjoyment is high (Reinhard et al., 2006). The third hypothesis (H3), therefore, relates to how the persuasive effect of

the content was perceived by players: Players who are more aware of the persuasive intent of the game were expected to show greater attitude change.

Methods

Sample

Respondents were sought through convenience and snowball sampling by second-year undergraduate students in an international bachelor track in the fall of 2014. 237 participants were exposed to one of the conditions and completed the full survey. Their mean age was 23 years ($SD: 9.3$), and 58.2% (138) of the respondents identified as female. Because the sample was gathered by students of an international bachelor program, multiple nationalities were present in the sample. Most respondents' native language was Dutch (56.8%), though sizeable portions spoke German (8.7%), English (8.3%), Russian (6.6%) and Vietnamese (6.1%), with the remaining 13.5% spread across 19 other languages. All stimuli and measures were presented in English.

Design

A 2 x 2 mixed experimental design was employed, whereby participants were randomly assigned to either play a game or watch a YouTube clip that dealt with the same issue. A within-subjects factor was also included as a pre- and post-test survey. The study took the form of an online experiment, giving respondents the freedom to experience the content they were assigned from their own computer for as long as they wanted to. The time participants spent away from the survey was logged.

Content

The persuasive game used in this study was *My Cotton Picking Life (MCPL)* (Rawlings, 2012). This game is hosted on GameTheNews.net, a site containing games reflecting on current events. The game is played on a single screen displaying an Uzbekistani child who is forced to pick 50 kilograms of cotton. Players click alternating buttons to pick handfuls of cotton and throw them into a bag hanging from the character's shoulders. Although a progress bar shows how close players are to reaching the quota, reaching this goal would take around 5 hours of continuous play. It is made to be a dull,

repetitive game with a bleak atmosphere. However, it gives players a way out of the situation; a large button labeled ‘Alright, I’ve had enough’ is visible throughout the play session. The game is intended to encourage players to give in, proving that no one would volunteer their time performing this kind of work, even if the harsh conditions of an Uzbekistani cotton field or enforced threats of physical abuse are not included in their experience. One playthrough of the game therefore takes as long as the player can persevere. The game stops when the player tires of the game or when they accept that trying to reach the quota is futile.

This game was chosen as a stimulus for this study for several reasons: First, it was available to play online for free in a browser window and in English. Second, its gameplay was accessible and did not require experience with digital games. Third, its persuasive intent was made explicit while playing. Text both embedded in and surrounding the game directly linked the players own feelings with the issue (e.g. “It’s OK for you, quitting isn’t a luxury these kids have!” (Rawlings, 2012, after clicking “Alright, I’ve had enough”), and links to take action and share on social media are present throughout the game. Fourth, the game did not need to be played for an extended period before the message became apparent. All in all, the game was exemplary as a digital pamphlet, combining high accessibility with concise and transparent persuasive intentions.

A YouTube clip was selected that dealt with the same issue of forced labor in the Uzbekistani cotton industry (Walk Free, 2014). The movie applies similar verbal rhetoric as that found in the game, as well as showing footage of children picking cotton. Despite the depressing subject matter, the clip includes an uplifting background score and is meant to empower rather than shock viewers. The message of the clip is that forming a united front against this practice can stop companies from purchasing cotton from improper sources.

The amount of time respondents spent on their respective content was monitored. On average, respondents in the game condition spent 101 seconds on the game’s page. The YouTube clip was 142 seconds long, and respondents on average spent a little less than that on the clip’s page (122 seconds). To control for possible confounds, responses were categorized as low-exposure and high-exposure, using a threshold of 45 seconds. This separated the sample in 153 high-exposure responses (game: 69,

clip: 84) and 84 low-exposure responses (game: 43, clip: 41). Both low- and high-exposure groups were used in subsequent analyses, introducing a quasi-experimental factor to the design.

