Full length article

Understanding emotional bond between the creator and the avatar: Change in behavioral intentions to engage in alcohol-related traffic risk behaviors

Ho-Kyung Kim [a, *], Sei-Hill Kim [b]

[a] Hallym University, Republic of Korea
[b] University of South Carolina, USA

ABSTRACT

This study examines the joint impact of an individual's relationship with his or her avatar and negative consequences to the avatar on changing the individual's behavioral intentions (BI) in terms of alcohol-impaired driving. One hundred eleven participants volunteered to participate in several experimental conditions where the degree of choice of avatar features and the degree of control of the avatar's actions were manipulated in Second Life, an immersive 3D virtual environment. Participants who were allowed to customize their avatars viewed their avatars not only more similar but also emotionally closer to themselves, and perceived their avatars to be physically more attractive than those who were assigned basic avatars. After observing a car crash caused by drunk driving, participants in the choice and control condition were more likely to change BI positively when they identified their avatars to be similar to themselves, and regarded their avatars more attractive. Furthermore, participants who were allowed to control their avatars were more likely to attribute the responsibility of the car accident to themselves than those who observed someone else's avatar playing. Implications for the use of virtual reality games in promoting healthy behaviors are discussed in detail.

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1. Introduction

This research examines the degree of emotional bonding between an individual and a virtual character, called an *avatar*, when s/he has different levels of interactions with the character. Then, the study evaluates the impact of negative consequences to one's avatar on changing a person's behavioral intentions with respect to driving under the influence of alcohol. Alcohol-impaired driving causes serious damages, and it is important to investigate the potential of using avatar-based virtual environments (VEs) in changing health-related behavioral intentions. This study reasons that a user who controls an alcohol-impaired avatar may change his or her behavior after watching the avatar end up in a serious car accident, and this change depends on the user's emotional attachment to the avatar and perceived resemblance between the two. This study uses a series of experimental procedures to create

varying degrees of relationship with one's avatar in Second Life (SL) where the most advanced 3-dimensional avatar technologies are adopted and a giant social world is constructed by SL users. In SL, users can either select one of twelve free, basic, and non-customizable avatars or create distinguishable and unique avatars by investing their money. After varying degrees of relationships between users and avatars are established, all participants' avatars engage in a "hard partying" section. In this section, participating avatars drink a variety of alcoholic beverages, dance and socialize with others. Once the enjoyable virtual party involving alcohol is over, all avatars undergo negative consequences of drunk driving (i.e. car crash). Participants watch an individualized video clip showing a motor vehicle crash caused by their avatars (seeing someone else's vehicle on fire, an accident resulting in severe casualties). Then, the degree to which these experiences affect the users' relevant behavioral intentions and their sense of responsibility for the accident are examined.

This study has two primary contributions. Even though alcohol consumption is not legal in most states for youths under 21 years of age, binge drinking is a wide-spread problem on American college campuses and it has a number of detrimental consequences

* Corresponding author. The Center for Health Communication Studies, Hallym University, 1 Hallymdaehak-gil, Chuncheon, Gangwon-do, Republic of Korea.
   E-mail address: digitalbrain@gmail.com (H.-K. Kim).

(National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2008). Among these are fights (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002), rape, sexual assault (Hingson, Heeren, Winter, & Wechsler, 2005), poor academic performances and other antisocial behaviors, including vandalism and getting in trouble with the police (Wechsler et al., 2002). More seriously, a recent review on American college students' alcohol consumption emphasizes that negative outcomes of alcohol-impaired driving, including death, are consistently happening on college campus (White & Hingson, 2014).

Educational approaches and medical treatments have been used for high risk students, but the effectiveness of these early intervention and prevention programs has been inconclusive. For example, the most widely adopted school-based substance abuse prevention program, Drug Abuse Resistance Education (DARE) is taught in all 50 states in the United States and 6 other countries around the world (DARE, 2014). The primary goal of DARE is to teach effective peer resistance and refusal skills so that students can better resist social pressures of their peers. Furthermore, local police officers and classroom teachers educate them about the dangers of drug use in an interactive school setting. However, more than 30 evidence-based studies have continuously shown that DARE is ineffective in reducing alcohol and drug uses (Zernike, 2001). The studies even illustrate that students who participated in DARE, in fact, increased their use of drugs (Zernike, 2001). It is evident that more practical approaches which take college students' dynamic social environment and life cycle into consideration are necessary.

