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A virtual “Room” with a cue: Detecting personality through spatial customization in a city simulation game

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ABSTRACT

Online simulation games provide an opportunity for people to express their personality through the design of their in-game virtual environment in a manner visible to third-party observers. We found that zero-acquaintance observers of these games can identify personality traits by simply looking at screenshots of the created virtual environment, and that the observed personality is closer to the self-reported “real” personality than “ideal” personality of the creator. These results contradict studies on avatar customization and personality, suggesting that spatial customization is more reflective of unintentional behavioral residue than conscious selective self-presentation.

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1. Introduction

People can make inferences about strangers from very limited cues. There has been research looking at personality inference in the context of physical spaces such as bedrooms or offices (e.g., Gosling, Ko, Mannarelli, & Morris, 2002). The research has since extended to the online domain, where studies have shown that personality is reflected in the design of personal websites (Vazire & Gosling, 2004), Facebook profiles (Back et al., 2010), and even gaming behaviors in massively multiplayer online games such as World of Warcraft (Yee, Ducheneaut, Nelson, & Likarish, 2011).

There have been fewer studies, however, on how personality is reflected in customization of virtual spaces within a *fictional* online environment. Spatial customization is becoming an increasingly popular feature in many online games, especially simple ones that are available as applications on social network sites such as Facebook (Wohn, Lee, Sung, & Bjornrud, 2010). Games such as Farmville, The Sims Social, and Pet Society enable users to create their virtual environment with a limited set of objects in the context of playing a game. Also, although not present in services for adults, social network sites for children (e.g., Club Penguin, Webkinz) usually take place in a fantasy setting and have spatial customization features, such as decorating one’s igloo.

Although prior research has shown that personality is reflected in customized spaces both online (Vazire & Gosling, 2004) and offline (Gosling et al., 2002) spatial customization in online games is an area of interest because it takes place within a fictional game situation. Although some games are solely about space customiza-

tion—for example, Pet Society is a game that is about decorating rooms in one’s virtual house—other games require space customization in the context of a greater goal. One such example could be the simulation game Farmville, in which players plant crops, raise animals, and continue to expand their farm with buildings and trees. The placement of objects within this game is closely tied to the game mechanics, yet no farm is the same. In games such as this, spatial customization in an online game is an act that is linked to the goals of the game, but as to how it is related to an individual’s personality is a question yet to be explored.

2. Self-presentation: intentional or unintentional?

As an overt action that involves visual elements, spatial customization is inevitably one of self-presentation, regardless of whether or not the person engaging in the activity is cognizant of it. Goffman (1959) explained self-presentation as a strategic activity that an individual engages in, to “convey an impression to others which it is in his interests to convey” (p. 4). He described two types of impressions: cues that are deliberately given by an individual and cues that are given off; unintentional cues, such as nonverbal communication. Studies have shown that personality inferences can be made on even the simplest of everyday behaviors, such as use of certain words (Mehl, Gosling, & Pennebaker, 2006), or voice quality (Scherer, 2006).

The question, however, is how close others’ interpretations of cues are to the individual’s perception of their own personality. Moreover, studies have shown that personality has multiple layers, in that individuals have different definitions of who they really are and who they want to be (Higgins, 1987). Although disparity between real and ideal selves is negatively related to general life sat-

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isfaction (Ogilvie, 1987) and can lead to heightened feelings of dejection (Higgins, 1987), having an ideal self is not always a bad thing, as the need for an ideal self can also fuel motivation and learning (Catteell, Radcliffe, & Sweney, 1963).

Online environments make it easier for individuals to create multiple representations of themselves (Turkle, 1997), some of which may be close to one's real self but some of which may be closer to one's ideal self. Walther (1992) found that the relative anonymity of computer-mediated environments allows people to be selective about how they present their identities, and that in a virtual environment, individuals' tendencies lean towards ideal self-presentation because they are able to have greater control over their self-presentation (Walther, 1996).

The ability for individuals to engage in selective self-presentation has been researched from both positive and negative angles. Scholars have found that the relative anonymity of CMC allows people to be deceptive about their true identities. For instance, Ellison, Heino, and Gibbs (2006) found that in an online dating setting, individuals engaged in self-enhancement, even when there was a certain level of expectancy for future face-to-face interaction that would provide contradicting evidence. Online dating site users also had a tendency to lie about their height (in the case of men) and weight, in the case of women (Hancock, Toma, & Ellison, 2007). That does not imply, however, that self-presentation over CMC is entirely deceptive. In fact, in certain situations, the visual anonymity that CMC offers can allow individuals to be more open and honest in social interactions in comparison with those in face-to-face contexts (Joinson, 2001); even revealing potentially negative aspects of themselves that they would otherwise not unveil in a face-to-face situation (McKenna & Bargh, 2000).

