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# Creating Virtual Alter Egos or Superheroines?
## Gamers' Strategies of Avatar Creation in Terms of Gender and Sex

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## ABSTRACT

*Who do people want to be in virtual worlds? Video game players can create their avatars with characteristics similar to themselves, create a superhero that is predominantly designed to win, or chose an in-between strategy. In a quasi-experimental study, players' strategies of avatar choice were investigated. Participants created an avatar they would like to play with for five game descriptions and two gaming scenarios by choosing from a list of (pre-tested) masculine and feminine avatar features. Additionally, participants chose their avatars' biological sex. The results reveal a mixed strategy: On the one hand, the avatar's features were chosen in accordance with the game's demands to facilitate mastery of the game. On the other hand, players strived for identification with their avatar and thus preferred avatars of their own sex. Participants rated those game descriptions and gaming scenarios more entertaining which required avatar features in line with their own sex role.* [Article copies are available for purchase from InfoSci-on-Demand.com]

*Keywords: Avatars; Entertainment; Gender; Sex Role; Video and Computer Games*

## INTRODUCTION

Avatars and agents have become the major forms of media access to virtual environments. Via an avatar the player can elicit all kinds of social interaction. Thus, "avatar-mediated communication," addressing the communication and the social interaction between users and avatars as well as its potential effects, seems to be the upcom-

ing issue in the studies of human-computer interaction, virtual environments, and video games. Avatars will increasingly be the first access and the "face" of computer-mediated communication, such as games, Internet or learning software (Donath, 2007; Nowak & Rauh, 2008). Studies on avatars and agents indicate that people get a more emotional access to computer-based environments by communicating with an avatar or agent (Dryer, 1999; McQuiggan & Lester, 2007; Rizzo, Neumann, Enciso, Fidaleo, & Noh, 2001). This has several implications. With avatars and agents people concentrate easier, learn better, and find computer-mediated communication more enjoyable and fun (Gaggioli, Mantovani, Castelnuovo, Wiederhold, & Riva, 2003; Ku, Jang, Kim, Kim, Park, Lee et al., 2005; Whalen, Petriu, Yang, Petriu, & Cordea, 2003).

In video and computer games, avatars are not limited to the visual characteristics of the interface players use to navigate through games. Game avatars are also embedded into the game narratives and may have different personalities and histories, offering different roles players may take. An increasing number of games, like massively multiplayer online role-playing games, allow their users to create the avatars' visual appearance, but also skills and personality. With their avatars the players can engage in social interaction and even behave like human beings. Thus, communication between players and avatars evolves to a new form and it has potential effects on user identity as well as on the experience of video and computer gaming (Bailenson, 2006; Bailenson & Beall, 2005; Bessière, Seay, & Kiesler, 2007; Hsu, Kao, & Wu, 2007; Hsu, Lee, & Wu, 2005). Depending on the game's features and the player's skills, the player might gain enormous freedom by interacting with an avatar. The players can either create an avatar with characteristics similar to themselves, create a virtual superhero with attributes far beyond reality, or chose an in-between strategy. Consequently, the manner in which a player designs an avatar triggers two questions: 1.) Who do people want to be in virtual worlds? 2.) If they have the freedom to create their avatars, do they prefer to resemble themselves in real life or to be somebody else, for example, a virtual superhero? To answer these questions, this article will deal with the similarity between avatars and players. It will be investigated whether the similarity has any impact on how enjoyable a game is perceived.

To measure the avatar-player similarity, many avatar characteristics such as outer appearance or physical strength could be taken into account. Here, gender attributes will be addressed. Avatars and gender have become crucial issues in studies on video games (Hartmann & Klimmt, 2006a; Lucas & Sherry, 2004; Ogletree & Drake, 2007; Smith, 2006). Not only do players create their avatar in terms of avatar-features, but also the players themselves are likely to be influenced by their avatars (Yee & Bailenson, 2007). Eastin (2006) reveals that the avatars' features influence the players' aggressiveness and their understanding of gender roles. Previous findings also indicate that a great part of computer gaming is still "a man's world," particularly in the action genre. Researchers criticize that video games portray women in a sex-stereotyped manner (Dietz, 1998; Ivory, 2006; Jansz & Martis, 2007; Smith, 2006) and that many games do not meet girls' entertainment needs (Hartmann & Klimmt, 2006a; Lucas & Sherry, 2004). It has been shown that sex-stereotyped and aggressive games affect women by rendering sex-stereotyped role-behavior (Bartholow & Anderson, 2002; Chumbley & Griffiths,

2006; Dietz, 1998; Eastin, 2006; Jansz & Martis, 2007; Norris, 2004; Quaiser-Pohl, Geiser, & Lehmann, 2006; Reinhard, 2006). Consequently, do women adjust to this "man's world" by taking on a masculine perspective and attributes or do they prefer gender attributes commonly ascribed to themselves in the real world when they play video or computer games?

