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Cultural Differences in Digital Game Experiences:

Psychological Responses to Avatar and Game Environments

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ABSTRACT

The literature proposes that East Asians have a holistic view focusing on both salient objects and their backgrounds, whereas Westerners maintain an analytic view paying attention to focal objects and their attributes. Moreover, East Asians stress interdependency of self, while Westerners emphasize independency of self. The current study examined how cultural differences in world views and self-construals influence players' digital game experience, including visual attention, avatar identification, sense of agency, and spatial presence. Supporting the hypotheses, results showed that South Korean participants, compared to European participants, did pay greater attention to background objects, feel greater spatial presence, and lower agency over their avatar. Participants also differed in the association between spatial presence and enjoyment: spatial presence positively predicted enjoyment for South Korean participants, but not for European participants. Theoretical and practical implications of the study are discussed.

KEYWORDS

Avatar Identification, Cultural Difference, Sense of Agency, Spatial Presence, Visual Attention

INTRODUCTION

While digital games are popular worldwide as a form of entertainment media, the popularities of the specific digital game genres vary across cultures. Shooting (e.g., the Call of Duty series) and sports games (e.g., the FIFA series), for example, are favored in the U.S. and Europe, whereas role-playing games (RPGs, e.g., the Dragon Quest and Pokemon series) are popular in East Asian countries such as South Korea, China, and Japan. This difference in the popular digital game genres is, we argue, partially because the experience players appreciate in a digital game differs across cultures. Westerners may appreciate a sense that they are in control over a virtual character in a digital game and feeling

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that they exert influence on the game world, whereas East Asians may enjoy being immersed in a story and complying to a role given to them in a digital game.

This speculation, indeed, is supported by literature on psychological differences between Western (largely North America and Western countries) and East Asian countries (largely Far East countries, such as Korea, Japan, and China). A large volume of cross-cultural studies provided evidence for differences between Westerners and East Asians in their ways of understanding the external world and internal self. Regarding the world view, East Asians are likely to focus on backgrounds as well as focal objects, exploring the relationship between environments and focal objects. Westerners, in contrast, are unlikely to pay visual attention to environments as they are predominantly occupied with analyzing internal attributes of focal objects (Amer et al., 2017; Chua et al., 2022; Ngo et al., 2018; Nisbett & Masuda, 2003; Wong et al., 2018). There is also a clear cultural difference with regard to the way of understanding self, or self-construals. For East Asians, the self is perceived to be interdependent and changing across different situations and environment; for Westerners, experiencing the self is dominated by a sense of being independent from others, and thus one's self-status is invariant over time and context (Freedman et al., 2021; Jauk et al., 2021; Markus & Kitayama, 1991; Morling & Lamoreaux, 2008; Oyserman et al., 2002; Yuki, 2003).

These sociopsychological cultural differences should create variations in game experiences for digital game players from different cultures, leading to the distinct preferences for digital game genres and styles. For example, the cultural differences in perceptual processes can influence players' visual attention during playing a digital game, determining to which parts of a digital game screen they pay attention. More importantly, cultural difference in self-construal may cause differences in the ways in which digital game players feel identified with and control over their avatar. Given that identification with an avatar (Klimmt, Hefner, & Vorderer, 2009), and perception of control in a digital game (Grodal, 2000; Klimmt, Hartmann, & Frey, 2007) are key factors determining players' enjoyment of digital game play, the cultural differences in self-construals can influence digital game enjoyment and preferences. Yet not much research has been conducted to investigate the cultural differences in the digital game experience. To this end, the current study tested the effects of players' cultural backgrounds on digital game experience, entailing visual attention, identification with an avatar, sense of agency, spatial presence, and digital game enjoyment.

