Can We Identify with a Block?
Identification with Non-anthropomorphic Avatars in Virtual Reality Games

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Abstract

This article explores identification with non-anthropomorphic avatars in a virtual reality game and its relationship to arousal and valence. Fifty-six male and female participants played a virtual game in a 360º stereoscopic immersive interactive visualization environment using either body movement or a joystick. A scale was developed to test identification with the block that represented each participant in the game. A gender effect occurred in which males that played using body movement experienced significantly higher identification than males that played with a joystick. Also, within the entire sample a positive correlation was found between identification and arousal as well as between identification and valence. Results suggest that identification might not be a process exclusively related to anthropomorphic characters.

Keywords: **Identification, non-anthropomorphic avatars, arousal, valence, virtual reality, video games**

1. Identification Beyond Anthropomorphic Characters

Most research on identification in media is based on identification with human-like characters (Cohen, 2001, 2006; Eyal & Rubin, 2003; Feilitzen & Linne, 1975; Hoffner, 1996; Hoffner & Buchanan, 2005; Moyer-Gusée, Chung & Jain, 2011; Oatley, 1994). However, is identification with other entities possible? This study investigates whether identification with non-anthropomorphic avatars representing users in a virtual game is also possible. .

Identification is an imaginative process through which an audience member assumes the identity, goals, and perspective of a character (Cohen, 2001). Oatley (1994) argued that the important components of identification are that the user adopts the characters' goals, comprehends plot events in reference to these goals, and experiences the feelings that result from the interaction of these goals and the events that take place. Klimmt, Hefner and Vorderer (2009) defined identification in the context of video game playing as a temporal shift of players' self-perception through adoption of valued properties of the game character.

In an attempt to operationalize the concept, Cohen (2001) proposed four dimensions to take into account when measuring identification with media characters. The first is empathy or sharing the feelings of the character (i.e. being happy, sad, or scared, not for the character, but with the character). The second is a cognitive aspect that is manifested by sharing the perspective of the character. Operationally, this can be measured by the degree to which an audience member feels s/he understands the character and the motivations for his or her behavior. The third indicator of identification is motivational. This addresses the degree to which the audience member internalizes and shares the goals of the character. Finally, the fourth component of identification is absorption or the degree to which self-awareness is lost during media exposure. Because identification is conceived as temporary and fleeting, it should be measured both in terms of intensity and frequency. The more someone is absorbed in the media experience, empathizes with and understands a character, and adopts his or her goals, the more s/he may be said to identify with that character (Cohen, 2001).

Following these considerations, identification in virtual game playing is defined in the context of the present study as an imaginative process through which a user assumes the identity, goals, and perspective of his or her avatar. The user comprehends plot events in reference to these goals, and experiences the feelings that result from the interaction of these goals and the events that take place. This avatar does not necessarily need to be human-looking, as it can be represented by any non-anthropomorphic entity or character, that is to say, a virtual object, an animal, a cartoon, etc.

Principally, studies on identification with characters have centered attention to television and audiovisual fiction (e.g. Cohen, 2001, 2006; Eyal & Rubin, 2003;

Feilitzen & Linne, 1975; Hoffner, 1996; Hoffner & Buchanan, 2005; Igartua & Muñiz, 2008; Moyer-Gusée et al., 2011). Recently, some studies regarding identification in interactive media have also appeared in the literature (e.g. Eastin, Appiah, & Cicchirllo, 2009; Klimmt, Hefner, & Vorderer, 2009; Klimmt, Hefner, Vorderer, Roth, & Blake, 2010; Konijn, Bijvank, & Bushman, 2007; Schneider, Lang, Shin, & Bradley, 2004; Soto-Sanfiel, Aymerich-Franch, & Ribes, 2010; Van Looy, Courtois, De Vocht, & De Marez, 2012). In particular, interactivity (Soto-Sanfiel et al., 2010) and the presence of a storyline (Schneider et al., 2004) have been highlighted as factors that increase identification with characters.