Measures

Because every persuasive game has its own subject, and even games on the same topic differ on what they want their players to think, studying the effects of persuasive games calls for the use of measures tailored to each case. For the current study, a three-part attitude scale was developed for the pre- and post-tests, consisting of 15 items. The first part consisted of items on slavery in contemporary society (e.g. 'Slavery still exists today'). The second part gauged the respondent's perception of the workload involved in picking cotton. The final part measured the perceived link between respondents and the topic, querying whether respondents could effect change in this situation and how their own behavior is affecting it (i.e. perceptions of empowerment). In the post-play observation, two further scales were developed intended to gauge the experiences respondents had with the content. The first concerned the enjoyment and educational value of the content experienced and was based on a combination of hedonistic and eudaimonic outcomes (Ryan & Deci, 2001) partly adapted from Peng, Lee, & Heeter (2010), while a second scale, measuring the respondents' awareness of the content's persuasive intent, was based on manipulation checks from a previous study [Author reference omitted for reasons of anonymity]. All items used in this study are listed in table 1.

Analysis

Incomplete responses were removed from the dataset before analyses were performed. Group distributions were compared using Chi Square tests for independence. Repeated measures analyses of variance (RMANova) and linear regressions were used to observe group and time differences together and find the influences of enjoyment and obtrusiveness of persuasive intent. Choices for effect size estimators were based on the guide and calculation aid of Lakens (2013).

The commonalities of the sample's scores of all 15 items of the attitude scale were analyzed with a confirmatory factor analysis with Varimax rotation (interfactor correlations were below .3). Of the three conceptual categories of slavery, empowerment and workload, only the workload category

was reflected in a factor that had high loadings on 4 of the 5 items' scores in this category. The biggest factor grouped 8 items from the slavery and empowerment categories. A third factor grouped together reverse-coded items which were phrased in a way that denies or underplays problems in this topic. The items that loaded highly on each of these three factors were combined into a three separate scales: the first was called Awareness and Empowerment, the second Workload, and the third was termed Denial. When the resulting three scales' scores were tested for interreliability using Cronbach's alpha, the awareness and empowerment scale scores showed decent cohesion (α : pre-test .74, post-test: .79) and so did those of the workload scale (α : pre-test .76, post-test: .85). However, the denial scale's scores did not show the same level of cohesion (α : pre-test .52, post-test: .59). The scale was maintained in this study to be able to explore this specific topic. Overall, all of the attitude items added to their respective scales' reliabilities, and none were left out of the final analysis (see table 1). Looking at the two experiential scales, it became clear the scores on items measuring enjoyment and educational value of the content had good interreliability (α : .80), so these items were also averaged to obtain an enjoyment scale. The first and third items from the persuasion obtrusiveness category (see table 1) were averaged (α : .68) to arrive at an indicator of respondents' awareness of the content's persuasive elements. The second item's scores ('the content I have just experienced was trying to persuade me') did not add to the reliability of the obtrusiveness scale. Because of the more negative connotation, it was used separately in the subsequent analyses.

[INSERT TABLE 1 ABOUT HERE]

Results

The first hypothesis for this study was concerned with the difference in the effectiveness of a persuasive game and a short video clip. This was tested using an RMANova. An interaction effect of condition and observation time was found for players who spent more than 45 seconds with the game

only on the workload scale ($F(1,151)=5.9, p=.017, \eta_p^2=.04, \eta_G^2=.01$)¹, though the effect size was small. A main effect for observation time was significant ($F(1, 151)=69.452, p<.001, \eta_p^2=.32, \eta_G^2=.07$), though there was no main effect for condition ($F(1, 151)=.665$). The workload scale increased more from pre- to post-test for the greater exposure group that played the game ($M\ diff=.53, SD=.65, \text{Hedges' } g_{av}=.70$) than for those that viewed the clip ($M\ diff=.29, SD=.56, \text{Hedges' } g_{av}=.36$) (see figure 1). After performing a 2-sample t-test on the differences in attitudes between the two conditions, this was confirmed ($t(151)=2.4, \text{one-tailed } p=.009, \text{Hedges' } g_s=.39$). The main pre- and posttest effect was seen for the other scales as well with both exposure groups together (Awareness and empowerment: $F(1,235)=125.3, p<.001, \eta_p^2=.35, \eta_G^2=.05$, denial: $F(1,235)=4.1, p=.044, \eta_p^2=.02, \eta_G^2<.01$), though these effects differ considerably in size. The interaction effect on workload attitudes was not found for respondents who chose to return to the questionnaire in under 45 seconds ($F(1, 82)=1.6$), nor was it present for players who did engage with the content for more than 45 seconds with the awareness and empowerment scale ($F(1, 151)<.1$) or the denial scale ($F(1, 151)=.4$). Hypothesis 1 is therefore supported for only the workload attitudes and rejected for the awareness and empowerment and denial attitudes. Figure 1 shows the increases in workload attitudes for participants of both conditions and low and high exposure times. Though the pre-test workload attitudes are not significantly different for high- and low-exposure groups, the sample differences are the result of letting respondents choose how long to spend with the content. It is reasonable that those respondents who had very low attitudes towards the topic on average spent less time with the content related to those attitudes.

