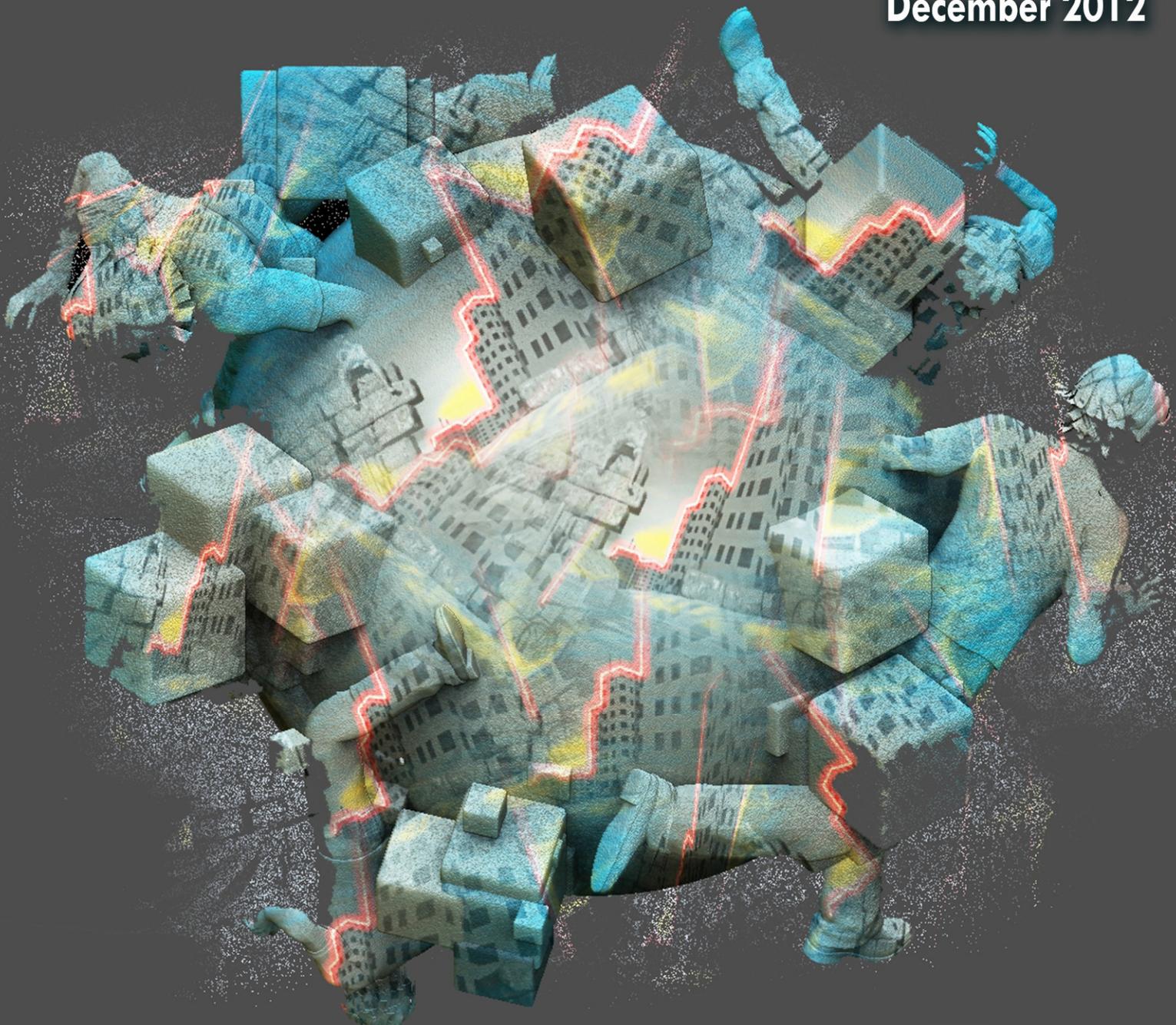


Journal of  
• Virtual Worlds Research

jvwresearch.org ISSN: 1941-8477

**Managerial and Commercial  
Applications**

**Volume 5, No. 3  
December 2012**



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# **Volume 5, Number 3**

## **Managerial and Commercial**

### **Applications**

#### **December 2012**

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**Volume 5, Number 3**  
**Managerial and Commercial Applications**  
**December 2012**

# **Avatar Identification on a 3D Commercial Website: Gender Issues**

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## **Abstract**

This research examines the influence of identification with an avatar on immersion in a 3D commercial website and its subsequent effect on satisfaction with the website. It also focuses on the potential moderating role of gender in these relationships. Two studies were conducted. The first study comprised 286 students and collected both quantitative and qualitative data on the visit to the website; the second, longitudinal study consisted of 32 participants who visited the website additional times during a two-month period. The results show that during the first visit, (1) gender influenced the creation of the avatar, (2) identification with the avatar strongly influenced immersion and satisfaction, and (3) gender moderated the identification–immersion relationship. The longitudinal results reveal the dynamics of avatar personalization over time and show that gender influence is not significant over time anymore. Implications of these results for managers and academics conclude the study.

## **Acknowledgement**

Authors dedicate special thanks to Idées-3Com, creators of the 3D shopping mall, for their help in this research.

## 1. Introduction

As commercial 3D virtual worlds develop and become more mature, they challenge previous knowledge from a merchant perspective (Nah, Eschenbrenner & DeWester, 2011; Ward & Sarren, 2011) and thus research is needed to better understand the impact of these hyper-real settings for marketing (Baudrillard, 1994; Parmentier & Rolland, 2009). 3D commercial websites now offer customers unique possibilities to shop online by reproducing real-life shopping malls and allowing customers to create and to be represented by avatars when shopping online. These websites' unique features may considerably change the way customers shop and buy online. As such, generating an enjoyable experience through immersion (Hoffman & Novak, 1996) is fundamental for online consumption experiences, especially in 3D online shopping contexts (Garnier & Poncin, 2009).

