The Effects of a Serious Game on Role-Taking and Willingness to Help
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Serious games are emerging as a new medium for social change. This study investigated the influence of presentation mode afforded by different media on willingness to help in the context of humanitarian aid. Two online experiments were conducted. The first experiment demonstrated that playing the Darfur is Dying game elicited greater role-taking and resulted in greater willingness to help the Darfuri people than reading a text conveying the same information. The second experiment deconstructed the variable presentation mode in more detail by adding a game watching condition. Similar results were found such that game playing resulted in greater role-taking and willingness to help than game watching and text reading. Implications for researchers and game developers are also discussed.

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Serious games are digital games designed with a purpose beyond entertainment, including but not limited to games for learning, games for health, and games for advocacy and social change (Michael & Chen, 2006; Ritterfeld, Vorderer, & Cody, 2009). For instance, games for learning have been developed to teach various subjects and high-level cognitive skills (Lee & Peng, 2006), and games for health have been developed to promote health-related behavioral changes (Lieberman, 2006; Peng & Liu, 2008). Games for change focus on persuasion, such as forming or changing attitudes about political or religious agendas, or simply increasing awareness of social issues. For instance, PeaceMaker (http://www.peacemakergame.com) is a political game in which players can take the role of either the Israeli Prime Minister or the Palestinian President to deal with a variety of events, including diplomatic negotiations, suicide bombers, and interaction with eight other political leaders, so as to reach a peaceful agreement for both sides. By facilitating role-taking from both sides, this game intends to provide a unique opportunity to inform people of the issues in the region and influence their attitudes toward the other side.

Dozens of serious games for social change have been developed and played by millions of people; however, few empirical study, to our knowledge, has been

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conducted to evaluate how effective these games are. This study seeks to empirically test whether a serious game for social change is indeed effective in influencing people’s attitudes toward social issues and their willingness to help. Furthermore, what is more important is to understand how this serious game achieves the proposed effects. Is the role-taking afforded by the game a key mechanism? This study also attempts to empirically test the underlying mechanism of effects of serious games.

Theoretical background

Role-taking
Role-taking is a term instituted by George Herbert Mead, for whom it was a cognitive activity, not an overt behavior (Mead, 1934, 1982). Role-taking has been used interchangeably with perspective-taking (Davis, Conklin, Smith, & Luce, 1996; Epley, Keysar, Van Boven, & Gilovich, 2004; Ligneu-Hervé & Mullet, 2005; Tjosvold & Johnson, 1977). The concept of role-taking has been refined over the years. In general, role-taking refers to a cognitive process by which an individual temporarily imagines or pretends that he or she is another person so as to gain insight into the other person’s thoughts, attitudes, intentions, and behaviors in a given situation (Coutu, 1951; Feffer, 1959; Flavell, Botkin, Fry, Wright, & Javis 1968; Kelley, Osborne, & Hendrick, 1975). Colloquially, this process is phrased as “putting yourself into other’s shoes.” During this role-taking process, an individual goes beyond his or her typically egocentric means of perceiving the world to contemplate a different point of view. According to Mead, role-taking may be carried out from the perspective of a particular other or a generalized other such as a social group (e.g., a man takes the role of a woman; an American takes the role of a Darfurian).

Role-taking is essentially a cognitive process and can be manifested perceptually, cognitively, affectively, or behaviorally (Davis, 1994). For example, perceptually, the individual may imagine how objects appear to someone else who occupies a different physical vintage point. Cognitively, the individual may infer the other’s thoughts, intentions, or motivations. Affectively, the individual imagines and tries him- or herself to feel the emotional reaction experienced by the other. Behaviorally, some dimensions of the individual’s experience can be affected by conforming to the behavior of the other or by engaging in behaviors that are compatible with the other whose role he or she takes.

A concept very similar to role-taking is identification, which is most frequently discussed in a mediated context. Cohen (2001) defined identification as “an imaginary process invoked as a response to characters represented within a mediated text” (p. 250). According to Cohen, when identifying with characters in movies or TV programs, viewers imagine themselves as the characters and temporarily replace their real-life identities and roles with the characters. The concept of identification includes perceptual, cognitive, emotional, and motivational outcomes (Cohen, 2001). Perceptually, the individual is absorbed into the environment where the character
exists. Cognitively, the individual imagines understanding the thoughts of the character. Emotionally, the individual has empathy with, or shares the feelings of, the character. Motivationally, the individual internalizes and shares the goals of the character. It seems that identification has been used as a term to describe the special case of the role-taking of mediated characters.

Role-playing is another related term. The conventional conceptualization of role-playing emphasizes it from a sociological point of view: People fulfill a social function of a particular role and perform behaviors that are associated with and expected from being in such a role. For instance, someone who plays the role of a teacher should be engaged in a whole series of behaviors—educating students, protecting them, and loving them. In some situations, role-playing has been used interchangeably with role enactment (Kelley et al., 1975), because both involve overt enactment of one’s own role in a given context. People usually play multiple roles in society. For instance, a woman plays the role of a mother, a daughter, a teacher, a wife, and so forth. She needs to behave appropriately to meet the social and cultural expectations of each role in a given situation. On the other hand, role-taking is usually discussed from a psychological point of view and it concerns the cognitive processes. During role-taking, people momentarily imagine or pretend that they are someone else. The major difference between role-playing and role-taking is that role-playing does not imply the elaboration of a different (real or imaged) person as role-taking requires, but only refers to behavioral adjustment toward a set of expectations attached to a certain role (Kelley et al., 1975).