[INSERT FIGURE 1 ABOUT HERE]

The second hypothesis held that enjoyment and informational value of the content would predict greater attitude change. This hypothesis is broadly supported for the game across all three

¹ When both high and low exposure groups were combined and exposure time was included as a covariate in an RMANOVA on the workload scale, only a main effect of observation time was significant ($F(1,231)=28.0, p<.001, \eta_p^2=.11$). The interaction effects and main effects of condition and exposure were both not significant.

attitude scales: without differentiating between exposure times, enjoyment as a sole predictor explains 21.2% of the variance in the difference in workload attitudes between pre- and post-test for the game players ($F(1, 110) = 29.6, p < .001, \beta = .46, R^2 = .21$), 12.2% of this variance in the awareness and empowerment scale differences ($F(1, 110) = 15.2, p < .001, \beta = .35, R^2 = .12$), and 8.5% of the variance in the denial scale differences ($F(1, 110) = 10.3, p = .002, \beta = -.29, R^2 = .09$). Note that the negative β for the denial scale indicates reduced denial of the issue. When testing for differences in enjoyment between the two conditions, a two-sample t-test returned insignificant results ($t(209.2) = .2$). Although the attitude change of the participants who watched the clip instead was also influenced by their enjoyment of the content for two of the scales, betas were lower (Workload: $p = .013, \beta = .22$, Awareness and Empowerment: $p = .027, \beta = .20$, Denial: $p = .411$). Summarizing, though differences in the average level of enjoyment were not found between conditions, the game carried with it stronger effects of enjoyment on attitude change than the clip did.

Finally, the same regression analyses were done for the obtrusiveness of the persuasive intent. For the players of the game, this factor reliably predicted attitude change in the expected direction for all three scales (Awareness and empowerment: $F(1, 110) = 15.5, p < .001, \beta = .35, R^2 = .12$, Workload: $F(1, 110) = 14.9, p < .001, \beta = .35, R^2 = .12$, Denial: $F(1, 110) = 7.2, p = .008, \beta = -.25, R^2 = .06$). The third hypothesis is supported: Players who were more aware of the game's intended effects were persuaded more. A medium-strength positive correlation between the enjoyment scale and the average of the obtrusiveness items was significant at .05 level across all participants ($r(237) = .56, p < .001$). Next, regression analyses were performed with both scales as independent variables. For the workload scale, this analysis showed that the effect of obtrusiveness was non-significant ($t(110) = 1.0$) while enjoyment retained a significant predictive effect ($t(110) = 3.7, p < .001, \beta = .40$). Similar results were found for the denial scale with enjoyment being marginally significant (Obtrusiveness: $t(110) = -1.0$, Enjoyment: $t(110) = -2.0, p = .052, \beta = -.22$), while for awareness and empowerment, it caused both predictors to be marginally significant (Obtrusiveness: $t(110) = 2.0, p = .046, \beta = .22$, Enjoyment: $t(110) = 1.9, p = .054, \beta = .22$). Like enjoyment, persuasion obtrusiveness was not significantly different between conditions ($t(235) = 1.7, two-tailed p = .079$). Looking at the clip-watching condition, the degree to which

participants recognized the clip's effect did have a weak influence on the differences on the denial attitude scale ($F(1, 123) = 5.5, p = .021, \beta = -.21, R^2 = .04$), though no influence was found on the other attitude scales (Awareness and Empowerment: $F(1, 123) = 3.1$, Workload: $F(1, 123) = 2.8$).