3. Personality and games

Most of the literature on personality manifestation in games has looked at avatars. Avatars are a digital representation of an individual and despite the limited choices in visual customizations, enable individuals to create somewhat unique representations of themselves (Cheng, Farnham, & Stone, 2002).

In an online game environment that gives more freedom for individuals to explore different identities, scholars have found mixed results in regards to whether or not avatars are more consistent with their true selves or their ideal selves.

Bessiere, Seay, and Kiesler (2007) found that in the online game World of Warcraft, players—especially those with low psychological well-being—were creating characters, or avatars, that were closer to their ideal self than their real self. Taylor (2002) found that when individuals in virtual worlds had the intention to engage in creative role play, they were thus selecting avatars that were closer to their ideal. Dunn and Guadagno (2012) also found that when given the option to design their own characters to play in a video game, both men and women made avatars that were consistent with ideal male and female bodies; in particular, they found that people who rated higher in neuroticism were more likely to design more physically attractive avatars.

On the other hand, Axelsson (2002) found that avatars were being used to display overt aspects of themselves, which became stable over time as the individual continued to engage in the online community. Vasalou and Joinson (2009) found that participants of their experiment tended to create avatars that were driven by personal preferences, but slightly differed depending on the context of the virtual environment.

It could be that the type of game also affects how much the avatar reflects an individual's personality. For example, Taylor (2002) found that when individuals in virtual worlds had the intention to engage in creative role play, the avatar was not necessarily a reflection

of the self. Huh and Williams (2010) also found that gender swapping was a prevalent behavior among male players of World of Warcraft, suggesting that the element of fantasy can interfere with accurate portrayals of the self in a game environment.

Although there is a growing number of studies on the relationship between avatar and personality, very few studies have looked at self-presentation reflected in virtual spaces. Here, we are referring to space as a literal concept—a visual representation of objects. Although space customization is not a widespread feature of MMOs, it is a prominent feature in social network games and social network sites. Some of these services are designed with the purpose to decorate one's virtual space; others have a space customization feature that is part of a larger purpose. The reason we make this distinction is because in the case of space customization in games such as Pet Society, the main goal of the game is space customization of a very personal space, such as a room or a house—thus the decisions made in decorating may be more conscious. In games such as Pet Society, there are no rules about what kind of items the player selects to decorate their space. However, with simulation games such as Cityville and The Sims Social, the games require the player to do specific tasks, such as constructing roads or building certain buildings. The creative freedom that is allowed in these games is mainly about visual arrangement: choosing where to place different objects.

The avatar is a literal visual representation of a virtual identity and can be interpreted, in Goffman's terms, as an intentional cue. Virtual spaces, however, may be a stronger mix of intentional and unintentional cues. In an online setting, Vazire and Gosling (2004) identified two sets of cues for inferences about personality: identity claims – statements made by individuals about how they would like to be regarded—and behavioral residue – physical traces of a person's behavior left unintentionally. It could be that spatial customization in the virtual world, like that in the physical world (e.g., Gosling et al., 2002) reflects a person's true personality through behavioral residue. On the other hand, in a fictitious (game) virtual environment, individuals may be more immersed in a fantasy setting and be more likely to customize their virtual space to reflect their ideal personality. When players of online games have the opportunity to customize their virtual environment, are those spaces identity claims or behavioral residue? Our main research question, therefore is to see if the virtual spaces people create through games are more reflective of their real self or actual self.

RQ. Does spatial customization in a simulation game reflect an individual's real or ideal personality?

4. Public self-consciousness

If online spaces are influenced by an individual's personality, then it is likely that some people put great consideration into designing their space while others do not. In other words, an individual's choice of object selection and placement may reflect his or her level of public self-consciousness. Public self-consciousness is the tendency to engage in the state of self-awareness and focus on the self as a social object (Fenigstein, Scheier, & Buss, 1975). A person who is high in public self-consciousness spends a lot of time thinking about observable aspects of their self, such as physical appearance (Cheek & Briggs, 1982). Studies have found that men who rate high in public self-consciousness tend to be interested in clothing (Solomon & Schopler, 1982) while women with high levels of public self-consciousness are more likely to use makeup (Miller & Cox, 1982). Individuals with high levels of public self-consciousness are also more likely to have plastic surgery for esthetic purposes (Culos-Reed, Brawley, Martin, & Leary, 2002).