More specifically, according to Biocca (1997) and Taylor (2002), avatars constitute a key element for enhancing immersion because they represent the individual on the interface and reintroduce the body in a context that in which it is not very solicited (Mennecke, Triplett, Hassall, Jordan & Heer, 2011; Merle, St-Onge & Senecal, 2011). This is particularly important from a commercial perspective because the body is highly mobilized in traditional consumption situations, as a processor of stimuli and information (Lakoff & Johnson, 1980), and is also strongly linked to identity and consumption (Belk, 1988). Moreover, avatars in 3D commercial virtual worlds are associated with utilitarian (more than games or life simulation universes), hedonic, and social outcomes that might influence their creation and influence on the experience. Use of avatars in the context of a merchant virtual world is thus a relevant and important topic for practitioners as well as academics in marketing.

Furthermore, research has often examined gender in relation to shopping (Otnes & McGrath, 2001; Noble, Griffith & Adjei, 2006) or to virtual universes (Turkle, 1994, 1995; Griffiths, Davies & Chappell, 2004; Yee & Bailenson, 2007; Hussain & Griffiths, 2008; Banakou & Chorianopoulos, 2010; Lehdonvirta, Lehdonvirta & Baba, 2011). Gender influences shopping, computer-mediated experiences, and interactions, especially in gaming contexts. Differences could exist, however, on how men and women create avatars for the specific purpose of shopping. Because this creation influences the whole process of using avatars and its consequences for the commercial relationship, the moderating role of gender deserves attention. However, little research has examined its influence on use of avatars, especially in a 3D shopping context.

Thus, this research focuses on the case of avatars created and used in 3D commercial universes that have recently appeared on the Internet. First, we focus on the creation of and identification with an avatar, its influence on immersion, and its consequences. Second, we assess the influence of gender on avatar creation and the website experience. From that perspective, we define the conceptual framework around avatar creation, identity construction, and its specificities in a merchant context. We then discuss the general influence of gender on shopping and, specifically, on avatar creation. Two studies were conducted and are presented. Finally, the results are discussed, and theoretical and managerial conclusions are drawn.

## 2. Conceptual framework

Commercial websites may employ 3D display to reproduce real-life shopping malls (see Appendix 1 for illustrations), with shops and spaces through which to move. In these virtual worlds, consumers can customize an avatar to represent themselves. In the shopping gallery, consumers can visit shops, visualize products, and buy these products for real. They can also meet other consumers (also

represented by avatars), interact with them by chatting or playing games, and also interact with virtual sales agents representing the firms. This design, which offers unique features and an orientation toward offer discovering and hedonic shopping may considerably change the way customers shop and buy online, as compared with more classical 2D websites. 3D commercial websites then provide consumers with new, enriching, and immersive experiences (Garnier & Poncin, 2009; Poncin & Garnier, 2010). Indeed, immersion is a fundamental aspect (Hoffman & Novak, 1996; Tisseron, 2008) of online consumption experiences.

Though, immersion is an embodied experience (Joy & Sherry, 2003; Niedenthal, Barsalou, Winkielman, Krauh-Gruber & Ric, 2005), as the body is a processor of sensory stimuli and information (Lakoff & Johnson, 1980). This may seem inconsistent with virtual experiences, which are usually considered disembodied. However, among all the specific features of virtual worlds, the avatar has early been presented as an essential key factor to enhance immersion (Biocca, 1997; Taylor, 2002; Tisseron, 2009) and potentially embody the immersion experience.

## **2.1 The avatar on a 3D commercial website: influences and creation process**

The first thing a new user on a 3D commercial website does is to create an avatar; doing so marks the user's first contact with the universe. Creating that virtual body is a fundamental element that strongly influences the experience lived by the consumer (Choi & Kim, 2004; Feldon & Kafai, 2008; Lim & Reeves, 2010) and its consequences on his or her global evaluation of the virtual universe, which is fundamental for practitioners and academics.

### **2.1.1 Avatars in a commercial setting**

Contexts in which consumers use an avatar are varied in nature (e.g., playful universes, collaborative work, commercial environments, online discussions), as are the specific roles of the avatar. The context of use thus necessarily influences the creation of avatars and individuals' identity process (Vasalou & Joinson, 2009).

In websites or virtual universes with a commercial aim, realism of the avatar—that is, its ability to truthfully represent the human body and the appearance of the individual (Garnier & Poncin, 2009)—is of major importance. Indeed, any commercial context has concrete consequences, such as buying a real product or financial transactions. Thus, individuals tend to create an avatar as realistic as possible (Suh, Kim & Suh, 2011), which has proved particularly important for virtual models in the case of online apparel/clothes purchases (Kim & Forsythe, 2008, 2009; Merle et al., 2009, 2011). According to Yee, Ellis and Ducheneaut (2009), some virtual universes are more favorable than others in terms of their human and realistic embodiments and the presence of familiar artifacts; and this should be the case of 3D commercial settings.

Beyond utilitarian aspects of realistic product fit, 3D shopping malls also entail social and recreational aspects. For example, by wandering around, the customer can meet and talk to other avatars and participate in playful activities offered by the mall. Consequently, personalization of the avatar assumes the social role of self-presentation, construction, and transmission of one's social identity, the body being a primary marker of identity and a means of self-presentation and socialization (Thompson & Hirschman, 1995; Kolko, 1999; Anderson, 2000; Schultze, 2010). Vicdan and Ulusoy (2008) use the term *symembodiment* to refer to the presence of the body in the virtual environment, without physical constraints but with its symbolic, identity, and experiential meanings.