On the other hand, people tend to attribute human characteristics to inanimate objects (e.g. Nass, Fogg, & Moon, 1996; Nass, Steuer, Henriksen, & Dryer, 1994; Reeves & Nass, 1996). Particularly regarding virtual representations, Nowak and colleagues explored the influence of anthropomorphism on avatar's perception, credibility and attractiveness (Nowak & Rauh, 2005). They also examined the influence of agent's anthropomorphism on perceived social presence (Nowak and Biocca, 2003) as well as on uncertainty and social judgment (Nowak, 2004). Even so, identification with non-anthropomorphic avatars has not yet been explored.

The aim of this study is to investigate the possibility of identification with a non-anthropomorphic avatar. New data is presented from a study that was partially published elsewhere (Aymerich-Franch, 2010).

In particular, it is analyzed whether using the body to move the avatar alongside the screen to play a game increases identification with the avatar. For that, a game was designed in which participants controlled a block on a 360° stereoscopic virtual environment using either body movement or a joystick.

Regarding this, it is hypothesized that (H_1) participants using body movement to play will experience higher identification with the virtual object representing them in the game than those playing with a joystick.

2. The Relationship of Identification with Arousal and Valence

Emotions in virtual game playing have received previous attention in the literature (Ravaja et al., 2004; Ravaja et al., 2006; Schneider et al., 2004). However, there is a lack of studies analyzing the relationship between identification with a non-anthropomorphic character and emotions.

The dimensional theory of emotion suggests that emotions are all placed in a two dimensional space as coordinates of valence and arousal (Lang, 1995; Larsen & Diener, 1992). Arousal indicates the level of activation associated with the emotional experience, and ranges from very energized to very calm. Valence reflects the degree to which an affective experience is negative or positive. The same approach has been previously adopted for measuring emotional response in interactive media (Schneider et al., 2004).

Experiencing the emotions of the characters is considered one of the main premises in identification theories (Oatley, 1994; Cohen, 2001). According to this, (H_{2A}) a positive correlation between identification and arousal is expected. Also, (H_{2B}) a positive correlation between identification and valence is expected.

3. Method

3.1. Sample

Fifty-six undergraduate, Master and PhD students from an Australian university took part in the experiment. There were 24 females and 32 males aged between 18 and 44 years (M=22.6). Students were volunteers and did not receive any payment or credit for their participation. They were randomly assigned to one of the two experimental conditions as described below.

3.2. Procedure and Materials

A collaborative virtual game was designed in which participants had a non-anthropomorphic avatar resembling a block. Each participant had to achieve an individual and a group goal. Two versions of the game were created. In one of them, participants controlled the block with a joystick; in the other one, by body movement.

Participants entered the virtual environment in groups of four wearing 3-D glasses. The block appeared on the screen as the participant entered the 360° virtual environment. Each block varied in color (blue, green or red) or shape (cube, pyramid or cylinder). The participant either controlled the block's movement with a joystick (low body participation) or with own body movement (high body participation). Subjects were able to freely move inside the ten-meter in diameter virtual environment. As soon as the game started, participants had to put their block in a specific hole represented on the screen. The whole group had eight minutes to achieve the general objective of the game (all participants had to put his or her block in the hole). In addition, a virtual agent (the opponents) appeared for each player on the screen that tried to kick the block, making it more difficult for
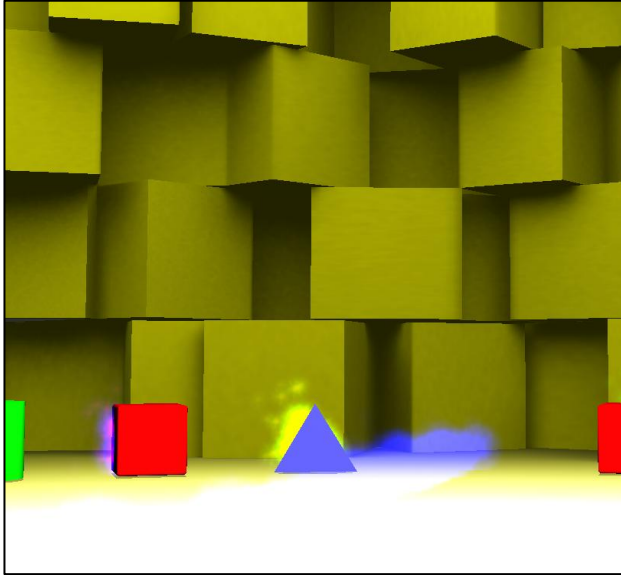
Figure1. Non-anthropomorphic avatars (blocks) of the four participants during the game