## Gendered Video Gaming

Men and women play differently in terms of genre, frequency, duration, their motivations, and how they are affected by games (Ambady & Gray, 2002; Digital Trends, 2006; Hartmann & Klimmt, 2006a; Information Solutions Group, 2007; Lucas & Sherry, 2004). And most importantly: Games not only do have different effects on men and women, they also affect gender as well as sex roles (Bem, 1974; Smith, 2006).[1]

According to the Entertainment Software Association (ESA), 65% of American households play computer or video games, and 60% of all game players are male (ESA, 2008). Sixty-four percent of online gamers are women (Digital Trends, 2006), and the overall audience for casual games is predominantly female (Information Solutions Group, 2007). However, the percentage of women under the age of 40 who play casual games (25%) is smaller than men (37%). Men choose casual game genres such as sports, war, role-playing, and other simulations, whereas women enjoy puzzle, word-games, arcade, and card games (Information Solutions Group, 2007).

Smith (2006) reports that women are not featured in video games as often as men are. Dietz (1998) accounts that only 41 percent of games include female characters. In a content analysis, Ivory (2006) used video game reviews to investigate the prevalence and portrayal of male and female characters. He argues that female characters were underrepresented and more frequently presented in a sexualized manner compared to their male counterparts. Jansz and Martis (2007) conducted a content analysis using introductory movies of twelve popular games such as "Enter the Matrix" or "Tomb Raider." They discovered that women and men were equally distributed as leading characters. Submissive female characters were not found at all. Although this study may indicate a leading trend in future game development, the authors still suspect a gender bias in video games. The sample size of Jansz and Martis' (2007) study was smaller than in the representative content analyses conducted by Children Now (2000, 2001). Also, Jansz and Martis (2007) had the aim to increase the diversity of the games in the sample. Opposed to that Children Now (2000, 2001) chose the most popular games in the market for their sample. Therefore, the sampling strategy may have influenced the results.

Apart from content preferences, men and women also differ in their motives to play video games. While the gratification of control is a primary gratification of video and computer games (Grodal, 2000; Klimmt & Hartmann, 2006), within the framework of Lucas and Sherry (2004) it is suggested that men and women have very different needs regarding how to reach the latter. While women strive for inclusion and affection, men look for challenges and competition (see also Graner Ray, 2004). In line with these arguments, we suppose that avatar design is directed by players' primary gratification of control.

Similar to the idea of primary gratification of control, Nowak and Rauh (2005) argued that avatars are chosen to reduce

uncertainty. That is, people's primary goal during a particular interaction is to reduce uncertainty about the individual they are interacting with. In doing so, they strive to understand others' behavior during interactions as well as to predict future conduct (Berger & Calabrese, 1975; Infante, Rancer, & Womack, 1997). In transferring Lucas and Sherry's (2004) assumption of primary gratification of control to video gaming, enjoyment can best be achieved if the player controls the game.

Here, it will be proposed that players may achieve control in quite different ways and with different strategies of avatar design. First, control–within Lucas and Sherry's (2004) framework–may be achieved by designing an avatar similar to oneself. In doing so, virtual and real worlds become similar and actions in the virtual world seem more predictable and easier to control. Second, control might be achieved by meeting the game requirements as well as possible. For many games this would mean that the player has to create an avatar that is very dissimilar from him-/herself in several respects. In the following we will argue that, generally speaking, players prefer games requiring same-sex avatars. However, if game requirements ask for an avatar with attributes of the opposite gender, players will not stick to their preference, because it might decrease their chance of winning.