In online gaming or life simulations, a person might possess several avatars on the same account<sup>1</sup>. He or she can then test multiple embodiments and parallel identities and, as such, separate or multiply the identity dynamics among the different characters (Turkle, 1984, 1995). This is a major potential difference with 3D commercial universes. Indeed, the commercial aim of these websites is to encourage consumers to have only one account and, thus, just one avatar. The whole process and dynamics of personalization and identification, and its consequences on the virtual shopping experience, will then be invested in that single avatar.

### 2.1.2 Avatars and the virtual shopping experience

Since Hoffman and Novak's (1996) and Holbrook and Hirschman's (1982) work, generating experience in a commercial setting has received a great deal of attention, particularly on the Internet. Online shopping experiences can now be as rich, stimulating, and immersive as real shopping experiences (Rose, Clark, Samouel & Hair, 2012). A positive virtual shopping experience can increase conversion rates and is a source of satisfaction, favorable intentions (visit, purchase, and recommendation), stickiness, and loyalty (Childers, Carr & Peck, 2001; Mathwick, Malhotra & Rigdon, 2001; Rose et al., 2012). Among the various characteristics associated with virtual experiences, such as interactivity, control, enjoyment, learning, presence, real relationships, and aesthetics (Steuer, 1992; Pine & Gilmore, 1999; Li, Daugherty & Biocca, 2001; Fiore & Jin, 2003; Fiore, Jin & Kim, 2005; Fiore, Kim & Lee, 2005; Fiore & Kim, 2007; Song, Fiore & Park, 2007; Rose et al., 2012), immersion is the most frequently mentioned (Turkle, 1995; Tisseron, 2008) and is closely related to the concept of flow (Hoffman & Novak, 2009) as the ultimate state of immersion.

Academic research has regularly demonstrated the positive effects of immersion on approach responses to the firm and favorable behaviors. Such behaviors include purchasing a product or service on the website, filling out a form to be contacted by the company, directly contacting the company, and positively talking about the company (Charfi & Volle, 2011). Another important behavior is the purchase of virtual goods (Guo & Barnes, 2009; Cha, 2011), which are a considerable source of revenue for companies in gaming and virtual universes. As a matter of fact, all those approach responses are highly valuable and important for Internet and virtual shopping firms.

Although firms can employ different techniques to arouse immersion in a shopping experience, rich media and virtual reality tools, such as 3D and avatars, are particularly useful for websites and should give advantage to websites using them. With avatars, the digital body anchors the self in the virtual and social space (Taylor, 2002). This embodiment is a potential source of perceived presence, immersion, and socialization (Choi & Kim, 2004; Davis, Murphy, Owens, Khazanchi & Zigungs, 2009; Garnier & Poncin, 2009; Schultze, 2010). Furthermore, it reintroduces the body in a consumption situation in which it is usually not solicited, contrary to real-life consumption (Vicdan & Ulusoy, 2008; Merle et al., 2011). From an experiential perspective, an avatar also allows the consumer to play an active and productive role, which is a key factor of immersion in a commercial space (Carù & Cova, 2006).

Logically, using an avatar should have positive consequences on consumers' virtual experiences and, especially, on their immersion. This was already observed in a certain number of studies (Taylor, 2002; Bente, Rüggenberg & Krämer, 2004; Choi & Kim, 2004; Hussain & Griffiths, 2008; Davis et al., 2009), but mainly in gaming or educational/work virtual universes. Conversely, the path from avatars to

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1 Online gamers can play several characters with different abilities and appearances on a same or on several account(s).

immersion and its commercial consequences has not yet been extensively explored (Garnier & Poncin, 2009).

### 2.1.3 Avatar creation and identity construction

Creating an avatar is a relatively long process (Tisseron, 2009), especially in online video games and life simulation virtual universes, such as Second Life. Regular modifications of the avatar's appearance and personality also occur (Bessi re, Seay & Kiesler, 2007).

The avatar serves as a tool for dynamic identity construction that allows individuals to experiment with identities and to express multiple aspects of their selves (Turkle, 1984, 1995). Individuals tend to reproduce either their real self or an improved or idealized self (Taylor, 2002; Bessi re et al., 2007; Tisseron, 2009; Jin, 2010). Underlying motivations to such identity works involve either (1) a self-confirmation perspective or a simple (promotion of a positive self-concept) or compensatory (distortion of negative information in a more positive way) self-enhancement perspective (Messinger, Ge, Stroulia, Lyons & Smirnov, 2008) or (2) a search for consistence with the physical and/or psychic self-concept (Suh et al., 2011).

The main aim of the identity construction process is identification with one's avatar, or "*the cognitive connection between an individual and an avatar, with the result being that the individual regards the avatar as a substitute self or has such an illusion*" (Suh et al., 2011). If this connection is strong and if the individual considers the avatar his or her own self, he or she might then live the experience to the fullest, in a more immersive way. Though logical, this link has not yet been tested in the literature (for an exception, see Poncin & Garnier, 2012). Rather, researchers have favored concepts such as physical or personality similarity. However, if identification can be linked to physical likeness, appearance cannot count as the only determinant of identification. For example, if individuals personalize their avatar as they wish and project their values, emotions, private self (Suh et al., 2011) and psychic self (Tisseron, 2008) in the virtual character, they are likely to identify with an avatar that does not necessarily (physically) resemble themselves.