Thus, game players who are high in public self-consciousness, as compared to those who are low in public self-consciousness, may be more likely to carefully customize their virtual space so that they are able to control their self-presentation. In other words, it could be that individuals with higher levels of public self-consciousness have virtual spaces that are closer to their ideal self, while individuals with low public self-consciousness have spaces closer to their real self.

H1. Individuals with higher public self-consciousness will have virtual spaces that are closer to their ideal self.

5. Method

5.1. Participants and design

The current study used three types of data collection to answer the research question and hypothesis. Undergraduate students taking telecommunication courses in a large Midwestern university in the United States were invited to participate in a study in which they would have to become Facebook friends with an anonymous student on Facebook in the discussion, we say that the other student was a confederate, but should also make that clear in the method section and play the simulation game Cityville with that student for one week. Cityville offers players an opportunity to customize a virtual city with virtual buildings, roads, parks, and other amenities (see Fig. 1). Although players can design their city uniquely, they can only choose components of the city from a limited set of items. Participants were offered \$10 if they completed the study.

Volunteers were first directed to an online survey, which asked them about their prior game experience, real and ideal personality, and basic demographic variables. Real and ideal personality was measured with the ten-item personality inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), a short scale of the Big Five dimension. Participants were asked to “think about your real personality” and then fill out the TIPI, followed by “think about your ideal personality” and another set of TIPI. Public self-consciousness was a seven-item scale from Fenigstein et al. (1975). The items addressed how concerned the individual felt about presenting themselves in front of others, such as “I usually worry about making a good impression,” “I’m concerned about what other people think of me,” and “I’m concerned about the way I present myself,” and were rated from “false” to “true” on a five-point scale.

The actual experiment took place about two weeks after the survey. Participants were told that the study was about people’s game experiences. Participants had to play the game for at least

5 min everyday for seven days but were not given any specific instructions on how to play. A research assistant recorded participants’ daily progress by taking screenshots of participants’ cities. On the eighth day, participants were given a survey asking about their game enjoyment that was irrelevant to this study.

Forty people participated in the study. Most participants were Caucasian ($N = 28$, 70%); there were also five Asians (12.5%), six African Americans (15%), and one multiracial (2.5%) participant. About 58% of participants were male; the mean age was 22.6 ($SD = .27$).

5.2. Coding personality

Coding was done by two undergraduate students who had not taken any classes in social psychology or personality psychology. The assistants were given an introduction on the game and what items were available to customize the city. They were then shown screenshots of participants’ cities and were asked to fill out TIPI for each screenshot. The TIPI questionnaire was reworded for coders so that instead of “I am . . .” the items were preceded by “I think this person is . . .” The coders were not given any directions as to how to code the screenshots; they were asked to make instantaneous assessments based on their intuition. All of the screenshots were those taken when the participants were at level 10, thus controlling for advancement, as more advanced levels have more access to items and are more likely to have increased virtual wealth that may affect customization.

6. Results

The coders’ observations of players’ personalities were averaged; coder reliability was assessed with a Pearson’s product-moment correlation, as used by Gosling et al. (2002). Coders’ highest agreement was on extraversion ($r = .75$, $p < .01$), followed by openness ($r = .58$, $p < .01$), agreeableness ($r = .53$, $p < .01$), conscientiousness ($r = .47$, $p < .01$), and emotional stability ($r = .37$, $p < .05$). The agreement of observers who have never interacted with the target has been called consensus at zero acquaintance (Kenny, Horner, Kashy, & Chu, 1992). Our coder reliabilities were very consistent with prior studies examining consensus at zero acquaintance (Kenny, Albright, Malloy, & Kashy, 1994).

We ran a series of paired-samples t tests to examine the mean value differences between: (a) self-reported real and ideal personality, (b) self-reported real personality and observed personality, and (c) self-reported ideal personality and observed personality.

The differences between self-reported real and ideal personalities were different at the $p < .001$ significance level for all five personality dimensions: extraversion ($t = -4.605$), agreeableness ($t = -5.212$), openness ($t = -6.389$), conscientiousness ($t = -4.945$), and emotional stability ($t = -6.389$). This suggests that people make a distinction between who they think they are and who they want to be.

6.1. Observed personality vs. self-report

Observed personality was always closer to real personality than ideal personality. The difference between observed and ideal personality was significantly different ($p < .001$) for all five personality dimensions. The difference between observed personality and real personality was only significantly different for openness ($t = 6.36$, $p < .001$) and conscientiousness ($t = 2.55$, $p < .05$); there were no significant differences between observed and real personality for extraversion, agreeableness, and emotional stability (see Table 1).