## SIMILARITY AND SUCCESS: GAME PLAYERS' STRATEGIES OF AVATAR CREATION

The motives for choosing a similar avatar may be to transfer real life social cognition to virtual worlds. This would make the virtual world much easier to comprehend. Similarity might facilitate that the player feels "at home" in the game. Hsu, Lee, and Wu (2005) show that buyers consider avatars similar to themselves the second most appealing game feature (after a dramatic game story). Accordingly, Hsu, Kao, and Wu (2007) reveal that both similarity and familiarity allow for predicting the preference for heroic roles in computer games. Further, feeling similar to their avatar, users most likely experience identification phenomena such as emotional release (Cohen, 2001).

Hsu, Lee, and Wu (2005) conducted a qualitative study with 16 frequent buyers of computer games. Participants put 28 different "Pac-Man" games into three groups in terms of perceived fun. Afterwards they compared games from different groups according to design features. The authors report that players enjoy games with characters similar to their own. Apart from having dramatic scenarios, an avatar's similarity to oneself is the second most important criterion for liking a game. Female students are also more likely to choose female characters and men are more likely to choose male characters when they play computer games (Ogletree & Drake, 2007). In line with preceding research, H1 will suppose that women as well as men prefer games requiring avatars of their own sex and that both women and men will find depictions of their own gender more enjoyable and fun.

**H1:** *Female players will find games requiring avatars with female attributes more enjoyable and male players will find games requiring avatars with male attributes more enjoyable.*

However, we suspect that not all players will design their avatars similar to themselves in all games. That is, some games

require abilities that do not resemble a player's gender or personality. Many video games are embedded in a context necessitating attributes such as physical strength or aggressiveness. Mastery and control in these games may only be reached by creating an avatar with attributes dissimilar to the player. Thus, control is achieved by designing an avatar according to game success requirements and not according to the player's build. The better an avatar is equipped in terms of success-enhancing features, the more control can be executed during challenges faced in the game. Moreover, players may want to try out different identities and use the game as a virtual playground to probe social interactions they would not dare to exhibit in the real world (Bessière et al., 2007).

How people create their avatar might also be driven by rational choice considerations. Video game players design avatars to maximize their chance of game mastery and success. Bailenson and Beall (2005, 2006) systematically explored transformed social interaction (TSI). They suggest that self-presentation is one of the dimensions possibly transformed during social interaction in virtual realities. Two experiments on the subject matter illustrate that outer appearance transforms social interaction. If participants were assigned an attractive avatar, they were more intimate with opposite-gendered confederates in a social disclosure task than players with less attractive avatars. Also, participants with taller avatars behaved more confidently in a negotiation task (Yee & Bailenson, 2007). By creating a dissimilar avatar that fits into a game and meets game requirements, the primary goal of control is accomplished (Grodal, 2000; Klimmt & Hartmann, 2006; Lucas & Sherry, 2004). Also, players can use a "borrowed" identity and try out behavior that is out of reach in real life. This allows for parasocial interaction, and associated processes such as attachment to the character and a feeling of company seem likely (Cohen, 2001).

Summing up, the literature review suggests that generally speaking, players like same sex games requiring same sex avatars (see H1). However, in some games players might not be successful with avatars that resemble them. In the second and third hypotheses it will be suggested that players want to play with avatars that meet a game's requirements. Accordingly, for games that can be considered "masculine" in terms of their requirements, players design masculine avatars. "Feminine" games will lead to the creation of feminine avatars.

**H2:** *In "masculine" games (pretest-rated), players of both sexes will create avatars with male attributes, and in "feminine" games (pretest-rated), players will create avatars with female attributes independent of their own sex.*

**H3:** *In "masculine" games (pretest-rated), players of both sexes will create an avatar with male attributes, and in "feminine" games (pretest-rated), players will create an avatar with female attributes independent of their own sex role orientation.*

In H1 it was assumed that players like to play games requiring avatars of their own gender. Thereupon H2 and H3 supposed that this preference is ignored as soon as the similar avatar would not be successful. It will now be suggested in H4 that players have the chance to stick to their gender-identity in terms of biological sex. In creating avatars with matching "biological" sex, players would have the chance to pursue their aim to play with

avatars reflecting attributes of their own gender and simultaneously they would be able to meet the game requirements and be successful. It is posited that players chose the following strategy to maximize their need for similarity as well as their chance of winning: Creating an avatar with their own "biological" sex with the aim to increase similarity and creating an avatar with gender attributes meeting the game requirements (e.g., physical strength) to increase the chance of winning.