BACKGROUND

Cultural Differences in Visual Attention

A wealth of studies on cross-cultural comparison have been devoted to investigating cultural differences in East Asians' and Westerners' cognitive processes, such as perception, attention, categorization, and memorization of visual stimuli. Cultural psychologists postulate that East Asians have a holistic view in visual perception, whereas Westerners have an analytic view (Nisbett & Masuda, 2003). East Asians tend to pay attention to background environments as well as focal objects, investigating relationships between focal objects and the environment, whereas Westerners tend to focus on the foreground object itself rather than its background (Choi, Koo, & Choi, 2007; Nisbett & Masuda, 2003). By focusing on background environments and their relationships with focal objects, East Asians are better at utilizing contextual information and memorizing background objects than Westerners. Also, such cultural differences were observed in the processing of social information. Rayner, Li, Williams, Cave and Well (2007) and Chua, Boland, and Nisbett (2005) compared eye movements on face and scene perception, revealing that the Chinese participants spent greater time looking at the background and fixated less on the focal objects than the American participants did.

Visuals in a digital game is a primary source to deliver information to digital game players, and thus they utilize visual information to make meanings of being in a digital game environment. Visual information allows players to identify where they are located in the virtual world, what social

situation they are facing, and what are goals they should achieve in the digital game. Also, using visual information, players recognize who are opponents preventing them from completing missions and who are supporters collaborating with them in the digital game. If the perceptual differences between the East Asians and Westerners also apply to the digital game context, East Asians will attend to backgrounds of a digital game (e.g., background objects) as much as focal objects, whereas Westerners would predominantly focus on focal objects (e.g., as avatars and opponents) and pay relatively less attention to digital game environments. Thus, regarding players' perceptual process in a digital game, we hypothesize that:

H1: When playing a digital game, East Asians focus on background objects more than Westerners do, whereas Westerners pay attention to focal objects more than East Asians do.

Cultural Differences in Experiencing Self and Avatar

In the view of self, there also exist cultural differences between East Asians and Westerners. After reviewing cultural difference in sense of self, Heine (2001) conceptualized the characteristics of East Asians' and Westerners' self-view as flexibility versus consistency, an extra-individual versus an intra-individual focus, and the malleability of the self-versus world, respectively. That is, East Asians, in contrast to Westerners, are more likely to view themselves as changing across social situations, being influenced by a social context, and behaving adaptively to external world (Heine, 2001). In contrast, Westerners, compared to East Asians, tend to define self-beliefs clearly and confidently and maintain their understanding of self internally consistent and stable (Campbell, et al., 1996).

Avatar Identification

We propose that this cultural difference in self-construals may lead to distinctive digital game experience, particularly in the way players perceive their avatar. Previous literature proposes that media users often experience a visual representation of self in as an actual self (i.e., self-presence, Lee, 2004; Park, Lee, Jin, & Kang, 2010), suggesting that an avatar in a digital game can cause players to change their self-representation (Peña, Hancock, & Merola, 2009; Yee & Bailenson, 2007). In a similar vein, the identification theory (Klimmt, et al., 2009) posits that digital game players shift their self-perception from their actual self to an avatar and feel identified with their avatar. This shift in self-perception usually involves adapting character's properties and simulating its emotional and cognitive status.

Having interdependent self-construals and other-focused tendency, we propose that East Asians would readily simulate cognitive and emotional responses of their avatar in a digital game and emulate avatar's perspective in the game world. This cognitive and emotional simulation may allow East Asians to experience identification with an avatar in a digital game to a greater extent. In contrast, because Westerners have independent self-construals and tend to focus on internal attributes of their selves in the real world, it is less likely that they identify themselves with the avatar, compared to East Asians. Thus, regarding avatar identification, the following hypothesis is suggested.

H2: East Asians feel greater identification with an avatar than Westerners do during playing a digital game.

Sense of Agency

The sense of agency in a digital game play is a player's subjective feeling that he or she is in control of an avatar's movements and exert influence on the digital game environment. The sense of control is different from the sense of identification, as the identification is often determined independently from feeling of avatar control. Thus, the sense of control in a digital game should be measured separately

from the sense of identification in order to provide a comprehensive understanding of digital game players' subjective relationship with their avatar and digital game enjoyment.