The introduction of interactive digital games blurs the line between role-taking and role-playing in a mediated context. Unlike role-playing in real life, where people do not pretend to be someone else, role-playing in an interactive gameplay context requires people to pretend that they are someone else and try to “take actions” to fulfill the social expectations of this other person in a make-believe situation. They try to think from the perspective of this other person and behave in accordance with the role expectations for the particular position or status of this other person. This kind of role-playing in a mediated environment heavily involves role-taking, because people need to pretend that they are someone else and need to think and feel from the perspective of others. A particular genre of digital games called role-playing games (RPGs) provides a mediated environment where people can act out certain roles that they normally do not play in real life, for example, warriors, sports stars, snipers, and so forth. While playing an RPG, people are pretending and imagining that they are someone else (e.g., gangsters in Grand Theft Auto) and acting accordingly to fit with the social and cultural expectations. In fact, all the actions taken are virtual actions through the player-controlled avatars in the mediated environment. Therefore, while playing an RPG, people are actually engaging in role-taking and play a role in the mediated environment through the control of the avatar.
Role-taking, empathy, and helping

Role-taking has been studied extensively in the realm of empathy, especially helping behaviors of role-takers. Empathy has meant different things to different scholars in philosophy and psychology (Zillmann, 2006). This study adopts the psychological approach for the conceptualization of empathy proposed by Davis (1994). There are two levels of empathy: parallel and reactive (Davis, 1994). Parallel empathy occurs when the individual experiences affective states that match or reproduce the other’s affects. Reactive empathy goes beyond a simple match of affect, and the individual has actual emotional reactions to the other’s affects.

Hoffman (1987) theorized six modes by which empathy takes place. Among the six modes, role-taking is the most advanced mode. The other five modes are primary circular reactions (e.g., infants cry to the sound of someone else’s cries), motor mimicry (e.g., people automatically imitate others, which creates internal kinesthetic cues to understand and feel the emotions of others), classical conditioning (e.g., communal experiences of an intense emotion in a disastrous situation, coupled with the realization that others are experiencing it as well), direct associations (e.g., observations of other people’s emotions remind us of our past experiences), and language-mediated associations (symbols serve as the medium by which the other’s emotions are communicated, most of the time by emotional labels, such as “I am worried”). Primary circular reactions and motor mimicry operate in a primitively automatic fashion. Classical conditioning, direct association, and language-mediated association require cognitive processing to some degree. In our everyday life, empathic concerns of adults mainly take the form of direct associations or language-mediated associations. Role-taking is the most advanced mode, which demands deliberate effort by the observer to imagine how he or she would feel in the same circumstances. Role-taking does not occur automatically. When role-taking does occur, however, it is more powerful than other modes for eliciting both parallel and reactive empathies.

Supporting Hoffman’s (1987) theorizing, Davis’ (1994) general review and summary of previous approaches to conceptualizing mechanisms underlying empathy identified role-taking as a process especially likely to produce empathy. Role-taking (perspective-taking) has long been found to be an antecedent of empathy (Baston, Eklund, Chermok, Hoyt, & Ortiz, 2007; Davis, 1994; Hoffman, 1987; Levy, Freitas, & Salovey, 2002; Scotland, 1969). In addition, ample empirical evidence has supported that empathy leads to helping behaviors (Archer, 1981; Batson, Batson et al., 1991; Batson, Eklund et al., 2007; Cialdini, Brown, Lewis, Luce, & Neuberg, 1997; Eisenberg & Miller, 1987; Fisher, Vandenbosch, & Antia, 2008; Levy et al., 2002). Numerous studies have particularly demonstrated that role-taking results in altruistic and helping behaviors (Batson, Sager, Garst, Rubchinsky, & Dawson, 1997; Coke, Batson, & McDavis, 1978; Schroeder, Penner, Dovidio, & Piliavin, 1995).

Using digital games to elicit role-taking

The preceding discussions suggest that role-taking is a mechanism that can produce empathy and helping. Role-taking can occur in a person’s imagination during
face-to-face interactions (non-mediated) or other real-life situations; role-taking can also be stimulated by a symbol-mediated environment (e.g., reading a story/narrative describing a situation) or by a mediated visual environment (e.g., watching a movie). An emerging media environment—interactive digital games, especially RPGs—provides a new platform that is highly conducive for role-taking to take place.

Each medium of communication has its own unique symbol system, which can have an impact on the cognitive skills that are activated to extract meanings from the messages (Salomon, 1979, 1990). Different media inherit certain form-related factors for the presentation of a view of the world. Language-mediated environments require the greatest cognitive capacity for role-taking to occur. Visual-mediated environments lower the cognitive requirement. The interactive digital gaming environment goes beyond the visual-mediated environment by providing a platform for mediated behavioral enactment and motor mimicry to take place, which further aids the role-taking process. For instance, while playing an RPG, the player controls the activities and experiences of the avatar, a graphical representation of the player taking on the imaginary role in the game. Perceptually, the line between the player and the avatar blurs, and the identities converge. Cognitively, the player needs to think from the perspective of the avatar so as to successfully interact in the game environment. Emotionally, the player feels with his or her avatar. When the avatar succeeds in the game, the player feels delighted; when the avatar fails, the player feels disheartened. Games usually set goals for the players to achieve. These goals are also the goals of the avatar in the game environment. Thus, motivationally, the player shares the goals of the avatar. All of these are in line with role-taking. In other words, interactivity and active participation in the game environment (Klimmt & Hartmann, 2006; McDonald & Kim, 2001; Vorderer, 2000) are features that facilitate role-taking in a virtual environment. On the basis of the previous discussion, we argue that the interactive game environment essentially provides affordance (Gibson, 1979) for role-taking to occur more easily than in other media environments.