Apart from similarity in terms of gender attributes, assigning a "biological" sex to an avatar seems to be crucial to players. Even though avatars do not have biological mechanisms (in terms of a genotype), they can have traits and conditions (similar to a phenotype) that would be causally biologically linked to being male or female (Gentile, 1993, p. 120), such as secondary sexual characteristics (e.g., breasts of female avatars). Most empirical work gathered on this issue demonstrates that players commonly choose same-sex avatars (Eastin, 2006; Hsu, Lee, & Wu, 2005; Nowak & Rauh, 2005). For the inhabitants of Second Life it was shown that only very few females choose to play a male character (4 %) and not many men choose to be a girl (14 %). Most users (42 % men, 40 % women) stay with their real world gender (Rymaszewski et al., 2007). Recent exploratory studies reveal that gamers might try out gender swapping (Hussain & Griffiths, 2008), however, when it comes to the "main" character, a gender match between the real world and the virtual world seems to be more likely (Eastin, 2006; Hsu, Lee, & Wu, 2005; Nowak & Rauh, 2005). Consequently, in terms of biological sex, players are expected to assign their own sex to avatars regardless of game requirements.

**H 4:** *Game players will prefer to assign their own sex to the avatar rather than creating an avatar with the biological sex that seems to match the game requirements.*

## METHOD

### Pretest One: Stimulus Material

In a pretest, 50 participants (36% men, 64% women; mean age = 27.84, SD = 8.70) rated descriptions of five computer games and two gaming scenarios according to the features an avatar should have to fulfill the situational demands required by the respective game.

The five game descriptions resemble authentic descriptions of existing computer games (The Sims, My Veterinary Clinic, Grand Theft Auto: San Andreas, Crysis, and Urban Chaos) and were obtained from the official product Web sites. All cues referring to the original games (e.g., titles or character names) were excluded from the descriptions. The two gaming scenarios depict two different situations within a crime video game (see Appendix A and Appendix B for exact wording of game descriptions and scenarios respectively).

Participants received the instruction to imagine an avatar for every description that optimally matches the requirements of the respective game or gaming scenario. For every game description and gaming scenario, participants indicated whether an avatar should have "primarily male attributes" or "primarily female attributes" to perfectly meet the respective situational demands. They made their ratings on a 7-point Likert scale. See Table 1 for the summarized results.

One-sample t tests were computed to test for significant deviations from the

*Table 1. Pretest one: stimulus material*

| | M | SD | t | df | p |
|---|---|---|---|---|---|
| Game One: *The Sims* | 4.42 | 1.30 | 2.293 | 49 | .026 |
| Game Two: *My Veterinary Clinic* | 5.36 | 1.27 | 7.549 | 49 | < .001 |
| Game Three: *GTA: San Andreas* | 2.52 | 1.33 | -7.877 | 49 | < .001 |
| Game Four: *Crysis* | 1.90 | 0.91 | -16.333 | 49 | < .001 |
| Game Five: *Urban Chaos* | 2.32 | 1.39 | -8.537 | 49 | < .001 |
| Scenario One: Pursuit | 1.98 | 1.04 | -13.737 | 49 | < .001 |
| Scenario Two: Interviewing a witness | 5.84 | 1.24 | 10.536 | 49 | < .001 |

*Note. Scales range from 1 = "requires primarily male features" to 7 = "requires primarily female features". One-sample t tests were conducted to test for significant deviations from the scale midpoint (4.0). Descriptions rated significantly lower than 4.0 were considered "masculine"; descriptions rated significantly higher than 4.0 were considered "feminine".*

scale midpoint (4.0). Descriptions rated significantly lower than 4.0 were categorized as "masculine" games because they were perceived as requiring primarily male avatar attributes by the pretest participants. Analogously, descriptions rated significantly higher than 4.0 were considered "feminine" games. Accordingly, Game One (The Sims), Game Two (My Veterinary Clinic) and Scenario Two (Interviewing a witness) were categorized as "feminine," whereas Game Three (GTA: San Andreas), Game Four (Crysis), Game Five (Urban Chaos) and Scenario One (Pursuit) were categorized as "masculine."