Similar to the cultural differences in avatar identification, culturally dependent is the extent to which individuals value and experience sense of control. Previous studies suggest that East Asians tend to align their behavior with people, objects, and surrounding circumstances, adjusting oneself to the environment, whereas Westerners have the desire for and focus on control over their own actions (O'Connor & Shimizu, 2002). In a similar vein Heine and Lehman (1995) argued that East Asians and Westerners differ in their beliefs about who has control over outcomes of events in their lives (i.e., locus of control). East Asians tend to believe that powerful others, fate, or chance primarily determine events, thus assume external forces beyond their control (external locus of control). In contrast, Westerners tend to believe that events result primarily from their own behaviors and actions (internal locus of control). This argument implies that control is significantly important to Westerners that they often fail to distinguish between objectively controllable and uncontrollable events; hence Westerners tend to perceive that they have greater ability to control an event than they actually have, and mistakenly report a high level of predictability of an event (Ji, Peng, & Nisbett, 2000).

This body of literature provides insights on the different perceptions of sense of agency over an avatar. During game play, it can be expected that Westerners are more likely to perceive that they are controlling an avatar, and accordingly, believe that they have influence over the game environment via their avatar more than East Asians do. For East Asians, however, the concept of control is confined to a narrow implication. During game play, East Asians' perception of control is restricted to a limited scope, namely, direct and passive sense of controlling their avatar. Thus, we suggest a hypothesis on cultural difference in sense of agency as follows.

H3: Westerners feel greater sense of agency over an avatar than East Asians do during playing a digital game.

Cultural Differences in Spatial Presence

When an avatar is used in a digital game and a player identifies with the avatar, a player is more likely to experience spatial presence, a subjective feeling of "being there" inside the digital game world, because the player's self-perception is moved to the avatar, and his or her sensory channels are engaged via the avatar in the digital game environment. Many contemporary digital games are designed to create a heightened sense of spatial presence, which have been shown to facilitate educational and entertainment effects (e.g., Lombard & Ditton, 1997). A wide range of factors influencing spatial presence has been recognized, from technological factors such as a screen size (IJsselsteijn, Ridder, Freeman, Avons, & Bouwhuis, 2001) and the number of modalities involved in media use (Lombard & Ditton, 1997) to human factors such as personality (Wallach, Safir, & Samana, 2010) and cognitive ability (Sacau, Laarni, & Hartmann, 2008).

Besides these factors, we also suggest that cultural background influences the extent to which players experience spatial presence during digital game play. In a previous study examining cultural difference in media experience, Hu and Bartneck (2008) found that Chinese participants reported a higher level of presence than Dutch participants, when watching an interactive movie in a distributed media environment. We also predict that the cultural difference would appear in spatial presence during digital game play. That is, when playing a digital game, East Asians would be involved themselves in a greater processing of contextual information and the environmental elements of a digital game. In contrast, for Westerners, their cognitive and subjective response would focus mainly on their avatars and salient focal objects related to their in-game missions, appreciating the sense that they are controlling the avatar. Thus, East Asians would feel a higher level of spatial presence than Westerners. In line with the argument above, we hypothesize that:

H4: East Asians perceive greater spatial presence than Westerners do during playing a digital game.

We further expect that there exist cultural differences in ways players enjoy a digital game. For East Asians, readily feeling present in the digital game environment and switching flexibly self-perception to an avatar in a digital game, spatial presence is positively associated with enjoyment of playing a digital game. In contrast, for Westerners, who prefer exerting influence to adjusting themselves into the digital game environment, sense of agency would be positively related to enjoyment of playing a digital game. Thus, we predict a moderating role of cultural background in relationship of spatial presence and sense of agency to digital game enjoyment.

H5: Spatial presence has a positive relationship with digital game enjoyment for East Asian, whereas the relationship is weak for Westerners.
H6: Sense of agency has a positive relationship with digital game enjoyment for Westerners, whereas the relationship is weak for East Asians.

METHODS

Participants

We conducted a laboratory experiment with a digital game to test the hypotheses. Thirty-eight participants at a private university in Seoul, South Korea were recruited for the experiment. For East Asian sample, twenty Korean college students (nine females) were recruited. They were all East Asians, without experience staying abroad longer than one year. Western sample included eighteen students (eight females), registered at the university as exchange students. All of them were Caucasian from northern Europe such as German, Finnish, and Swedish. They spent less than a month in South Korea when they participated in the experiment.