The second reason follows from the recent advances in the use of VEs technologies in the health and medical fields. Innovative 3-D virtual programs have been used to reduce burn pain (Maani et al., 2011), smoking (Lee, 2010, 2013), drinking (Cho et al., 2008), and phantom limb pain (Ortiz-Catalan, Sander, Kristoffersen, Håkansson, & Brånemark, 2014). If health-relevant behaviors can be changed in a desirable way by utilizing VEs technologies, then there are great potential for VEs to be used in many beneficial ways to solve a variety of health problems. The question, however, involves identifying the most effective 3D interactive situations that will induce health-related behavior changes. Various VEs conditions have been used to promote healthy behaviors, but the mechanisms in which VEs can function effectively is still little known.

In an attempt to understand VEs technologies in health-related areas, this paper outlines two important theoretical frameworks: the "identification theory" within developmental-social psychology and the "Proteus Effect" describing the importance of a chance to be representing in a better visual image in VEs.

2. Theoretical background

2.1. Identification theory within developmental-social psychology

Cohen (2001) examined how individuals identify themselves as with media characters, and explained its consequence on identity development. However, Cohen's understanding about the identification process with characters in traditional media channels should be carefully applied to dynamic virtual environments. In virtual reality conditions, the users controlling their customized and unique avatars are more emotionally attached to their avatars than those controlling their free, basic avatars which were given from the Web site (Kim, 2001). Moreover, the information of the avatar's graphic image has become more personal than before (Kim & Davis, 2012).

In establishing self-identity through the processes of identification, two conditions play a key role: (a) whether an individual has

a choice and (b) the degree of control an individual has. The present study examines which one of these two in VEs has a greater effect on discouraging individuals from driving after consuming alcohol. Previous studies suggested that both having a chance to create a personalized avatar and having an option to proactively participate in health-related activities can increase the likelihood that the user will identify himself or herself with the avatar, it can lead to behavioral changes. To understand the dynamic mechanism of building identity through the development of identification, the literature on the two key variables and their impacts on changing behaviors are reviewed.

2.2. Key factors of identification development and relationship with avatar

2.2.1. Choice

Choice has long been considered a powerful variable to explain human behaviors. For example, choice is a central determinant of whether or not one feels or has cognitive dissonance after engaging in a behavior inconsistent with his or her belief. Davis and Jones (1960) and Cooper and Fazio (1984) showed that without an option to choose, attitude-discrepant behaviors (e.g., behaviors that crashes with previously held attitudes) did not induce dissonance. Brehm (1966, 1972) demonstrated that attempts to restrict personal choice led people to behave directly opposite to what was expected.

By analyzing a number of surveys and interviews with users who actively participated in an avatar-based chatting site named SayClub, Kim (2001) argued that options to choose the physical features of a user's avatar established different levels of relationship with the avatar and positive feelings toward it. More studies (Chung, 2005; Williams, 2011) also claim that having an opportunity to choose the avatar's features enhanced the creator's emotional attachment to it and increased the degree of perceived similarity with it.

2.2.2. Control

The second key factor in developing multiple stages of identification is whether or not individuals have an interactive control over the avatars and their activities. This study draws directly on the research of Aron, Aron, and Smollan (1992) by using an option to control a cybercharacter in gaming and virtual worlds. Play is an interactive and mutually rewarding activity (Ossorio, 1977; Piaget, 1962) so that playing together increases bonds among strangers and newcomers. The idea of having control over playing activities has been used in immersive 3D VEs to enhance the outcome of medical treatments. Maani et al. (2011) conducted a study using VEs technology to reduce excessive pain of soldiers with combat-related burn injuries and found that a severe burn pain was more likely to be relieved when patients actively engaged in VEs by experiencing freezing winter environment.

The literature review suggests that the degree of perceived relationship with one's avatar would be different by the degree of choices given in creating an avatar and by the degree to which the user has control over avatars. The degrees of the relationship with one's avatar are assessed with two categories: (a) similarity judgments and (b) emotional closeness. Based on the two separate key factors, four hypotheses are proposed:

H1a. : Participants who have an option to customize their avatar will consider their avatar to be more similar to themselves than those who are assigned a basic avatar.

H1b. : Participants who have an option to customize their avatar will consider their avatar to be more emotionally close to themselves than those who are assigned a basic avatar.