Parmentier and Rolland (2009) argue that this identity construction is not rigid but is set within a dynamic. They identify four dynamics: (1) duplication (loyal graphical and behavioral copy of the creator), (2) enhancement (extension that represents the more positive aspects of the creator and that can differ in or enhance the physical appearance), (3) transformation (real physical and behavioral differences from the creator), and (4) metamorphosis (totally imaginary self, physically different and for which the creator plays a character part). Furthermore, this dynamic is part of a construction process regarding the virtual world (Parmentier & Rolland, 2009).

However, if the typology of the real vs. enhanced self-representation or Parmentier and Rolland (2009)'s identity dynamics are interesting, they were mainly developed within online gaming or life simulation contexts. Thus, it is worthwhile to question avatar personalization in the light of a commercial consumption setting and to assess its consequences on the experience. As mentioned previously, the context is likely to influence avatar creation and identity dynamics (Kang & Yang, 2004; Garnier & Poncin, 2009; Vasalou & Joinson, 2009; Yee et al., 2009; Suh et al., 2011; Sung & Moon, 2011), just as creation of the avatar and identity dynamics can influence the relationship (e.g. feelings, behaviors) with and within the virtual world (Yee & Bailenson, 2009; Yee, Bailenson & Ducheneaut, 2009).

Building on this conceptual framework, we predict that the stronger the relationship between the consumer and his or her own avatar (identification with the avatar), the more likely he or she is to become immersed in the new environment and develop favorable responses (i.e. satisfaction) to the experience. Thus:

**H1:** Identification with the avatar positively influences immersion in the commercial virtual universe.

**H2:** Immersion has a positive influence on satisfaction with the commercial virtual universe.

As mentioned previously, the shopping context may influence the effect of the avatar, and gender can also influence shopping. Thus, we also discuss gender's influence on the process of creating and identifying an avatar in a shopping context, as it is rarely examined in avatar literature.

## **2.2 Gender, shopping, and avatars**

### **2.2.1 Gender and shopping**

Noble et al. (2006) focused on sociological theories to explain gender differences in shopping motives and loyalty to merchants. Building on Cross and Madson's (1997) work, they argue that women build their self as interdependent of others and therefore develop self-defining relationships to maintain connectedness with others through interpersonal affiliations to groups and communities. As such, they are more likely to be loyal to local merchants than men. Moreover, women are more motivated by social interactions; thus, shopping might afford them the opportunity to socially interact with salespeople and other consumers. Noble et al. (2006) also find that women are more prone to browsing than men. Finally, according to Campbell (1997), men consider shopping a needs-driven activity and are mainly motivated by the purchase of the product, while women are more likely to view shopping as enjoyable and intertwined with satisfaction derived from obtaining purchases for both themselves and others.

### **2.2.2 Gender and avatar**

Research has demonstrated the influence of gender in computer-mediated interactions (Chistofdes, Islam & Desmarais, 2009), in various contexts, including online dating and flirting, online communities, and instant messages. More generally, according to socialization literature (Turkle, 1988; Spender, 1995), women try to maintain their safety through contingency planning and by learning the rules before taking action, while men engage in exploration, adventure, and risk-taking, with little forethought about the consequences of their actions. In the context of Internet relay chat, Bowker (2001) observes that gender influences the degree of identity exploration. Men were more likely to take advantage of the electronic medium to explore beyond their boundaries by identifying with something different from their real identity. On the whole, however, gender has not been extensively explored in relation to avatar use or creation.

Although research includes gender as a descriptive demographic variable or an observed covariate, it is rarely central to research on avatars. In this case, three main perspectives can be identified. First, research has examined the influence of avatar gender when an individual is interacting with an avatar (Nowak & Rauh, 2005; Yee, Bailenson, Urbanek, Chang & Merget, 2007), particularly the influence of similarity (or dissimilarity) of the avatar and individual gender on interactions and the individual's reactions to and attitudes toward the avatar. Second, research has explored how real-world gender stereotypes and gender roles apply in 3D virtual worlds (Banakou & Chorianopoulos, 2010; Lehdonvirta et al., 2011). Such studies globally demonstrate a preservation of stereotypes and roles in the virtual

worlds. Third, in her work on virtual universes, Turkle (1984, 1995) identifies the phenomenon of gender swapping (playing a character of the opposite gender). Gender swapping is a common practice online (more than 10% of occurrences; Koles & Nagy, 2012), be it in MUDs (Turkle, 1984, 1995), MMORPG or virtual worlds (Griffiths et al., 2004). According to Hussain and Griffiths (2008), the primary motivations for gender swapping are to avoid unsolicited approaches (mainly for female users), for fun and change, to obtain items or characteristics specific to a gender (in MMORPG), or to experiment with new aspects of one's personality and social interactions.

Within the field of avatar use in a commercial context, gender is generally not considered. Studies on virtual models (Kim & Forsythe, 2008, 2009; Merle et al., 2011) are limited to women because these models are generally displayed on female apparel websites. Consequently, the influence of gender in such a context is unknown and thus deserves greater attention.

### 2.2.3 Gender and avatar creation in 3D shopping malls

Several questions can be raised regarding avatar creation and use in 3D shopping mall universes. Because shopping in 3D malls may be for utilitarian purposes and may require a representation of the individual as realistic as possible (Yee et al., 2009; Suh et al., 2011), consumers might represent themselves as they really are (duplication of the real self). However, the commercial context may also induce gender differences, as mentioned previously, such that men and women may differently apprehend the online shopping context and the relationship with a virtual body in a commercial perspective. That is, women may give more importance to the hedonic and social aspects of the shopping, consequently (re)presenting themselves in an improved or idealized way, while men may be influenced more by the utilitarian side of the website and consequently represent themselves in a truthful way. However, sociological literature and previously cited work on identity exploration on the web (Spender, 1995; Bowker, 2001) contrarily suggest that men are more likely to explore identities that depart from their real identity and appearance while women are more likely to represent themselves in a realistic way as a means of self-preservation in an unknown environment.