Study 1

Hypotheses
To examine the relative effectiveness of interactive digital games on role-taking and helping behaviors in comparison with other media forms, in this study we focus on two types of mediated environments, interactive game environments and language-mediated environments. As role-taking has been identified as a process especially likely to produce empathy and helping behaviors toward the target or the social group that the target belongs to, it is hypothesized that

**H1**: Playing a serious game for social change will result in greater willingness to help than reading an informationally comparable text.
H2: Game players are more likely to engage in cognitive role-taking processes than the text readers.

H3: Role-taking mediates the effect of presentation mode on willingness to help.

Method

Participants
One hundred and thirty-three undergraduates (72 male) from two classes (one related to communication technology and one related to advertising) at a large university in the Midwestern United States volunteered to participate in the study in exchange for extra credit. The average age was 20 ($SD = 1.91$). Eighty-four percent of the participants had played a digital game within the last 6 months. Sixty-five of the participants (36 male) were in the game-mediated presentation condition and 68 (36 male) were in the language-mediated presentation condition.

Stimuli
An existing online Flash game (game presentation) and a created text (language-mediated presentation) were used in this study. The game (www.darfurisdying.com) and the text were about the conflict in Darfur. Five months after its release in 2006, more than 800,000 people had played the *Darfur is Dying* game for a total of 1.7 million times, of which tens of thousands had forwarded the game on to friends or sent a letter to an elected representative (Vargas, 2006). In the *Darfur is Dying* game, players select an avatar (a Darfurian refugee) and try to forage water to bring back to the refugee camp. They need to forage water from a well about 5,000 m away from the confined refugee camp, while at risk of being attacked, captured, and possibly killed by the Janjaweed militia. The game provides a simulated environment of the barren Darfurian desert region. When the players fail in their attempt to forage for water and are captured by the militia, they are informed that they have become one of the hundreds of thousands of people already lost to the crisis in Darfur. Depending on which avatars are chosen, players are also shown messages about their fate at the hands of the militia. If the avatar is a girl or a woman, when they are captured, they are told that they face abuse and rape by the militia; if their avatar is a boy, when they are captured, they are told that they face abuse and possible death. The text version was developed with content information comparable to the content messages provided in the game. The text is included in Appendix A.

Design and procedure
The hypotheses were tested using a one-factor (presentation mode: digital game presentation vs. language-mediated presentation) between-subjects experimental design. Students registered to two large undergraduate classes received both in-class and e-mail invitations to this study. The URL of the study was provided. When the participants opened the URL, the site was programmed to randomly assign participants to either the game playing condition or the text reading condition. A prequestionnaire that measured empathy tendency, issue involvement, and
previous knowledge of Darfur was administered online before game playing or text reading. A brief description of the Darfur crisis was included at the end of the prequestionnaire.

Immediately after completing the prequestionnaire, the participants randomly assigned to play the *Darfur is Dying* game were instructed how to play the game. They were asked to choose an avatar to forage water. If they succeeded in the first attempt, they could stop playing and proceed to the postquestionnaire. Otherwise, they were asked to refresh the web page and play it again for at most three times. Although there was another section of the game where people could enter the refugee camp, the participants of this study were not asked to play that section. Time spent on game playing was calculated based on the timestamps of the finishing time of the prequestionnaire and the starting time of the postquestionnaire. On average, the participants played the game for about 5 minutes. Subjects in the text reading condition spent on average 2.5 minutes to read about the crisis in Darfur. The postquestionnaire measured role-taking of the Darfurian featured in the game or in the text, willingness to help the Darfurian people, and demographic information.

**Measures**

Willingness to help was measured using four behavioral intention indicators. The participants were asked to use a 7-point scale to rate how likely, how probable, and how possible it was that they would (a) donate money to help fund crucial awareness and advocacy programs needed to end the crisis in Darfur ($\alpha = .90$); (b) sign a petition to build the political pressure needed to end the crisis in Darfur ($\alpha = .95$); (c) discuss the situation in Darfur with their friends or family ($\alpha = .93$); and (d) forward the link of the game (news story) to their friends to disseminate the message about Darfur ($\alpha = .94$).

As discussed earlier, identification is a term that has been used to describe the role-taking process with mediated characters. In this study, we modified Cohen’s (2001) identification scale to measure role-taking. The participants were asked to use a 7-point Likert scale ($1 = strongly disagree, 7 = strongly agree$) to rate six statements: “I was able to understand the events in a manner similar to that in which the Darfurian understood them.” “I felt I could really get inside the Darfurian’s head.” “At key moments, I felt I knew exactly what the Darfurian was going through.” “I wanted the Darfurian to succeed in achieving the goal.” “I could feel the emotions of the Darfurian.” “When the Darfurian failed, I was sad; when the Darfurian succeeded I felt joy.” For the two conditions, either “while playing the game” or “while reading the text” was added to each of the six statements accordingly ($\alpha = 72$).

As willingness to help can be influenced by both situational and dispositional variables, potential covariates were also measured. First, participants’ general involvement with international humanitarian affairs was measured using four created items: (a) I am fairly interested in issues concerning human rights; (b) I am fairly interested in issues concerning international affairs; (c) I pay attention to news about human rights; and (d) I pay attention to news about international affairs ($\alpha = .88$). Second,
empathic tendency was measured using the empathic concern subscale developed by Davis (1983) to assess individual tendencies to experience feelings, sympathy, and compassion for others in unfortunate circumstances ($\alpha = .87$). Third, sex difference with regard to empathic tendency has been assumed by the population at large. Thus, participants’ sex was taken into consideration. Fourth, previous knowledge of the crisis in Darfur was measured using a single item asking participants whether they had heard about the crisis in Darfur.