Discussion

The results presented in this article add to the small but growing evidence on the effectiveness of persuasive games. In most cases this evidence comes from exploratory studies and show either small or non-significant effects. The current study follows this trend, displaying a significant difference on the workload scale, whereby players of *MCPL* showed greater increases than viewers of the YouTube clip on the same topic. However, the effect size for this difference was small. The fact that the difference was only found in the long-exposure players can be interpreted as that only those players who have played the game for more than 45 seconds came close to the sensation of the workload involved in harvesting 50 kilograms of cotton. These players had played the game long enough to see that in spite of their efforts, they were not coming any closer to filling the quota. Though the harsh nature of the work was also shown in the clip, it seems this particular sensation had a small but noticeable effect on their views on the topic. Whether this effect comes from the interactive experience of the game or from subtle content differences between clip and game is not unequivocally determined.

Both enjoyment and educational interest as well as obtrusiveness had interesting predictive effects on attitude change. Despite the game's apparent intention to not have the players enjoy themselves with the game, those who did enjoy themselves more were also influenced to a greater degree. If enjoyment is seen as related to player mood and source likeability, this result fits with previous findings where participants had limited resources to elaborate on the message, where the message had weak arguments, and/or came from a source that was considered an expert (Mackie & Worth, 1991; Schwarz et al., 1991). Because no differences in enjoyment were found between the two conditions in the current study, further conclusions on the level of processing routes cannot be drawn on the basis of these findings.

The results are reflective of the enjoyment scale used in this study, which included items on eudaimonic rewards (such as the joy of learning something new) alongside items related to fun (Ryan & Deci, 2001). This conclusion is supported by the finding that players who found that the game tried to affect them also had greater attitude change. The two obtrusiveness items used in these analyses (items 1 and 3 in table 1) could be interpreted in a positive way, that by noticing that the game tried to affect them, players understood the idea behind the game more than players who did not feel affected. Judging by the overlap of effects from enjoyment and obtrusiveness, it is likely that these players appreciated the game more because they saw its intention, and were more open to attitude change because of it. This mechanism is supported by studies in traditional persuasive settings (Reinhard et al., 2006). As this essentially means that conscious awareness of a game's effects on players coincided with being affected more, causation cannot be concluded from these results. The most likely path is a reciprocal one, where attitude change and enjoyment both influence each other positively.

Apart from the differential processing routes discussed earlier, another possible explanation can be found for the differences of the effect of enjoyment in this study when compared to that of Peng, Lee, & Heeter (2010). An answer may lie in the complexity of the enjoyment scale used in both studies. The three items used in the latter were "I enjoyed playing this game/watching this video/reading this story, I think this game/video/this story is fun, and Playing this game/Watching this video/Reading this story gave me an entertaining experience." (Peng et al., 2010, p. 733), while the current study's items also included eudaimonic rewards under enjoyment. Although three of the items (the third, fourth, and fifth items under Enjoyment in table 1) are virtually identical to those found in the other study, the presence of items 'I learned something new' and 'I liked learning about this topic' might have influenced respondents to think of the good the game does, rather than how much they enjoyed the experience on a hedonistic level. The current study's game is certainly more enjoyable for its message than it is as an entertainment experience. Care must be taken that in future studies both types of enjoyment are disentangled. More complete and multi-faceted enjoyment measures would alleviate these concerns greatly. Such a dualistic view on enjoyment is also warranted as the

intentions of persuasive games are in a lot of cases obvious to players; prospective players' motivations and expected outcomes will undoubtedly lie further away from pure entertainment than they do with other kinds of games.