In summary, we then expect gender to influence the creation of an avatar in a commercial context. However, the lack of convergence in mobilized literature prevents us from being decisive and eventually hypothesizing the possible direction of this newly explored effect.

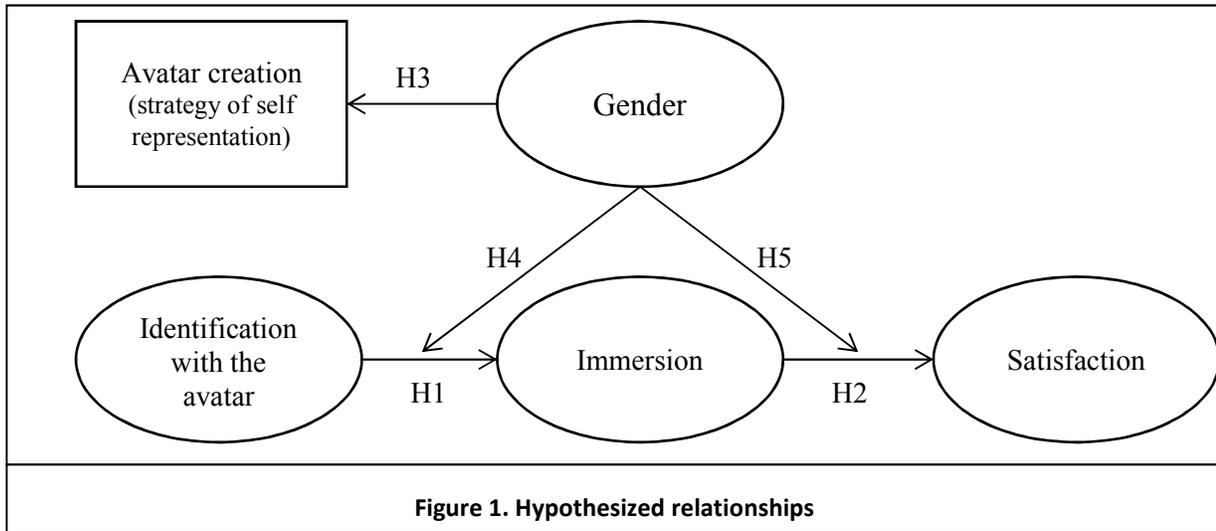
**H3:** Gender has an influence on the creation of an avatar.

We also predict that men and women differ in terms of (1) their identification with the avatar and (2) the influence of the avatar on immersion and approach responses:

**H4:** Gender moderates the relationship between identification with an avatar and immersion.

**H5:** Gender moderates the relationship between immersion and satisfaction with the commercial universe.

Figure 1 illustrates the hypotheses we test and the relationships of interest we observe.



### 3. Methodology

Building on the literature on online gaming, life simulation metaverses, and web marketing, we treated identification with the avatar as the basis of immersion and the online buying process on a 3D commercial website. Thus, we examine creation of the avatar and identification with that virtual character in a 3D shopping mall and investigate its influence on immersion and subsequent approach responses. We also explore the potential effect of gender on avatar creation.

To the best of our knowledge, this research is the first to examine the process of creating an avatar in a 3D commercial virtual universe. According to our review of methodologies used to study avatars in virtual worlds or virtual models in commercial settings, research has mainly used one-shot studies or provided life narratives, which prevents us from empirically validating the long-term processes of avatar creation and identification. Therefore, we adopt an exploratory methodology, using qualitative and quantitative data, with two studies that were conducted.

In the first study, we collected data focusing on avatar creation during participants' first visit to a 3D mall. In total, 286 students, aged 19 to 24 years, were recruited from undergraduate classes of a French business school, as part of a course. They were awarded bonus points for their participation. The sample comprised 105 men (37%) and 181 women (63%).

Each participant needed to visit a newly developed 3D shopping mall (see Appendix 1). The 3D mall is an extensive virtual gallery, displaying virtual 3D shops for retailers in various consumption areas and an external space with paths, gardens, and games. A large variety of products are available, including flowers, clothes, high-tech products, phones, travel, household appliances, and beauty products. During customer visits, their avatars could interact with other avatars (other customers) or with virtual sales agents in the stores. Visitors could also attend events or play online games displayed throughout the mall. Finally, the 3D shopping mall also entails flats consumers may personalize with virtual products from shops, though this part of the website was not available at the time of the study.

All participants created an avatar and then visited the website for as long as they wanted. The personalization tool offered them the ability to customize their avatar's body, parts of the face, hair, clothes, and accessories, with predetermined sets of possibilities (from three to more than 20

possibilities for each part). With the combinations of the various characteristics, participants were able to personalize their avatars in relatively extensive and realistic ways.

After the visit (average time: 80 minutes), the participants immediately filled out a qualitative logbook of roughly 10 open-ended questions on their experiences<sup>2</sup> among which some of them focused on the avatar personalization (Appendix 2). This qualitative methodology was coupled with an associated questionnaire that participants filled out directly after the logbook. The questionnaire measured, among other variables, identification with the avatar (eight items from Hefner, Klimmt & Vorderer, 2007), immersion (as a proxy to measure experience; six items adapted from Fornerino, Helme-Guizon & Gotteland, 2008), and satisfaction (global satisfaction three-item composite measure). Appendix 3 lists the measures, all of which had satisfactory Cronbach's alphas ( $\alpha = 0.898$ ,  $\alpha = 0.82$ , and  $\alpha = 0.832$ , respectively). Satisfaction served as a representative variable of approach responses and an important outcome for marketing (because it may condition further intentions).