participants to achieve the goal. If subjects achieved it before running out of time, a new screen appeared congratulating them. Otherwise, a screen appeared after eight minutes in which the environment became virtually destroyed. Afterwards, participants filled out a computer-based questionnaire.

4. Measures

4.1. The Scale of Identification with Non-anthropomorphic Avatars

As mentioned above, most research on identification has to do with anthropomorphic characters. However, due to the lack of research on measuring user identification with non-anthropomorphic avatars, a new approach must be considered and alternative measures developed. For this purpose, a scale to measure identification with non-anthropomorphic avatars was developed. The scales used by Schneider et al. (2004) to measure identification with video game characters and Cohen's (2001) conceptualization of identification were taken as the main references to build the scale. Though created specifically for the experiment, this newly developed scale could be easily adapted to similar research related to interactive games.

The first three items in the *Scale of Identification with Non-anthropomorphic Avatars* were designed to investigate whether subjects identified with the block

itself (e.g. to what extent did you identify yourself with the block you were playing in the game?) Next, there was a question related to empathy (i.e. when the opponents tried to follow and kick your block, how much did you feel like it was happening to you?). As the previous literature suggests, one of the most important aspects for experiencing identification is internalizing and sharing or adopting characters' goals. Thus, the last two questions were aimed to determine the interest in achieving the general and the individual objectives of the game (e.g. to what extent were you interested in putting your block in the hole?).

The internal consistency of the scale was acceptable (α=.758). Principal Components Analysis was used to determine internal consistency. The Kaiser-Meyer-Olkin measure of sampling adequacy was acceptable (KMO=.616), and Bartlett's test of Sphericity was significant (p= .000). The final Scale of identification with non-anthropomorphic avatars was composed of 6 items.

Users rated each item in a 7-point Likert scale ranging from Not at all to Very much.

4.2. Arousal and Valence

In order to measure arousal and valence, Lang's Self-Assessment Manikin (SAM) (Lang, 1985) was employed. SAM visually represents the pleasure, arousal, dominance model (PAD) developed by Russell & Mehrabian (1977). It represents each PAD dimension with a graphic character displayed on a nine-point scale. SAM has previously been employed to study emotions in virtual environments (Ravaja et al., 2004; Ravaja et al., 2006; Schneider et al., 2004). For the purpose of this study, valence and arousal scales resembling Lang's SAM were employed.

5. Results

T-test did not report significant differences between the two groups (body movement vs. joystick) in terms of identification (independent sample t-test at 5%: t=1.34, p=.460). However, a General Linear Model was then used to incorporate gender as a factor to be considered in the model. Condition (body movement vs. joystick) and gender were placed as fixed factors and age as a covariate. In the analysis, the interaction between condition and gender was significant (F=5.41, p=.024, partial η^2=.098). No significant differences were found for Condition (F=.861, p=.358, partial η^2=.017), Gender (F=.038, p=.847, partial η^2=.001) or Age (F=3.5, p=.067, partial

Table1. Mean and SD: Gender plus Condition

Condition	Mean	SD
Men+Body	4.7	1.13
Men+Joystick	3.92	.79
Women+Body	4.31	1.08
Women+Joystick	4.63	1.26
Total	4.34	1.06

Table 2. Pearson's Correlations between Identification and Valence / Arousal

		Valence	Arousal
Identification Scale	Pearson's correlation	.476(*)	.487(*)
	Sig. (two-tailed)	.000	.000
	N	55	54

* Correlation is significant at the 0.01 level (two-tailed).