**Results**

To test the effect of presentation mode on willingness to help (H1), a one-way multivariate analysis of variance (MANCOVA) was conducted, using issue involvement, empathy tendency, sex, and previous knowledge of the crisis in Darfur as the covariates. The one-way MANCOVA showed significant differences for all the dependent measures related to willingness to help between the two conditions, Wilk’s $\lambda = .86$, $F(1, 123) = 3.91$, $p < .01$. As expected, game players ($M = 4.43$, $SD = 1.40$) were more likely to donate money to fund programs to raise awareness of the crisis in Darfur than the text readers ($M = 3.69$, $SD = 1.78$), $F(1, 127) = 6.81$, $p < .01$, $\eta^2 = .05$; game players ($M = 5.35$, $SD = 1.35$) were more likely to sign a petition to build the political pressure needed to end the crisis in Darfur than the text readers ($M = 4.43$, $SD = 1.80$), $F(1, 127) = 12.11$, $p < .001$, $\eta^2 = .09$; game players ($M = 4.92$, $SD = 1.47$) were more likely to discuss Darfur with friends or family than the text readers ($M = 4.20$, $SD = 1.70$), $F(1, 127) = 6.98$, $p < .01$, $\eta^2 = .05$; and game players ($M = 3.97$, $SD = 1.71$) were more likely to forward information about Darfur to friends to help disseminate the message than text readers ($M = 3.25$, $SD = 1.58$), $F(1, 127) = 7.69$, $p < .01$, $\eta^2 = .06$. Thus, H1 was supported. Issue involvement was a significant covariate for all the dependent variables. Empathy tendency was a significant covariate for all the dependent variables except for forwarding messages. Sex and previous knowledge of the crisis in Darfur were not significant covariates for any of the dependent variables. Analysis of variance results indicated that the game players ($M = 4.29$, $SD = 1.09$) had greater role-taking than the text readers ($M = 3.71$, $SD = 1.00$), $F(1, 131) = 10.56$, $p < .001$, $\eta^2 = .08$. H2 was supported.

To test the mediational hypothesis (H3), three regression equations based on the classical analytical framework for mediation by Baron and Kenny (1986) were used. The first regression was to establish that there was a significant relationship between the predictor (presentation mode) and the outcome (willingness to help) (path c). The second regression was to establish that there was a significant relationship between the predictor and the potential mediator (role-taking) (path a). In the third multiple regression equation, the outcome variable was regressed on both the predictor (path c’) and the mediator (path b). A complete mediation is established if the effect of the predictor on the outcome (c’) controlling for the potential mediator (b) is zero and a partial mediation is established if the effect (c’) is smaller than the effect when the outcome is only regressed on the predictor (c).
Table 1 contains the analyses necessary to test whether role-taking mediated the relationship between presentation mode and willingness to help (donation, signing petition, discussions with friends or family, and forwarding messages). Conditions in the three regression equations were all met. Presentation mode was significantly related to willingness to help; presentation mode was significantly related to role-taking; and role-taking significantly affected willingness to help and the coefficients associated with the relationships between presentation mode and willingness to help decreased when both presentation mode and role-taking were in the regression model. Therefore, role-taking partially mediated the relationship between presentation mode and willingness to help. H3 was supported.

Discussion
Study 1 compared the relative effectiveness of an interactive game and a text in influencing people’s willingness to help relieve the crisis in Darfur. The results of this study demonstrated that the mode of presentation influenced participants’ willingness to help the Darfurian people such that those who played a game expressed greater willingness to help than those who read a text with comparable information about the crisis in Darfur. Furthermore, role-taking was found to partially mediate the relationship between presentation mode and willingness to help.

Although the findings are interesting, a conservative approach is needed to interpret the findings. The game playing condition and the text reading condition were manipulated in such a way that they differed in terms of presentation mode. However,

**Table 1** Testing Role-Playing as Mediator

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<td>Petition</td>
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*p < .05. **p < .01. ***p < .001
these two conditions differed also in the target of role-taking. The conceptualization of role-taking suggests that the target of role-taking can be a particular individual or the general social group which the particular individual belongs to (Mead, 1934, 1982). The game playing condition inherently involved an individualized target person in Study 1, yet the text reading condition involved only a general social group and no individualized target person. With the design of Study 1, therefore, it is hard to specify whether it is the presentation mode or the presence of an individualized target person for role-taking that results in the effect on willingness to help. Still, Study 1 provided preliminary evidence for the impact of the interactive experience of game playing on role-playing and willingness to help.

**Study 2**

**Hypotheses and research question**
A second study is needed to manipulate the modes of presentation as comparable as possible. Furthermore, Study 2 seeks to extend Study 1 by deconstructing the variable presentation mode in more detail. Generally speaking, digital game environments include interactivity and audiovisual cues, whereas language-mediated environments lack both. By comparing a condition in which the participants do not actively interact in the game but only passively observe the game (the game watching condition) with the game playing condition, the effect of interactivity of the game presentation mode on willingness to help the Darfurian people can be studied (Peng, 2008). Additionally, the effect of multimodality (i.e., audiovisual plus textual cues vs. textual cues only) can be examined by comparing the game watching condition and the text reading condition. It is hypothesized that

**H4:** Playing a serious game for social change will result in greater willingness to help than watching the same game or reading an informationally comparable text.

**H5:** Playing a serious game for social change will result in greater role-taking than watching the same game or reading an informationally comparable text.