In the second study, 32 participants (22 women and 10 men) from the first study volunteered to continue the experience<sup>3</sup> through a longitudinal study that included at least three additional visits to the website during a two-month period. As previously, participants filled out a logbook directly after each visit to describe their experience and answered an online questionnaire. Questions related to the avatar in the logbook for the second and fourth visit appear in Appendix 2. In the quantitative questionnaire, to avoid habituation, which can induce biases, and to preserve a reasonable length<sup>4</sup>, immersion and satisfaction were identically measured at each visit, while identification with the avatar was measured only during the third and fourth visit.

Regarding textual data, two independent coders conducted a content analysis on NVIVO9, based on logbook themes and identical coding units, with flexibility being preserved. Quantitative data were analyzed with SPSS18, with regression and General Linear Model with repeated measures analyses.

## 4. Results and discussion

### 4.1 Study 1

One objective of the first study was to understand the role of the avatar and the effect of immersion on consumer experiences on a 3D commercial website. Another objective was to determine potential gender differences.

As expected, the results from the regression analysis show that identification with the avatar ( $M_{IDAV} = 2.29$ ,  $SD = 0.86$ ) has a highly positive effect on immersion ( $\beta = 0.754$ ) and significantly explains more than 57% of the immersion variable ( $M_{IMM} = 2.41$ ,  $SD = 0.95$ ;  $R^2_{adjusted} = 0.573$ ,  $t = 19.51$ ,  $p < 0.001$ ). This means that the more participants feel embodied with their avatars, the more they

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- 2 Both logbooks and questionnaires dealt with the global experience lived and specific elements such as realism, sensory stimulations, mental imagery, and interactions with virtual sales agents. However, only questions pertaining to avatars are included and analyzed in this study.
  - 3 The results from the first study enabled us to assess and confirm that the volunteers did not differ from the original global sample on the control variables (e.g. satisfaction, immersion during the first visit).
  - 4 Other measures induced variations in the quantitative questionnaires across visits (see footnote 2). Thus, to preserve a reasonable questionnaire length, we spaced out some measures, such as identification with the avatar, across visits.

are able to have an immersive experience in the new environment. Thus, H1 is validated. Moreover, gender helps explain inter-subject variance in the immersion experience ( $R^2_{\text{adjusted}} = 0.578$ ,  $F(2, 283) = 3.833$ ,  $p < 0.05$ ). The relationship between identification with the avatar and immersion is also stronger for women ( $\beta = 0.754$ ,  $t = 15.36$ ,  $p < 0.001$ ) than for men ( $\beta = 0.736$ ,  $t = 11.02$ ,  $p < 0.001$ ). Thus, H4 is also validated.

In addition, identification with the avatar and immersion both directly and positively explain satisfaction ( $M_{\text{SAT}} = 3.04$ ,  $SD = 0.82$ ) with the website ( $\beta_{\text{IDAV}} = 0.397$ ,  $t = 5.352$ ,  $p < 0.001$ ;  $\beta_{\text{IMM}} = 0.216$ ,  $t = 2.904$ ,  $p < 0.01$ ;  $R^2_{\text{adjusted}} = 0.329$ ). We get an additional result with the direct influence of identification with the avatar on satisfaction. Thus, H2 is validated. However, gender does not moderate the relationship between immersion and satisfaction ( $F(3, 282) = 0.666$ , n.s); thus, H5 is rejected.

The qualitative analysis strengthens these results by providing explanations on avatar creation and highlighting gender differences in the identity-building process and the relationship between participants and their avatars. More specifically, we observed three different ways participants created their avatars:

(1) Representation and high similarity between the participant and the avatar (60% of the sample)

*"I chose to personalize my avatar so that it fits me. Possibilities of personalization are large enough so that we can make an avatar that looks like us as much as possible. You better take it over like that."* (F, 21)

*"I find it nice to be able to move with an avatar that looks like me as much as possible, it makes things more real. It makes the visit more interactive."* (M, 22)

(2) Representation of an improved or ideal self (37% of the sample)

*"I've made her a little bit taller and with a little more breast but otherwise, she looks like me."* (F, 21)

*"I think that my avatar is typical of the young active guy, just graduated, with a relatively high purchasing power."* (M, 21)

(3) Fanciful representation (3% of the sample)

*"I wanted to have fun by inventing an original bearded character, with sunglasses and an 'afro' haircut."* (M, 24)

These results in a commercial context are in line with literature on avatar personalization strategies identified in other contexts (Parmentier & Rolland, 2009; Vasalou & Joinson, 2009) and on underlying motivations (Messinger et al., 2008; Suh et al., 2011). Because real-self representations may be closely related to utilitarian motivations (e.g. preserving fit in trying on clothes), enhanced representations can be explained by the social aspect of the universe. They allow consumers to reveal a positive social identity or to indicate a certain message about their identity in a social presentation or from a socialization perspective (Turkle, 1994; Taylor, 2002; Tisseron, 2009). Finally, fantasy representations mainly relate to a probable perceived proximity with gaming virtual universes, that serve as an anchoring point to capture the novelty of the universe (Poncin & Garnier, 2012), the playful aspects of the universe, and the subsequent desire to depart from self-presentation social norms.