For the Korean participants, the average age was 23.65, and for the Western participants, the average age was 22.85. Students from the two cultural backgrounds are comparable in their intellectual achievement and social status in their respective countries, which ensured the equivalence of the samples. All of the Western participants had good command of English in listening, speaking, and writing.

Materials

A digital game was developed using Adobe Flash (Adobe Systems, San Jose; see Figure 1), to measure visual attention and subjective responses. In the game, the participants were represented as a diver, and asked to collect as many planktons that were floating around as possible while avoiding collision with focal fishes. As the avatar was in a diving suit, the ethnicity and gender were not noticeable to participants.

The digital game presented objects carefully designed to measure participants' visual attention to focal and background objects. Focal objects included foreground objects related to the mission of the digital game, such as planktons participants were asked to collect and focal fishes participants were asked to avoid. Also, the digital game showed background objects, which consisted of three subcategories: background fish, inert objects, and environment (see Table 1).

The digital games were displayed on a screen with a size of 143 X 81 cm (16:9). The screen was located approximately 2 m away from a table where participants were seated with a joystick controller supporting a 4-way directional control and button-pressing. The participants played the game with the aid of a high-quality surround sound system and dim lighting for an immersive digital game experience.

Figure 1. Captured images of the digital game used in the experiment. The diver appeared in the images is the avatar controlled by participants

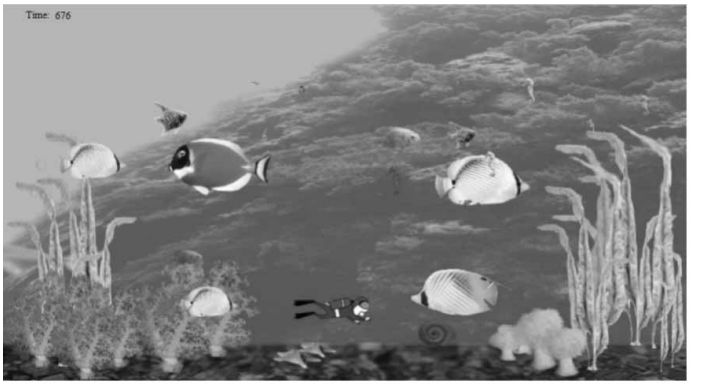
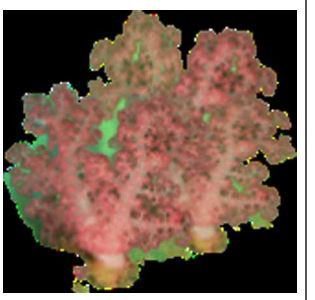


Table 1. Types of Objects in the game

Type	Category	Definition	Picture
Focal objects	Plankton	Agents, participants were asked to collect	
	Focal fish	Agents, participants were asked to escape from	
Background objects	Background fish	Fish, blurring feature and swimming in background	
	Inert object	Inert underwater creatures such as coral reef, seaweed, and shell	
	Environment	Other background information that referred to the context	

Procedure

The experiment was administrated on participants individually. Upon entering the laboratory, they signed a consent form and were given a questionnaire assessing demographic status. Next, they were escorted to a room equipped with two computers: one for game play and the other for a post-game questionnaire. In the digital game, a short story was provided to the participants so that they can be implicitly encouraged to pay attention to environment without any direct instruction. The story told participants that they would take a role of a scientist investigating an underwater environment. Their mission was to dive underwater and collect as many plankton samples as possible while avoiding collision with the focal fishes. Participants played the digital game for 5 minutes. After that, a recognition test was conducted to measure participants visual attention to focal and background objects. Then, a questionnaire was administered to measure participants' subjective responses, including identification with avatar, sense of agency, spatial presence, and enjoyment.

Measures

Recognition Test

Participants were presented with 36 pictures of objects including 18 focal fishes, and 18 background objects (i.e., 6 background animals and 12 inert objects) and were asked to indicate whether they had seen the objects in the game. Among them, 18 had appeared in the game, and 18 had not appeared in the game. Accuracy rates were calculated based on the appeared fishes. On average, participants recorded an accuracy rate of .56 for the focal fishes ($SD = 0.15$), and .57 for the background object ($SD = 0.18$).