**R1:** Does multimodality influence willingness to help and role-taking?

**Method**

**Participants**
One hundred and twenty undergraduates (55 male) from a large university in the Midwestern United States participated in Study 2. The average age was 20 ($SD = 1.38$). Forty participants (18 male) played the *Darfur is Dying* game, 40 (22 male) watched the playback of the *Darfur is Dying* game, and 40 (15 male) read a story about Darfur with individualized target persons for role-taking.

**Design and procedure**
Students registered to two large undergraduate classes received URL of the Study. When the participants opened the URL, the site was programmed to randomly assign
participants to one of the three conditions: game playing, game watching, and text reading.

The *Darfur is Dying* game was again used. In the game playing condition, the participants were introduced to the situation in Darfur and then instructed to first play as Poni, a 13-year-old Darfurian girl, and then play as Jaja, a 12-year-old Darfurian boy. To make the content information comparable, only those participants who failed at both trials to forage water were included in the subsequent analyses. In the game watching condition, the participants were first introduced to the situation in Darfur and then watched the screen stream capture of the gameplay of the *Darfur is Dying* game in which Poni and Jaja both failed in their attempts to forage water. In the text condition, the participants read about the situation in Darfur and the failed attempts by a Darfurian girl named Poni and a Darfurian boy named Jaja (Appendix B). The game watching condition stimulus was created using the screen capture software Camtasia. The text condition was developed by describing the *Darfur is Dying* game experience in words. All three conditions were informationally comparable and included individualized target persons for role-taking. The game playing and game watching conditions were different in terms of interactivity. The game playing and the text conditions differ in terms of multimodality.

Measures
The same scales used in Study 1 were used to measure willingness to donate money (α = .83), sign a petition (α = .93), discuss with friends or family (α = .95) and forward information about Darfur (α = .93), role-taking (α = .77), empathic tendency (α = .78), and involvement (α = .91). Although a serious game deals with a serious issue in real life, playing the serious game as a form of digital games can be entertaining. To control for the influence of enjoyable gameplay experiences, enjoyability was measured on three items (“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.”) using a 7-point Likert scale, with 1 being strongly disagree and 7 being strongly agree (α = .92).

Results
A one-way MANCOVA was conducted, using issue involvement, empathy tendency, sex, previous knowledge of the crisis in Darfur, and enjoyability as the covariates. The one-way MANCOVA showed significant differences for all the dependent measures among the three conditions, Wilk’s λ = .67, F(1, 112) = 4.75, p < .001. Post hoc tests indicated that the game playing group and the text group differed significantly in their willingness to donate (p < .001, d = .80), to sign petition (p < .01, d = .78), to discuss with family and friends about Darfur (p < .01, d = .99), and to forward the information (p < .01, d = 1.20). Likewise, post hoc tests indicated that the game playing group and the game watching group differed significantly in their willingness to donate (p < .001, d = 1.27), to discuss with family and friends about
Darfur ($p < .05, d = .87$), and to forward the information ($p < .05, d = 1.01$). However, the game playing group and the game watching group did not differ in their willingness to sign the petition ($p = .09, d = .63$). Additionally, there was no significant difference between the game watching and text reading groups in participants’ willingness to help. Means and standard deviations for the dependent measures are reported in Table 2.

The three conditions differed significantly in facilitating role-taking, $F(1, 119) = 5.01, p < .01, \eta^2 = .08$. Post hoc tests demonstrated that the game playing condition had significantly higher score of role-taking than the game watching condition ($p < .05, d = .67$) and the text reading condition ($p < .05, d = .63$), but there was no significant difference between game watching and text reading ($p = .99, d = .03$). We also explored whether role-taking was the mediator for the relationship between interactivity and willingness to help, yet this was not established.

**Discussion**

Study 2 complemented Study 1 by ruling out the influence of the possible confounding variable—the presence of individualized target people for role-taking. Furthermore, Study 2 extended Study 1 by deconstructing the variable presentation mode in more detail. A game watching condition was added to examine the effects of interactivity and multimodality dimensions of the presentation mode variable. The game playing condition differs from the game watching condition in terms of interactivity. The game watching condition differs from the text reading condition in terms of multimodality (textual and audiovisual cues vs. textual cues only).

Similar to Study 1, it was found that the game playing condition resulted in greater willingness to help the Darfurian people than the text reading condition. Likewise, playing the game resulted in greater willingness to help than watching the game, suggesting interactivity as an important element that contributed to the relative positive effect of the game playing mode on willingness to help. The post hoc tests did not find significant difference between the game watching and text reading conditions. This finding suggests that multimodality is not a significant dimension of the presentation mode that contributes to willingness to help.

Study 2 also found that the game playing condition led to greater role-taking than game watching or text reading, although role-taking did not mediate the

**Table 2** Study 2 Means and Standard Deviations of Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Game Playing</th>
<th>Game Watching</th>
<th>Text Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donation</td>
<td>4.81 (.27)</td>
<td>3.54 (.37)</td>
<td>4.01 (.83)</td>
</tr>
<tr>
<td>Petition</td>
<td>6.14 (.83)</td>
<td>5.52 (.65)</td>
<td>5.37 (1.30)</td>
</tr>
<tr>
<td>Discussion</td>
<td>5.32 (1.30)</td>
<td>4.45 (1.67)</td>
<td>4.33 (1.52)</td>
</tr>
<tr>
<td>Forwarding</td>
<td>4.41 (1.69)</td>
<td>3.40 (1.73)</td>
<td>3.31 (1.32)</td>
</tr>
<tr>
<td>Role-taking</td>
<td>4.33 (1.06)</td>
<td>3.67 (1.14)</td>
<td>3.70 (.98)</td>
</tr>
</tbody>
</table>

*Note: Standard deviations are in parentheses.*
relationship between presentation mode and willingness to help. Even though both Study 1 and Study 2 demonstrated that game playing was superior to text reading in influencing role-taking, the inconsistent findings regarding the mediating role of role-taking suggests that the underlying mechanism is more complicated than previously discussed and more research is needed to disentangle this issue.