Regarding gender repartition across the three representations, women mainly represent themselves as they really are or, in some cases, as an improved or ideal self, while men are more prone to provide an improved representation of themselves or to create a totally fanciful and imaginary character, as suggested by socialization literature. Consequently, gender influences avatar creation, confirming H3. A possible explanation for this is that men might have confused the virtual universe with a game more than women (Garnier & Poncin, 2009). Several elements might have influenced such confusion: (1) "real"

purchases were not possible at the time of the study, (2) the virtual mall also offered games, and (3) there was a significant relationship between gender and being an online player ( $\chi^2 = 36,576$ ; ddl: 3;  $p < 0.000$ ); that is, 77% of the global sample's male participants reported being occasional, regular, or heavy online game players (with a significant difference from women, with 53% of non-players). Thus, men might have created an avatar to engage in online games or life simulation universes, in which idealized or fantasy avatars are a majority. Another explanation may be that men perceived greater social value, which is contradictory to literature on gender and shopping (Noble et al., 2006), while women may have given more weight to the utilitarian value. Indeed, because various clothes shops are available in the 3D mall, women might have enjoyed the realism of their avatar, thinking of it as a virtual model, to ensure fit between the avatar and products they might want to try on (Merle et al., 2011).

## 4.2 Study 2

In the second study, which involved a longitudinal approach, we observed a dynamic process of identification with the avatar in both the qualitative and quantitative data. Twenty-five percent of the sample modified their avatar during the second visit. Participants who had created a realistic avatar tended to modify it (32%) more than those who created an idealized/enhanced avatar (16%). Almost all participants who modified their avatar were women. In addition, although this correlation occurs between gender and personalization strategy during the second visit, these differences disappear on the following visits. However, from the small number of people modifying their avatar on the third and fourth visit, this cannot be formally confirmed.

Regarding the quantitative data, identification, immersion, and satisfaction all increase until the third visit ( $M_{IDAV} = 2.81$ ,  $SD = 1.03$ ;  $M_{IMM} = 2.65$ ,  $SD = 1.19$ ;  $M_{SAT} = 3.56$ ,  $SD = 0.70$ ) and then decline on the fourth visit ( $M_{IDAV} = 2.27$ ,  $SD = 1.09$ ;  $M_{IMM} = 2.27$ ,  $SD = 1.14$ ;  $M_{SAT} = 3.20$ ,  $SD = 1.01$ ). One possible explanation is that experience is not exponential and may fluctuate over time (Carù & Cova, 2006) and from external or situational variables. Other explanations could be a well-liked third visit (as suggested by high means of immersion and satisfaction), and the lack of novelties on the website for the last visit, which may have decreased the global quality of the experience.

The relationship between identification with the avatar and immersion is also reinforced across visits (fourth visit:  $\beta = 0.87$ ,  $R^2_{adjusted} = 0.747$ ,  $t = 9.632$ ,  $p < 0.001$ ). The influence of identification with the avatar on satisfaction also increases on the third visit, while the influence of immersion decreases at a non-significant level ( $\beta_{IDAV} = 0.92$ ,  $t = 2,902$ ,  $p < 0.05$ ;  $\beta_{IMM} = n.s.$ ,  $R^2_{adjusted} = 0.281$ ). They then decrease on the fourth visit ( $\beta_{IDAV} = 0.786$ ,  $t = 2,632$ ,  $p < 0.05$ ;  $\beta_{IMM} = n.s.$ ,  $R^2_{adjusted} = 0.324$ ). Despite this phenomenon, the positive influence of avatar identification on satisfaction remains over time.

Moreover, gender no longer influences the relationship between identification with the avatar and immersion over time (inter-subject effect:  $F(5, 27) = 0.000$ ,  $p = 0.988$ , n.s.). Explanations for this come from the literature; for example, Venkatesh, Morris, and Ackerman (2000) observe that user gender does not moderate decisions made after initial use. Hernandez, Jimenez, and Martin (2011) find that socio-economic characteristics (age, gender, and income) have little significance in the explanation of e-shoppers' behavior after they acquire experience with the channel. In short, gender does not condition the behavior of experienced online shoppers, which is similar to our participants who get more and more experienced with the website throughout the visits.

Table 1 summarizes the main results of our research in terms of the hypotheses and propositions. It also provides additional results from the longitudinal study.

<b>Table 1. Results summary</b>			
<b>Hypotheses</b>	<b>Statistics</b>	<b>Status</b>	<b>Main results</b>
H1	$R^2_{\text{adjusted}} = 0.573$ , $\beta_{\text{IDAV}} = 0.754$ $t = 19.51$ $p < 0.001$	Supported	During the first visit, identification with the avatar positively influences immersion in the commercial virtual universe.
H2	$R^2_{\text{adjusted}} = 0.329$ $\beta_{\text{IMM}} = 0.216$ $t = 2.904$ $p < 0.01$	Supported	During the first visit, immersion positively influences satisfaction.
H3		Supported	During the first visit, gender has an influence on avatar creation: a difference is observed between men and women. Men are more prone to create idealized or fantasy avatars, while women tend to create avatars that represent their real selves.
H4	$R^2_{\text{adjusted}} = 0.578$ $F(2, 283) = 3.838$ $p < 0.05$ Women: $\beta_{\text{IDAV}} = 0.754$ , $t = 15.36$ , $p < 0.00$ Men: $\beta_{\text{IDAV}} = 0.736$ , $t = 11.02$ , $p < 0.001$	Supported	During the first visit, gender moderates the influence of identification with the avatar on immersion: the relationship is stronger for women than for men.
H5	$F(3, 282) = 0.666$ , n.s	Not supported	During the first visit, gender has no moderating effect on the influence of immersion on satisfaction
<b>Additional results from the longitudinal study</b>			
25% of the samples modify their avatar on the second visit.			
Participants who created a realistic avatar modify it more than people who created an idealized/enhanced avatar.			
The majority of participants who modified their avatar are women.			
Identification with the avatar has a direct and positive effect on satisfaction ( $\beta_{\text{IDAV}} = 0.397$ , $t = 5,352$ , $p < 0.001$ )			
The influence of identification with the avatar on immersion is reinforced over time (up to $\beta = 0.87$ , $R^2_{\text{adjusted}} = 0.747$ , $t = 9.632$ , $p < 0.001$ for the fourth visit)			
The influence of identification with the avatar on satisfaction continues over time and is reinforced ( $\beta_{\text{IDAV}} = 0.92$ , $t = 2,902$ , $p < 0.05$ for the third visit).			
The influence of immersion on satisfaction loses direct significance over time ( $\beta_{\text{IMM}} = \text{n.s.}$ ; $R^2_{\text{adjusted}} = 0.324$ for the fourth visit).			
Experiences of identification with the avatar and immersion fluctuate over time.			