Subjective Responses

All questions for subjective responses were answered on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The questionnaires were prepared in English first and translated to Korean. To guarantee the equivalence of two versions, items were evaluated in their qualities of translations according to a procedure suggested by Sperber, Devellis, and Boehlecke (1994). All Korean items were back-translated into English for evaluating the equivalence with the original version. The two versions of questionnaires and additional questions for reference were rated by four English native coders on two criteria (i.e., comparability and similarity). Two items, which had a below-average score for the reference questions, were revised and before included in the questionnaire.

Avatar Identification

Avatar identification was assessed by three items: (1) "During the game, I felt as if the diver was me," (2) "During the game, I felt the diver was an extension of me," and (3) "During the game, I felt the diver was an actual representation of me." Items were reliable, $\alpha = .76$, and participants' ratings were averaged to create a composite measure for avatar identification.

Sense of Agency

Sense of agency was measured with 3 items: (1) "During the game, it felt like I was in control of the diver," (2) "During the game, it felt like I could move the diver as I intended," and (3) "During the game, it felt like the diver was out of my control" (reverse coded). Items were reliable, $\alpha = .75$, and participants' ratings were averaged to create a composite measure for sense of agency.

Spatial Presence

Spatial presence was measured by four items adopted among in the Igroup Presence Questionnaire (Schubert, Friedmann, & Regenbrecht, 2001). The items are (1) "In the game, I had a sense of being there." (2) "I felt like I was just perceiving pictures or a movie clip" (reverse coded). (3) I felt that the underwater environment surrounded me", and (4) "I felt present in the game environment." Items were not strongly reliable, $\alpha = .69$, but the validity of the scale has been evidenced in a previous study

(Schubert, Friedmann, & Regenbrecht, 2001). Thus, we used the average ratings on these items to create a composite measure for spatial presence.

Enjoyment

The degree of enjoyment of the game was assessed with the items developed by the authors (1): "I enjoyed playing this game very much," (2) "This game was fun to play," (3) "I thought this game was a boring activity" (reverse coded), (4) "This game did not hold my attention at all" (reverse coded). Items were reliable, $\alpha = .88$, and participants' ratings were averaged to create a composite measure for digital game enjoyment.

RESULTS

Recognition Test

Regarding the recognition test, we anticipated that Korean participants would recognize more background objects as compared to their Western counterparts, whereas Western participants would recognize more focal objects than their Korean counterparts. The accuracies of the recognition test were analyzed using independent *t*-tests. Supporting our prediction, Korean participants' accuracy rates of background objects, $M = 0.63$, $SD = 0.21$, were significantly higher than Western participants' accuracy rates, $M = 0.51$, $SD = 0.11$; $t(36) = 2.19$, $p = .035$, $d = .72$. For the accuracy rates of the focal fish, the difference was not significant between Korean participants, $M = 0.56$, $SD = .16$, and Western participants, $M = 0.56$, $SD = 0.15$; $t(36) = 1.63$, $p = .112$.

Subjective Responses

Regarding the subjective responses to the digital game, we expected that Korean participants would feel greater avatar identification and spatial presence than Western participants, whereas Western participants would feel a higher sense of agency than Korean participants. As our measures for the subjective responses were correlated (see Table 2), we employed a multivariate ANOVA (MANOVA) and examine overall differences on the measures between Korean and Western participants. Then, we performed a planned *t*-test to check the difference for each measure.

The result of MANOVA showed that the main effect of background culture was significant, Wilks' $\lambda = 0.632$, $F(3, 34) = 6.60$, $p = .001$, $\eta p_2 = .37$. Univariate analyses revealed that Korean participants reported greater avatar identification than Western participants, but the difference was not statistically significant (see Table 2). Korean participants, however, reported higher spatial presence than their Western counterparts, while Western participants felt higher level of sense of agency than Korean participants (see Table 2).