Enjoyability was added as a control variable in Study 2. Surprisingly, the game players had less enjoyable experience ($M = 4.08, SD = 1.34$) than the game watchers ($M = 4.70, SD = 1.89$) and the text readers ($M = 4.80, SD = 1.40$). In fact, not all serious games provide enjoyable and fun experience, especially serious games for change. Serious games create a unique first-hand experience for the player, which enables the player to better understand the experiences of other people, but the experience could be enjoyable or frustrating. This finding opens the new question whether people will be willing to expose themselves to special genres of games that will bring emotional experiences that are not fun.

**General discussion**

The incorporation of social issues into interactive games is not entirely new. As early as 1980, an energy crisis simulation game, *Energy Czar*, was created. The 2004 presidential election in the United States also generated a number of political games. For example, *Howard Dean for Iowa* was created to educate Dean supporters on various grassroots outreach programs. Despite the growing interest in “serious games for change,” little is known about how effective these games are in comparison with other media forms. To test whether a serious game was effective in influencing people’s role-taking and willingness to help, two studies were conducted to compare the game with different presentation modes. Both studies demonstrated that game playing resulted in greater willingness to help and greater role-taking. This study is important in that it is among the first to provide empirical evidence that interactive digital games are more effective than noninteractive presentation modes in influencing people’s empathic reactions to social issues.

Study 1 demonstrated that game playing resulted in greater role-taking than text reading and role-taking appeared to be the partial mediator for the relationship between presentation mode and willingness to help. However, the pitfall of Study 1 was that the game playing and the text reading conditions differed in the presence of an individualized target person for role-taking; the game playing condition included individualized target people for role-taking, whereas the text condition did not. To address this issue, the presence of individualized target people for role-taking was kept constant across the conditions in Study 2. Although game playing was still more effective than text reading in facilitating role-taking in Study 2, role-taking was not established as a mediator. The findings in Study 1 and Study 2 appear to suggest that the presence of individualized target people for role-taking was a significant element for role-taking to take place. Such exemplification effects have been demonstrated to affect user responses to news story, advertising, as well as other types of messages.
(Zillmann & Brosius, 2000) and the presence of a specific individual (in the present case: Poni and Jaja) in the serious games and the comparable texts can be considered as an exemplar. Digital games often involve individualized target people and exemplars. More research thus is needed to further investigate this mechanism for the game effects.

Nevertheless, role-taking is an important cognitive process which researchers should take into consideration when examining the effects of games for change. Despite the importance of role-taking in influencing empathy and helping behaviors, the concept of role-taking has lacked practical implications because role-taking does not occur automatically in reality. In experimental studies on the effects of role-taking, role-taking was generally manipulated by verbal instructions asking participants to imagine and pretend that they are someone else. Even though significant differences have been found between the role-taking group (given verbal instruction) and the control group (no instruction), this aspect of role-taking as a research technique has been criticized in that it lacks realism and does not resemble everyday life practice (Freedman, 1969). Our finding that interactive digital games (especially RPGs), an emerging new medium, provide affordance to role-taking to some extent promises practical implications of the concept of role-taking outside the laboratory environment. As digital games have become one of the most popular forms of media, there are significant practical implications of harnessing the power of interactive digital games to motivate people to engage in role-taking and subsequently influence their attitudes toward social issues. Theoretical investigations of role-taking and role-playing in the interactive-mediated environment as well as practical endeavors to improve game design to maximize role-taking are needed in future research. However, it also has to be acknowledged that the same game and same role can be played differently by different individuals because people often incorporate their own identities in virtual environments.

Another contribution of this study is that the second study singled out two dimensions of the variable presentation mode—interactivity and multimodality—to provide a more in-depth analysis of the effects of a serious game. The game playing condition was compared with the game watching condition to examine the effect of interactivity; the game watching condition was compared with the text reading condition to examine the effect of multimodality. As interactivity and multimodality are usually intertwined in many interactive applications, rarely has previous research manipulated and subsequently attributed the outcome effects to one element independent of the other. By examining the informationally comparable game playing, game watching, and text reading conditions, this study empirically tested the independent impacts of interactivity and multimodality of a serious game. However, it has to be acknowledged that even for interactivity, there are subdimensions. For instance, Moreno and Mayer (2005, 2007) summarized five common types of interactivity (i.e., dialoguing, controlling, manipulating, searching, and navigating). More research is needed to dissect the variable to provide a more complete picture when we study the effect of interactive media.
Several cautionary remarks need to be made here with regard to the interpretation and generalization of the findings of the current research. First, like any study on media innovation, the findings of the two studies should be interpreted with caution due to the novelty effect. Most people are not used to learning about a real-life humanitarian crisis through serious games. It is likely that the participants might have been more attentive and motivated during gameplay in this study. Serious games are still at an early stage of development. However, once serious games become abundant and compete with other media programs in the media-saturated world, it is not definite that serious games can keep their advantages. Second, the graphics and visual cues of the Darfur is Dying game are of simplistic cartoon style and not comparable to commercial-off-the-shelf games such as Call of Duty that has photorealistic rendering effect to immerse players. It is thus not appropriate to generalize the findings to those contemporary high-tech video games. It will be interesting to study the impact of graphic realism by comparing two games, one rendered in photorealistic manner and one rendered in cartoonish style. This will be especially relevant for serious games that address social issues in real life. It is likely that photorealistic graphics can significantly increase the sense of presence (Lee, 2004; Tamborini & Skalski, 2006), which is a concept that is related to role-taking. It will be interesting to study whether and how presence might mediate the effects of games. Third, the dependent variables in the current research are behavior intention variables. Even though behavior intention has been found to predict actual behavior, generalization of the findings of this study to actual behavior is limited. Finally, the game watching condition was artificially created to single out one dimension of the presentation mode and keep the content information constant to achieve internal validity. However, game watching does exist in real life as players usually take turns and those who are not in control of the joystick usually watch others play (Kerr, 2006). To some extent, the game watching condition in this study is similar to passively watching a cartoonish video clip. More research is needed to compare game playing and game watching in different contexts with different types of games in the future.