## 5. Conclusion

The purpose of this research was to examine the process of avatar creation in a 3D commercial setting with two exploratory studies—one focusing on avatar creation and the other adding a longitudinal perspective through observation of the subsequent relationship between users and their avatars. We expected to observe a gender influence on avatar creation and on website experience. In line with Koles and Nagy (2012) in *Second Life*, we observe high similarity between the participants and their avatars in either a real-self representation or an idealized version of the self. Surprisingly, and considering the commercial context, men were more prone to provide an improved representation of themselves or to create a totally fanciful character. Possible reasons might be that men have a greater tendency to explore online identities, or they confused the commercial universe with a game. Finally, there was probably a predominance of utilitarian values of the avatar among women in this specific context. This latter result may be considered contradictory to literature on gender and shopping (Noble et al., 2006) but is understandable given the potential role of virtual models in this context. Furthermore, during the experience, consumers had few social interactions with other avatars/consumers present at the same time on the website.

As expected, identification with the avatar very well predicted immersion and had a subsequent consequence - namely, satisfaction during the first visit. Regarding the moderating effect of gender on the relationship between identification with the avatar and immersion during the first visit, this effect tended to disappear as the user gained more experienced with the website.

The contributions of this research are twofold. First, this study provides a better understanding of the process of avatar creation and gender specificities in the context of virtual commercial environments. Second, the study reveals the evolution of gender influence on the relationship between avatar and immersion over time. Moreover, the results have crucial implications on the shopping process of trying on and buying real products in 3D shopping malls and on the relationship between the self and consumption in this context. The findings offer key insights into avatar personalization tools on 3D shopping malls. Because women may be the primary target of these websites, firms should give priority to providing a larger variety of realistic personalization options to ensure their immersion and satisfaction. Doing so would also help avoid any confusion with games. Nevertheless, freedom in personalization should not be inhibited. Furthermore, regular offers of new options could revive interest in avatar personalization for both men and women over time.

In terms of limitations, the small size of the longitudinal sample makes it difficult to generalize the results and encourages being finely-shaded on conclusions regarding the decrease of immersion's influence. This phenomenon might be explained by other influences, such as mediating variables between immersion and satisfaction. Furthermore, although consumers had the opportunity to visit the website several times, they had few social interactions with other avatars and could not purchase real products during their experience. Replicating this study with a larger and more balanced (between men and women) sample of real consumers (new and experienced ones) would be a worthwhile extension. Further research could also examine the influence of utilitarian versus hedonic motivations to shop in virtual environments, which might explain the unexpected differences between men and women in the avatar creation process. More longitudinal studies could also explore avatar personalization in commercial settings.

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## Appendix 1. Illustrations of the 3D shopping mall



Avatars in outdoor spaces



Avatar in a 3D shop



Avatar personalization tool

## Appendix 2. Logbook questions on the avatar

### Visit 1:

- What did you expect before visiting the website?
- Describe your avatar.
- How did you create your avatar? Have you personalized it? *If yes, how? Why? What do you think about it? What do you feel about it? If no, why have you decided not to personalize it?*

### Visit 2, 3, and 4:

- What do you think about your avatar?
- Have you made changes in his or her appearance?
- What do you feel about this avatar?

## Appendix 3. Measures for identification with the avatar, immersion, and satisfaction

Identification with the avatar (adapted from Hefner et al., 2007),  $\alpha = 0.898$

*When visiting the website I forgot everything around me.*

*I've had the feeling of being the avatar.*

*I've forgotten myself as I focused on the character's actions on the website.*

*I've had the feeling on the website to be more the avatar than myself.*

*The aims and actions of the character became my aims and my actions.*

*When visiting the website, the virtual world of the shopping mall was more real for me than my own "reality."*

*I have the feeling that I really participated to what happened in the shopping mall.*

*I have almost had the feeling to really be the character.*

Immersion (adapted from Fornerino et al., 2008),  $\alpha = 0.82$

*The virtual mall created a world that brutally disappeared at the end of the visit.*

*At some moments, I lost consciousness about what was around me.*

*During the visit of the website, my body was in front of the computer, but my mind was in the world created by the website.*

*The virtual mall made me forget realities of the outside worlds.*

*During the visit, what had happened before or what would happen after did not matter.*

*The virtual mall made me forget my immediate environment.*

Satisfaction composite measure,  $\alpha = 0.832$

*After this visit on the website I am... (very dissatisfied/very satisfied).*

*After this visit on the website I am... (not happy at all/very happy).*

*I found this visit... (very displeasing/very pleasing).*