For the results of this study, the focus was on finding an interaction effect of observation time and condition. Considering that main effects for observation time were found for all scales on both exposure times and conditions, there is no reliable way to separate any true effect of the game from a retesting effect whereby attitudes improved simply because the respondent had spent time contemplating the topic because of the pretest. That the effect size for the denial scale for this analysis was very small ($\eta_p^2=.02$) while it was large for the others (.18 for workload and .35 for awareness and empowerment) does not offer solid evidence to deny a possible retesting effect for any of these scales. However, if we can assume that a portion of this effect is caused by the content experienced by players and viewers, these results do show that this persuasive game's effect is at least on par with watching a short video clip and - for the workload scale - even has a stronger effect despite the exposure time being shorter for the game.

As evidenced in this study as well as in others (e.g. Gerling et al., 2014; Ruggiero, 2015), persuasive effects of this type of game can be found in multiple ways. Because of the variety of messages that persuasive games aim to spread, it is important to work towards a methodology that allows for robustly detecting small effects on attitude sets unique to each game (All, Nuñez Castellar, & Van Looy, 2016). Regardless of whether an absolute effect still needs to be established in the first place (through a no-treatment control) or if an effect is incremental and found through comparisons with competing persuasive media (Soekarjo & Oostendorp, 2015), future research should combine diverse methods such as implicit attitude tests with qualitative interviews (Gerling et al., 2014) as well as solidify scale-based testing. The latter is done through the application of pre-validated scales wherever possible (Ruggiero, 2015), though such measures would have to be selected to match the game's message closely. If no matching scales exist, it is better to develop tailor-made scales that exactly fit the game and to subsequently perform factor and reliability analyses validating their sensitivity and specificity, as was done for the current study. This diverse toolset should ultimately be

used to elevate the study of persuasive games to generalizable levels, linking game elements to effects to be able to predict future games' impact, and linking all of the factors in game, player, and play session to differential processing routes to construct a psychological model for the effects of persuasive games.

The small number of published works on this point to a future for persuasive games to be employed alongside other communicative media. As *MCPL* showed, persuasive games can be small, short term pamphlets to spread a message not in a ubiquitous, but in a uniquely personal way that calls for an active and engaging player to experience fully.

References

- All, A., Nuñez Castellar, E. P., & Van Looy, J. (2016). Assessing the effectiveness of digital game-based learning: Best practices. *Computers & Education, 92-93*, 90–103.
<http://doi.org/10.1016/j.compedu.2015.10.007>
- Bogost, I. (2007). *Persuasive Games*. Cambridge, Massachusetts: The MIT Press.
- De la Hera, T. (2015). A Theoretical Model for the Study of Persuasive Communication through Digital Games. In J. M. Parreno, C. R. Mafe, & L. Scribner (Eds.), *Engaging Consumers through Branded Entertainment and Convergent Media* (pp. 74–88). Hershey, PA: IGI Global.
<http://doi.org/10.4018/978-1-4666-8342-6>
- Gerling, K. M., Mandryk, R. L., Birk, M. V., Miller, M., & Orji, R. (2014). The effects of embodied persuasive games on player attitudes toward people using wheelchairs. *Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems - CHI '14*, 3413–3422.
<http://doi.org/10.1145/2556288.2556962>
- Gustafsson, A., Bång, M., & Svahn, M. (2009). Power explorer: a casual game style for encouraging long term behavior change among teenagers. *ACE '09 Proceedings of the International Conference on Advances in Computer Entertainment Technology*, 182–189.
<http://doi.org/10.1145/1690388.1690419>

- Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4(863), 1–12.
<http://doi.org/10.3389/fpsyg.2013.00863>
- Lavender, T. (2008). *Homeless: it's no game-measuring the effectiveness of a persuasive videogame (Master's thesis)*. Simon Fraser University. Retrieved from <http://summit.sfu.ca/item/9314>
- Mackie, D. M., & Worth, L. T. (1991). Feeling Good, But Not Thinking Straight: The Impact of Positive Mood on Persuasion. In J. P. Forgas (Ed.), *Emotion and Social Judgments* (pp. 201–219). Oxford: Pergamom Press.
- Peng, W., Lee, M., & Heeter, C. (2010). The Effects of a Serious Game on Role-Taking and Willingness to Help. *Journal of Communication*, 60, 723–742. <http://doi.org/10.1111/j.1460-2466.2010.01511.x>
- Petty, R. E., & Cacioppo, J. T. (1986). The Elaboration Likelihood Model of Persuasion. *Advances in Experimental Social Psychology*, 19, 123–205. [http://doi.org/10.1016/S0065-2601\(08\)60214-2](http://doi.org/10.1016/S0065-2601(08)60214-2)
- Rawlings, T. (2012). My Cotton Picking Life. Retrieved from <http://gamethenews.net/index.php/my-cotton-picking-life/>
- Reinhard, M.-A., Messner, M., & Sporer, S. L. (2006). Explicit Persuasive Intent and Its Impact on Success at Persuasion—The Determining Roles of Attractiveness and Likeableness. *Journal of Consumer Psychology*, 16(3), 249–259. http://doi.org/10.1207/s15327663jcp1603_7
- Ruggiero, D. (2014). Spent: Changing Students' Affective Learning Toward Homelessness Through Persuasive Video Game Play. *Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems - CHI '14*, 3423–3432. <http://doi.org/10.1145/2556288.2557390>
- Ruggiero, D. (2015). The effect of playing a persuasive game on attitude and affective learning. *Computers in Human Behavior*, 45, 213–221. <http://doi.org/10.1016/j.chb.2014.11.062>
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141–166.

<http://doi.org/10.1146/annurev.psych.52.1.141>

Schwarz, N., Bless, H., & Bohner, G. (1991). Mood and persuasion: Affective states influence the processing of persuasive communications. *Advances in Experimental Social Psychology*, *24*, 161–199.

Sinclair, R. C., Moore, S. E., Mark, M. M., Soldat, A. S., & Lavis, C. a. (2010). Incidental moods, source likeability, and persuasion: Liking motivates message elaboration in happy people. *Cognition & Emotion*, *24*(6), 940–961. <http://doi.org/10.1080/02699930903000206>

Soekarjo, M., & Oostendorp, H. Van. (2015). Measuring Effectiveness of Persuasive Games Using an Informative Control Condition. *International Journal of Serious Games*, *2*(2), 37–56.

<http://doi.org/10.17083/ijsg.v2i2.74>

Steinemann, S. T., Mekler, E. D., & Opwis, K. (2015). Increasing Donating Behavior Through a Game for Change: The Role of Interactivity and Appreciation. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play*. New York, New York, USA: ACM Press. <http://doi.org/10.1145/2793107.2793125>

Walk Free. (2014). Walk Free delivers petition to Daewoo HQ. Retrieved from

<https://youtu.be/4bXx8QKRJtU>

Table 1: Item list for the measure used in this study. Means and standard deviations are shown for each item and scale, and Cronbach's α is shown for relevant scales.