There could be several interpretations for these results. If we assume that the self-reported real personality is the individual’s



Fig. 1. An example of spatial customization in the game Cityville.

Table 1
Means and standard deviations of observed and self-reported personalities on a 7-point scale ($N = 40$).

	Observed	Self-reported real	Self-reported ideal
Extraversion	3.84 (1.59)	4.36 (1.39)	5.31 (1.04)
Agreeableness	4.60 (1.16)	4.59 (1.16)	5.55 (1.05)
Conscientiousness	4.96 (1.16)	5.64 (1.07)	6.53 (.784)
Openness	3.98 (1.35)	5.58 (.805)	6.33 (.773)
Emotional stability	4.94 (.945)	5.26 (1.19)	6.32 (.862)

“true” personality, then we can suggest that people’s spatial customization activities in the game Cityville may only reflect extraversion, agreeableness, and emotional stability. This was somewhat different from Gosling et al. (2002), who found that observations for personalities reflected in bedrooms and offices were most accurate for openness and least accurate for extraversion and agreeableness.

The second interpretation is that if the observed personality is the individual’s “true” personality, people have a natural social desirability bias in reporting their personality traits towards their ideal.

The third interpretation is that coders were more conservative in rating others’ personalities because they were less confident (or unsure of) how to discern personality from the virtual space. If coders were uncertain about how to rate personalities, we would see a tendency of their reports to be clustered closely around the mean (4 on a 7-point scale). However, the standard deviations of the observed personalities are larger than those for the self-reported real and ideal personalities. This casts doubt on the third interpretation; it is unlikely that coders were systematically inclined towards the mean.

6.2. No moderating effect of public self-consciousness

To examine the moderating effect of public self-consciousness ($M = 2.91$, $SD = .56$), we did a mean split, dividing players into those with high PUSC and low PUSC and looking at the observed, real, and ideal ratings. PUSC did not have any moderating effect.

7. Discussion

We found that individuals create virtual spaces that observers rate as closer to the individuals’ self-reported real personality than ideal personality. This was opposite of the finding of Bessiere et al. (2007), who found that people making avatars in World of Warcraft created figures that were closer to their ideal. It was consistent, however, with results that looked at personality in Facebook profiles (Back et al., 2010).

There may be several reasons why we found different results. The first is that in comparison to an avatar – which is an overt digital representation of oneself – space, especially in a game, is something that individuals may not consider as being an object of self-presentation. If individuals were not consciously thinking of their space as being something that represents them, it could be that the act of customization was more of an unconscious reflection of their personality. This may be why we did not find a moderating effect of public self-consciousness, although lack of evidence is not an indicator of support for the null. This interpretation is consistent with studies on behavioral residue.

Another interpretation is that in this experimental setting, individuals were only playing with one other person (the confederate) whose identity was unknown to them. Given that they would most likely never see this stranger again, it could be that they did not feel a need for selective self-presentation, which may have resulted in creating a space that was closer to their real self as there was no

need for selective self-presentation. In a non-experimental setting, the characteristics of the other player(s) may influence how the individuals customize their space.

A third interpretation is that the game itself did not provide much opportunity for self expression. Unlike other simulation games that give more options for spatial customization, Cityville has a limited set of items that individuals can use. At level 10, individuals could only choose from five types of residential buildings, five commercial buildings, four administrative buildings, four types of decorative items, one farm, and two types of roads. However, the fact that coders were able to detect differences even with this limited set of cues suggests that personality can be observed even in restrained situations.

8. Conclusion

Simulation games provide an opportunity for people to express their personality through the design of their in-game virtual environment in a manner visible to third-party observers. We found that observers of these games who have no psychological training made judgments about personality traits by simply looking at screenshots of the created virtual environment, and that the identified personality more closely resembled the real personality of the creator than the ideal personality of the creator. Since the game only had a limited set of items, this suggests that the arrangement of items in a personalized virtual environment reflects the personality of the creator. This may be a useful rationale for creating unobtrusive behavioral measures for personality that minimizes limitations of language or person-situation debates.

Our results also suggest that avatar customization and spatial customization in virtual environments are different in relation to personality. Further investigation is required to see if there are similarities and differences in different genres of virtual environments. Future research should also see if untrained observers’ instantaneous judgments of others’ spaces are more or less accurate than those of trained professionals. Although this study was limited to undergraduate students, given the prevalence of spatial customization features in online games for adolescents and games that have a global presence, there are many opportunities for future studies comparing different populations.

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