Moderating Role of Cultural Background

Regarding the overall enjoyment, Western participants reported higher enjoyment, $M = 4.39$, $SD = 0.71$, than Korean participants, $M = 3.59$, $SD = 1.50$; $t(27.68) = -2.14$, $p = .041$. In order to examine

Table 2. Contrast of Korean with Western participants for subjective responses

	Korean	Western		Correlation coefficient		
	M (SD)	*M (SD)*	*t*	**1**	**2**	**3**
1. Avatar identification	3.12 (1.64)	2.24 (0.96)	1.98	-	.22	.70*
2. Sense of agency	3.85 (1.21)	4.85 (1.04)	-2.72*		-	.16
3. Spatial presence	3.41 (1.12)	2.74 (0.78)	2.14*			-

Note. *df* for the *t*-tests is 36. $p^* < .05$

the possible moderating role of cultural background, multiple regression analyses were conducted. In Model 1, a dummy variable representing cultural background (1 for Korean and 0 for Western participants) and subjective responses--avatar identification, sense of agency, and spatial presence--were employed as independent variables and enjoyment as a dependent variable. The subjective responses were scaled before entered into the model.

The result showed that the model accounted for significant variance in the enjoyment of the game, *adj.* $R^2 = 0.20$, $F(4,37) = 3.24$, $p = .024$. Western participants felt significantly higher enjoyment than the Korean counterparts after controlling for sense of identification, sense of agency, and spatial presence, $b = -1.07$, $t = -2.35$, $p = .025$. The other independent variables, however, did not predict digital game enjoyment (see Model 1 in Table 3).

In addition, we conducted two moderated multiple regression analyses in order to test H5 and H6 by adding cross-product terms (i.e., Korean × Spatial presence and Korean × Sense of agency, respectively). In Model 2, the cultural background by spatial presence interaction was employed, and the model significantly accounted for the variance in the enjoyment, *adj.* $R^2 = 0.33$, $F(5,32) = 4.64$, $p = .003$. The result showed that the coefficient of the product term was positive and significant, $b = 1.08$, $t = 2.76$, $p = .009$, implying that for Korean participants, the association between spatial presence and enjoyment is stronger than for Western participants. On the other hand, Model 3 employed the cultural background by sense of agency interaction. The result, however, failed to reveal the significant interaction, $b = 0.22$, $t = 0.50$, $p = .619$ (H6 was not supported, see Table 3).

In order to specify the relationship between the level of spatial presence and the enjoyment for Korean and Western participants, we conducted a post-hoc probing of the moderation effect. Supporting H5, the result of the analysis revealed that spatial presence was a significant predictor for enjoyment for Korean participants, $b = 0.86$, $t = 2.39$, $p = .029$, whereas it was not for Western participants, $b = -0.11$, $t = -0.34$, $p = .741$ (see Figure 2).

DISCUSSION

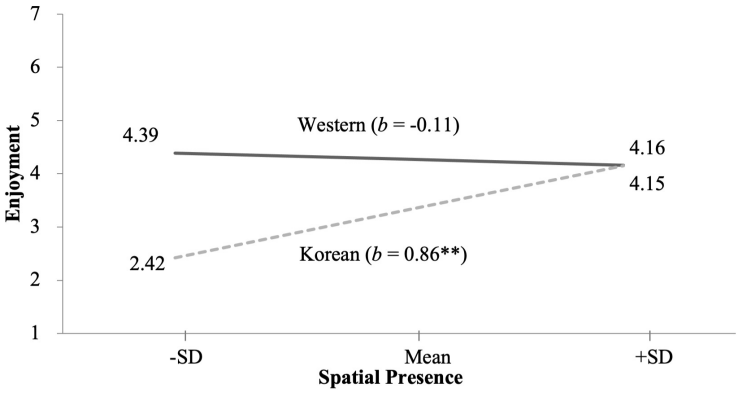
Building on cross-cultural studies suggesting socio-cognitive differences between Westerners and East Asians, the current study examined whether players with different cultural background have distinctive experiences from a digital game. In an experiment using a digital game, we assessed