References


The Effects of a Serious Game  

W. Peng et al.


Appendix A: Study 1 Text Condition

In the Darfur region of western Sudan, the ongoing genocide has displaced 2.5 million people. Sudanese government soldiers and government-backed Janjaweed militias have killed more than 300,000 people and destroyed 1,600 villages. Women and girls are also raped by the militias as a weapon of war. The crisis continues as thousands more die each month from the effects of inadequate food, water, health care, and shelter in a harsh desert environment.

Below is a news report about Darfur. From it you will get a sense of what the Darfuri people are going through now.

“Refugees from the Darfur region of western Sudan have fled across the border into Chad to escape alleged ethnic cleansing in their war-torn country. The UUA president reports from a fact-finding trip to African region of ethnic violence.

Darfuri Women and Children Risk Capture, Abuse, and Death for Water Correspondent Kate Smith looks at the challenges villagers face.

More than 200,000 refugees from the murderous ethnic violence of the Darfur region of Sudan are now living in camps in neighboring Chad, and they have chilling stories to tell about life in Darfur.

Refugees fled from unprovoked and coordinated attacks by aircraft of the Sudanese army and the Janjaweed militia on the ground. Theft of livestock and property. Rape. Killing. And escape for those lucky enough to cross the Chadian border, often with only the clothes on their backs. Darfuri villagers live in the desert where water is scarce. Foraging for water has become very dangerous in this climate of violence because hastily dug, shallow wells are located a distance from the village.

Adult males rarely forage for water because they are so likely to be killed by the Janjaweed Militia. Foraging for water is a dangerous mission for the Darfuri women because they might be attacked, abused, and raped by Janjaweed militias on their way to the well. They must risk being caught to get water for their community. Without water, families and villages suffer and die.

Children also go to distant wells to get water for their community. Children can run faster and hide more easily, but they can carry less water. A little boy is fast and agile, but carries less water than his seniors. Girls face abuse, rape, and kidnapping by the Janjaweed. Boys face abuse, capture, and possible death if caught by militias.”

Appendix B: Study 2 Text Condition

In the Darfur region of western Sudan, the ongoing genocide has displaced 2.5 million people. Sudanese government soldiers and government-backed Janjaweed militias
have killed more than 300,000 people and destroyed 1,600 villages. Women and girls are also raped by the militias as a weapon of war. The crisis continues as thousands more die each month from the effects of inadequate food, water, health care, and shelter in a harsh desert environment. Below is a story about a Darfuran boy and a Darfuran girl. From it you will get a sense of what the Darfuran people are going through now.

Poni is a 13-year-old Darfuran girl in the refugee camp. She starts the daunting task of foraging water for her camp over 5,000 m southeast of the well. Poni plans to try to go north first and then go west to reach the well. For a while, it seems to be all fine. Then, some 3,500 m in, she hears the faint whine of a Janjaweed Jeep in the distance. Seconds pass as it becomes clear—the engine noise is growing louder, and she can see the blurry form of the Jeep getting larger and larger. Poni turns to the opposite direction. She successfully avoids the Jeep.

Perhaps there will not be any more patrols, she thinks, but that familiar whine is heard in the distance once again. Now she is in a bad position, as she has gone further away from the rocks and has no place to hide. She has no choice but to run across the open desert, hoping to outpace the Janjaweed militias. What feels like an eternity passes as Poni runs across the desert, trying to get away from the patrol. Somehow, she succeeds. The Jeep deviates from its course.

But she paid the price: she is much further from the well than she was before, some 6,500 m away. If only she did not have to run and hide all the time! Poni runs to the north for 500 m and she hears the faint whine of a Janjaweed Jeep coming to the south. She turns right and runs to the east and the militias drive away without noticing her. She then turns left and runs to the east and then to the north to try to reach the well. Another Janjaweed Jeep! Poni makes a detour again. She tries to run as fast as she can, but the Jeep is moving faster. It is coming closer and closer. The only solution for her now is to try to hide. But on this barren land, she has nowhere to hide. She is captured by the militias.

Girls in Darfur face abuse, rape, and kidnapping by the Janjaweed militias. If she succeeds, the girl can bring more water back than a smaller boy, but less than an adult.

Jaja is a 12-year-old Darfuran boy in the refugee camp. He must forage for water to bring back to his camp. This task often falls to women, as they routinely forage for water, firewood, and food. However, while an adult woman can carry a heavier load back to her family, she faces a grave risk of rape and abuse if caught. In Jaja’s case, he risks being attacked and possibly killed by Janjaweed militias if he leaves the confines of his camp. Despite this risk, he must do it in order to provide water for his community.