η^2=.065) alone. Post-hoc tests helped to determine that men using body movement experienced higher identification than men using a joystick (p=.033). No significant differences were found in women or between men and women. Thus, Hypothesis 1 is partially supported. Table 1 shows mean and SD for all combinations of condition plus gender.

In order to test Hypothesis 2, Pearson's correlation was employed to test the relationship between identification and arousal as well as between identification and valence. Identification positively correlated with valence and arousal (see Table 2). Thus, Hypothesis 2a and 2b are supported.

6. Discussion

This work explored the possibility of identification beyond anthropomorphic characters. It analyzed whether players in a virtual game may experience identification with non-anthropomorphic avatars in virtual reality. In particular, the study explored whether using body movement to control the avatar contributed to experience higher identification compared to using a joystick. This hypothesis was supported in the case of men. Males using body movement experienced higher identification than males using a joystick. The concept of proto self-presence may contribute to explain these results. Self-presence describes how people connect to their self-representations and the extent to which the self is present during media use (Ratan, 2010, in press). Proto self-presence (or body-level self presence) is one of the levels of self-presence. It defines the extent to which a mediated self-representation is integrated into body schema. The experience of proto self-presence involves using a virtual object as if it is an extension of the body. High self-presence implies self-representation treated as an extension of the body without conscious consideration of the media interface. This requires comfort with the interface used to control the virtual object (Ratan, 2010, in press). The concept of proto self-presence is very close to identification as defined in the study. Users that played with their bodies might have experienced higher connection with their virtual representations given that they controlled their avatars directly with the body. In the joystick condition, higher awareness of the media interface might have occurred. Thus, a more direct connection with the avatar (without the constraint of the joystick) might have increased identification. However, this effect only occurred in males. Future studies are needed to explain gender differences on this regard. Perhaps females experienced a higher constraint using body movement to control the avatar or the joystick interfered less and was better integrated in the connection with the virtual body. Experiencing the emotions of characters is considered one of the most relevant characteristics in identification theories. Accordingly, the relationship between identification with non-anthropomorphic avatars and arousal as well as the relationship with valence were tested. Results showed a positive correlation between identification and arousal as well as between identification and valence. The greater identification, the more aroused and positive participants felt during the game. These findings can be framed and integrated within media entertainment theory that places enjoyment at its core (Vorderer, Klimmt & Ritterfield, 2004). Media-related enjoyment is defined in this theory as a complex construct that includes references to physiological, affective, and cognitive dimensions. From this perspective, emotions can be placed within the general concept of enjoyment. Also, this paradigm integrates identification as one of the mechanisms of enjoyment (Hefner, Klimmt & Vorderer, 2007; Klimmt, Hefner & Vorderer, 2009). Previous studies observed a

relationship between identification and enjoyment on the context of video gaming (Hefner, Klimmt & Vorderer, 2007; Trepte & Reinecke, 2010). The correlation between identification and emotions found on this study contributes to cast light on the relationship between identification and overall enjoyment in the context of interactive media and video gaming.

Finally, participants reported an overall Mean of 4.34 in a 7-point scale in which 1 indicates no identification at all and 7, extremely high identification. Participants presented moderate-to-high levels of identification with their non-anthropomorphic avatar.

The findings in the study suggest that identification might not be exclusively related to anthropomorphic characters. However, future work is needed to further investigate the identification and anthropomorphic character relationship. In particular, it would be of interest to compare identification in anthropomorphic vs. non- anthropomorphic avatars in the context of virtual reality.

Finally, it is important to be aware that products capable of inducing strong identification are likely to elicit greater arousal and positive valence to participants. Given the results of this study video game and virtual reality developers need to consider identification as an important variable not only in reference to anthropomorphic characters, but also to non-anthropomorphic avatars.

Acknowledgments

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