Table 3. Moderated multiple regression results

Variable	Model 1		Model 2		Model 3	
	b (*SE*)	*t*	*b* (*SE*)	*t*	*b* (*SE*)	*t*
Constant	4.53 (0.30)	2.94*	4.32 (0.29)	15.11*	4.57 (0.32)	14.50*
Korean	-1.07 (0.46)	-2.35*	-1.01 (0.42)	-2.41	-1.07 (0.46)	-2.31
Avatar identification	0.01 (0.27)	0.03	0.00 (0.24)	-0.02	0.00 (0.27)	-0.01
Sense of agency	0.09 (0.22)	0.40	0.00 (0.21)	0.00	-0.03 (0.33)	-0.09
Spatial presence	0.51 (0.26)	1.95	-0.20 (0.35)	-0.57	0.50 (0.27)	1.84
Korea X Spatial presence			1.08 (0.39)	2.76**		
Korea X Sense of agency					0.22 (0.43)	0.50
adj. R^2	0.20		0.33		0.18	
F	3.24*		4.64**		2.58*	

Note. The *b*s indicate unstandardized regression coefficients. Avatar identification, sense of agency, and spatial presence were scaled. $N = 38$. * $p < .05$, ** $p < .01$.

Figure 2. Regression lines for relations between presence and enjoyment as moderated by background culture. b = unstandardized regression coefficient; ** p < .01. The marginal means of enjoyment were evaluated at each mean of covariates



participants' visual attention by measuring recognition accuracies and subjective experience such as avatar identification, sense of agency, and spatial presence.

For visual attention, Korean participants focused on background objects in the digital game as well as mission-related focal objects, whereas Western participants paid attention mainly to focal objects, as evidenced in Korean participants' higher recognition for background objects than Western participants'. The recognition accuracy for the focal objects, however, did not reveal any significant difference between Korean and Western participants. We suspect that this non-significance might be due to the difficulty of the test, as indicated by low scores for the background objects ($M = 0.56$ for both groups). Yet, the difference in recognition of the focal object is in line with previous findings on visual perception in cultural psychology (Masuda & Nisbett, 2001). Further, this finding extends our knowledge on how cultural background would influence digital game experience and their selection of digital games. East Asians tend to draw contextual information from backgrounds of a digital game and explore how focal objects such as an avatar or main characters in a digital game are related with the contextual information, whereas Westerners are likely to concentrate on objects related to main missions of a digital game rather than pay attention to background of the digital game.

Also, the current study revealed that subjective digital game experience is different between East Asians and Westerners. Compared to Westerners, East Asians felt that they are present in the digital game environment, as indicated by Korean participants' higher ratings on spatial presence than Western participants'. Furthermore, as evidenced in Western participants' higher rating on sense of agency than Korean participants', Western participants, compared to Korean participants, felt a sense of being in control of their avatar on the digital game environment. These findings are in line with previous studies showing East Asians' adeptness in adjusting themselves into a given context (Heine, 2001) and Westerners' over-appreciation of agency (Heine, Kitayama, & Lehman, 2001; Heine & Lehman, 1995; Ji, et al., 2000; O'Connor & Shimizu, 2002). They also broaden our knowledge on digital game experience, in that cultural difference induce distinctive digital game experience both in a cognitive and subjective dimension.

The current study also found distinct roles of spatial presence in inducing enjoyment of digital game play. For Korean participants, spatial presence yielded enjoyment in the digital game, whereas such relationship was not observed for Western participants. This result, we argue, is potentially due to the East Asians' willingness of adjusting themselves to the roles given in a situation, which helps them to effortlessly bridge the sense of spatial presence and the pleasures of playing a digital game. As the popular game genres in South Korean and Japan are Massively Multiplayer Online Role-Playing Games (MMORPGs) and RPGs, it may evoke pleasure for East Asians to identify themselves with

an avatar in a digital game and assume avatar's role in the digital game environment, despite a lower degree of freedom in controlling the avatar. In contrast, for Westerners, pursuing consistency in self-perception and the sense of being in the digital game environment is not necessarily affiliated with enjoyment unless the game provide appropriate elements, such as challenge (Jansz & Tanis, 2007; Sherry, 2004), or competence (Ryan, Rigby, & Przybylski, 2006), which are known for eliciting game enjoyment in the Western culture.