Jaja begins his dangerous journey over 5,000 m southeast of the well. It is so far away that he cannot even see it, even across the flat and barren terrain he must travel across. Hoping for the best, Jaja runs to the north first. For a while, he thinks he may be able to get to the well without encountering any trouble. Then, some 2,000 m in, he hears the faint whine of a Janjaweed Jeep in the distance. Seconds pass as it...
becomes clear—the engine noise is growing louder, and he can see the blurry form of the Jeep getting larger and larger. Jaja has to avoid the Jeep at all costs, even if it means going further away from the well into the desert.

Narrowly, Jaja finds a hiding place behind a few tall rocks and waits for the Jeep to pass. Crouching in the narrow shadow, he clenches himself together as the Jeep roars by, passing within a few feet of his hiding space. He remained undiscovered, but he has paid the price for it. Now he is further away from the well, and the patrols have more opportunities to find him.

Desperate to get water for his friends and family, Jaja runs across the open desert, taking the straightest course he can. The Jeep appears again, coming right at him. With no place left to hide, and nowhere to run, this time they catch him. It is likely that Jaja will become one of the hundreds of thousands of people already lost to this humanitarian crisis.

Boys face abuse, capture, and possible death if caught by militias. A little boy is fast and agile, but carries less water than his seniors.
严肃游戏对角色承担和乐于提供援助的影响

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【摘要：】

严肃游戏正逐渐成为一个社会变化的新媒介本研究调查了不同的媒介的呈现模式对是否愿意提供人道主义援助的影响。本研究进行了两个在线实验。第一项，试验表明玩游戏《达尔富尔即将灭亡》游戏比阅读传达同样信息的文本能产生更大的角色承担作用和更大的帮助达尔富尔人民的意愿。第二项实验通过增加一个观看游戏的条件更加详细地解构变量的呈现。模式与第一项实验结果类似玩游戏，比观看和阅读同样的信息更能导致角色承担和提供帮助的效果。最后，本文讨论了结果对研究人员和游戏开发商的
Les effets d'un jeu sérieux sur la prise de rôle et la volonté d'aider

Wei Peng, Mira Lee & Carrie Heeter

Les jeux sérieux apparaissent comme de nouveaux médiums de changement social. Cette étude a exploré l'influence des modes de présentation permis par différents médias sur la volonté d'aider dans le contexte de l'aide humanitaire. Deux expériences en ligne ont été menées. La première a démontré que jouer au jeu « Darfur is Dying » (le Darfour se meurt) a suscité une plus grande prise de rôle et a eu pour résultat une plus grande volonté d'aider les Darfouriens que ne l'a suscitée la lecture d'un texte contenant les mêmes informations. La seconde expérience a déconstruit les différents modes de présentation en plus de détails en ajoutant une condition de visionnement du jeu. Des résultats similaires ont été révélés : participer au jeu a suscité plus de prise de rôle et de volonté d'aider que ne l'ont suscité le visionnement du jeu et la lecture d'un texte. Les conséquences pour les chercheurs et pour les développeurs de jeux sont également discutées.

Mots clés : prise de rôle, communication et technologie, ludologie
Der Einfluss von Serious Games auf Rollenübernahme und Hilfsbereitschaft

Wei Peng, Mira Lee & Carrie Heeter


Schlüsselbegriffe: Rollenübernahme, Kommunikation und Technologie, Game Studies
The Effects of a Serious Game on Role-Taking and Willingness to Help

역할취득과 도와주려는 의도에 대한 진지한 개입의 효과들

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요약

진지한 게임들이 사회적 변화를 위한 새로운 미디어로서 떠오르고 있다. 본 연구는 인간적 구조의 문맥에서 도움을 주려는 의도에 대한 다른 미디어에 의해 제공된 제시방식의 영향을 조사하였다. 두가지의 온라인 실험들이 행해졌다. 첫번째 실험은 Darfur is Dying 게임을 하는 것이 더욱 큰 정도의 역할취득을 이끌었으며, 같은 정보를 전달해주는 텍스트를 읽는 것보다 더 큰 정도로 Darfuri 사람들을 도와주려는 의지를 확대하였음을 보여주었다. 두번째 실험은 게임을 보는 상황을 더하는 것에 의해 보다 정밀화된 여러 제시방식을 분석하였다. 비슷한 결과들이 발견되었는바, 따라서 게임을 하는 것은 게임을 보는것이나 텍스트를 읽는 것보다 도움을 주려는 의도나 역할을 획득하려는 의지가 더 크게 나타났다. 연구자들과 게임 개발자들을 위한 함의들이 논의되었다.
Los Efectos de un Juego Serio sobre la Toma de Roles y la Buena Disposición para Ayudar

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Resumen

Los juegos serios están emergiendo como un nuevo medio de cambio social. Este estudio investigó la influencia del modo de presentación proporcionado por los distintos medios sobre la buena disposición para ayudar en el contexto de la ayuda humanitaria. 2 experimentos online fueron conducidos. El primer experimento demostró que al jugar el juego *Darfur se está muriendo* obtuvo mayores tomas de rol y resultaron en una mayor disposición para ayudar a la gente de Darfur que leer un texto que expresaba esta misma información. El segundo experimento destruyó la variable de modo de presentación en más detalle agregando una condición de observar el juego. Los resultados similares fueron encontrados tal que el jugar el juego resultó en una mayor asunción del rol y disposición para ayudar que los que observaron el juego y leyeron el texto. Las implicancias para los investigadores y los que desarrollan los juegos son discutidas también.

Palabras Claves: Toma de rol, Comunicación y Tecnología, Estudios de Juego