<u>Item</u>	<u>Pretest</u>	<u>Posttest</u>
	<u>M (SD)</u>	<u>M (SD)</u>
Awareness and Empowerment (α pre: .74, post: .79)	4.8 (.8)	5.2 (.9)
It is important to me that people who made the products I use are treated fairly.	5.1 (1.5)	5.7 (1.2)
Slavery still exists today.	5.6 (1.2)	5.9 (1.1)
Forced labor is a big problem in the world right now.	5.2 (1.3)	5.7 (1.2)
I can make a difference to stop forced labor.	4.1 (1.4)	4.6 (1.3)
Signing petitions and joining in protests helps to stop forced labor.	3.9 (1.4)	4.5 (1.4)
Buying clothes from trusted brands helps to stop forced labor.	4.4 (1.6)	4.6 (1.6)
I want to make a change to stop forced labor	5.2 (1.3)	5.5 (1.2)
Workload (α pre: .76, post: .85)	5.7 (.8)	6.0 (.9)
Harvesting cotton by hand is hard work.	5.7 (1.1)	6.1 (.9)
Harvesting cotton by hand takes a long time.	5.8 (1.0)	6.1 (1.0)
Cotton harvesters in some countries have to meet large quotas daily.	5.5 (1.1)	5.9 (1.1)
Cotton harvesters in some countries are not paid according to their efforts.	5.6 (1.1)	6.0 (1.1)
Denial (α pre: .52, post: .59)	2.8 (.7)	2.7 (.9)
In this day and age, clothes are made from materials harvested through honest labor.	3.0 (1.3)	2.7 (1.4)
As long as you're paid for work, it is not slavery.	2.9 (1.4)	2.5 (1.4)
I could pick 50 kilograms of cotton with little trouble.	2.3 (1.2)	2.2 (1.3)
I am well-informed about how my clothes are made.	2.9 (1.4)	3.4 (1.6)
Enjoyment and Educational Value (α : .80)		4.7 (1.0)
I have learned something new.		5.1 (1.5)
I liked learning about this topic.		4.9 (1.3)
I liked experiencing this topic.		4.6 (1.3)
I liked how the topic was presented.		5.1 (1.3)
I had fun experiencing this topic.		3.9 (1.5)
Obtrusiveness of Persuasive Intent (α : n.a.)		4.6 (.9)
The content I just experienced had a strong message.		5.5 (1.2)
The content I have just experienced was trying to persuade me.		5.1 (1.2)
I was being persuaded by the content I just experienced.		4.4 (1.3)
I felt I had to answer the second part of this questionnaire in a different way from how I feel about this topic.		3.8 (1.7)
The questionnaire itself tried to persuade me.		4.4 (1.7)

Figure

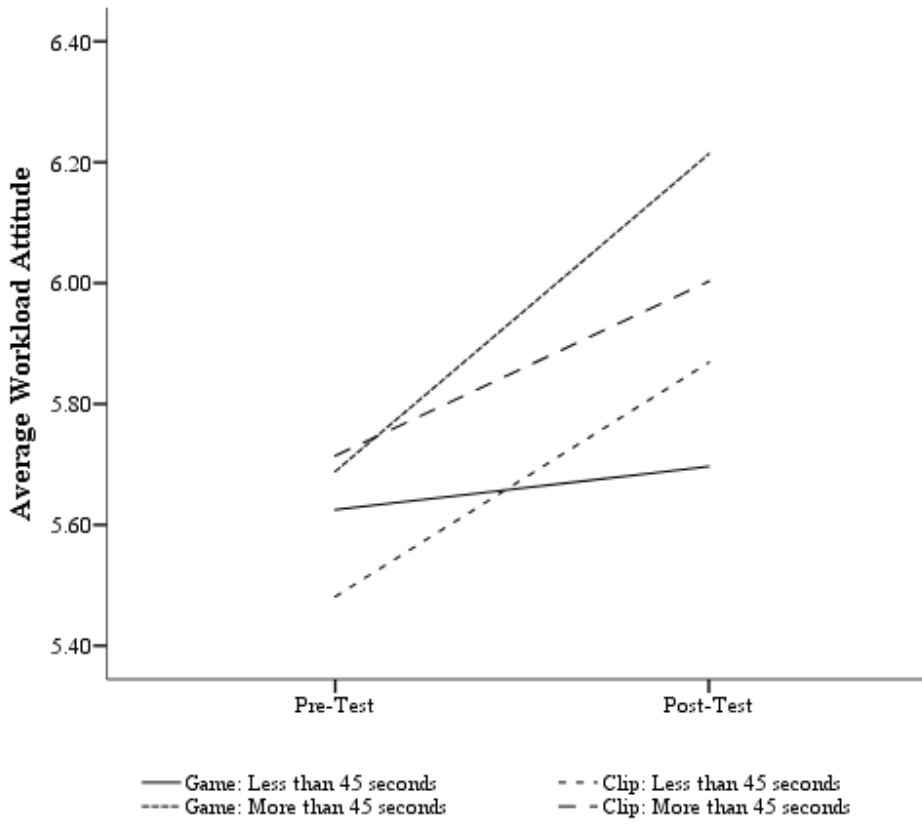


Figure 1: Graph of the average of the workload scale from pre- to post-test for both conditions and exposure times. The top two lines denote the high-exposure groups, while the lower two lines indicate low-exposure groups.