Implications

This study presents theoretical and practical implications regarding players' digital game experience. First, in order to examine the possible differences in game experiences, we introduced an extended set of psychological constructs as key factors in digital game experience: avatar identification, sense of agency, and spatial presence. Given that users have increasing chances to interact with their virtual representation (i.e., an avatar) in digital game or in computer-mediated communications, the importance of theory-building behind this interaction is also continually growing. So far, many media studies on audiences' responses to the characters emphasize passive observations of the audience and neglect the audiences' active participation because of the non-interactive aspect of traditional media (e.g., Cohen, 2001; Green, Brock, & Kaufman, 2004). Even in the recent explication of media user responses to interactive media, the active roles of the players were considered as an innate characteristic of the digital game (Klimmt, et al., 2009). However, technological features of the media, such as interactivity, should be addressed as perceived characteristics of a communication act, which varies according to the communicating actor's perception (Lee, Park, & Jin, 2006). Thus, in this study, we addressed the interactivity—specifically, the agency over an avatar—as a set of psychological constructs that can vary according to a user factor such as players' cultural background, rather than an objective technological characteristic. We expect that this formulation will provide a useful framework in further investigations of media users' experiences in interactive media such as digital game and virtual reality.

Moreover, with this conceptualization, we empirically demonstrated the differences in game experience according to the participants' cultural backgrounds. Although the current study is about digital game experience, our results also shed light on potential cultural differences in users' experience in other domains harnessing interactive media. For example, examining effects of using an interactive medium for an educational purpose, one can expect that an embodied character in an application can motivate learners (e.g., Chase, Chin, Oppezzo, & Schwartz, 2009) or a realistic virtual environment enables a situated learning (e.g., Mintz, Litvak, & Yair, 2001). Such effects, however, may differ by users' cultural background, such that East Asians may benefit from the application to a greater extent that Westerners, due to East Asians' emphasis on development of a psychological connection to an avatar and processing contextual information. In contrast, enhanced controllability of contents in educational applications would be more appreciated by Western users than by East Asians, as Westerners are willing to take control of the application and exert influence on an environment presented in the application.

Furthermore, the current study presents novel insights to previous studies on interactive media. Previous studies primarily conducted in Western countries suggest that an avatar evokes or reinforces diverse effects in different contexts such as level of presence (Nowak & Biocca, 2003), credibility of an agent in a virtual environment (Nowak, 2004), health behaviors (Fox & Bailenson, 2009), behavioral changes (Yee & Bailenson, 2009), and racial bias (Groom, Bailenson, & Nass, 2009). Under our findings, it is expected that effects of a virtual representation of users could differ in strength and mechanisms according to the user's cognitive styles and cultural background. For example, if East Asians are more likely to be attached to the avatar than Westerners, the avatar effect would be more prominent among East Asians than among Westerners. Moreover, if Westerners tend to feel a stronger sense of agency through operating an avatar, then effects on psychological responses, such as self-efficacy obtained by controlling an avatar would be higher for Westerners than for East Asians.

Limitations and Further Directions

Note that digital game used in the experiment was substantially simple in their graphic qualities, control scheme, and background storyline, as compared to widely enjoyed commercial games. It is worthy to mention that our experiment revealed cultural differences in cognitive and psychological responses, even for such a simple stimulus. Yet, contemporary digital games provide considerably realistic graphics, often in full 3-dimensional presentations; control of the avatar often use a motion detecting controller, allowing a greater freedom of control over the avatar than ever before. Thus, such a gap between our experimental flash game and commercial digital games may weaken the ecological validity of the current study.

In order to present better explanation on the differences in popularities of digital game titles between the Western and East Asian cultures, a future study may employ in its experiment commercially successful, recent digital games, which have a realistic graphic quality, sufficient freedom of control over the game characters, and better-structured story lines. In addition, a future study can extend the findings of the current study in relation to the various aspects of interactive media. Social interactions with agents in digital games are expected to be different according to the players' cultural backgrounds because of differences in self-construals and visual perception. Further, in a broad sense, it is valuable to study the cultural differences in users' responses to new media as such new media products have a trans-national and trans-cultural reach.

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