## Pretest Two: Avatar Features

In a second pretest, 57 participants (19 men and 38 women) rated eight adjectives: analytical, warm, athletic, forceful, ambitious, affectionate, beautiful, has leadership qualities. These features were derived from literature on sex role stereotyping (Bem, 1974) and they represent typical masculine or feminine attributes. The features were pretested to verify their stereotypical gender character. Participants received the instruction to indicate for every adjective whether it resembles a rather masculine or rather feminine feature. Participants rated each adjective on a 5-point Likert scale ranging from 1 = "masculine" to 5 "feminine." The results are presented in Table 2.

One-sample t tests were computed to test for significant deviations from the scale midpoint (3.0). Features rated significantly lower than 3.0 were categorized as masculine features and features rated significantly higher than 3.0 were considered feminine features. Accordingly, the attributes "analytical," "athletic," "forceful," and "has leadership qualities" were categorized as masculine features, whereas "warm," "affectionate," and "beautiful" were rated as feminine features. No significant deviation from the scale midpoint was found for "ambitious," which is why this feature was excluded from data analysis in the main study.

*Table 2. Pretest two: avatar features*

| | M | SD | t | df | p |
|---|---|---|---|---|---|
| Analytical | 2.35 | 0.81 | -6.031 | 56 | < .001 |
| Warm | 3.93 | 0.65 | 10.787 | 56 | < .001 |
| Athletic | 2.59 | 0.60 | -5.155 | 56 | < .001 |
| Ambitious | 2.93 | 0.68 | -0.782 | 56 | .438 |
| Forceful | 1.72 | 1.41 | -6.852 | 56 | < .001 |
| Affectionate | 3.81 | 0.72 | 8.485 | 56 | < .001 |
| Beautiful | 3.84 | 0.82 | 7.761 | 56 | < .001 |
| Has leadership abilities | 2.68 | 0.81 | -2.961 | 56 | .004 |

*Note. Scales range from 1 = "masculine" to 5 = "feminine". One-sample t tests were conducted to test for significant deviations from scale midpoint (3.0). Features rated significantly lower than 3.0 were considered "masculine"; features rated significantly higher than 3.0 were considered "feminine".*

## MAIN STUDY

### Participants

A total of 142 undergraduate students from a large German university participated in this quasi-experiment.

Sub-sample one: In a first step, 108 participants (38 men and 70 women) were recruited in introductory psychology classes and received course credits for participation.

Sub-sample two: To equalize the ratio of male and female participants, 34 additional male participants were added to the sample. This second male sample was part of a follow-up study, which addressed the role of satisfaction with life on avatar choice. The results of this study are presented elsewhere (Trepte, Reinecke, & Behr, in preparation). Participants of sub-sample two received exactly the same instructions as participants of the first sample, only the measures of entertainment value slightly differed in both samples (see procedure section for further information).

The final sample comprised 72 men (50.7 %) and 70 women (49.3%). Their ages ranged from 18–48 years (M = 24.6 yrs.; SD = 6.05 yrs). None of the participants of pretest one or two took part in the main study.

### Procedure

In a 2 (gender) x 2 (male vs. female situational setting) quasi-experimental design, the avatar features participants chose were investigated. All experimental sessions were conducted in a computer laboratory with six open cubicles and data were collected using a computer-aided procedure.

Participants received the five previously rated computer game descriptions in random order. After a game description was presented, participants were asked to create an avatar "they would like to play with" for the respective game by choosing from a list of the eight pretested attributes (analytical, warm, athletic, ambitious, has leadership qualities, beautiful, strong, affectionate). Participants were allowed to distribute a total of 40 points among these attributes

and up to 10 points for one, that is, they had to assign a value between 0 and 10 to every attribute. After configuring the avatar's features, participants were requested to choose the avatar's biological sex (1 = "male;" 2 = "female"). After receiving all five game descriptions and configuring an avatar for each one, participants obtained the two gaming scenario descriptions used in the pretest in random order and they were requested to develop another two avatars using the same procedure.

To control for participants' prior experience with the games used as experimental stimuli, participants in sub-sample one were asked to indicate for each description whether they were familiar with the respective game (1= "yes;" 2 = "no;" 3 = "I don't know").

Participants were then asked to judge the games' entertainment value by indicating their approval of the statements: (a) "This game [scenario] sounds exciting," (b) "I could entertain myself well with this game [scenario]," and (c) "I would like to play this game [scenario]." Judgments were given on a five-point Likert scale ranging from 1 "not right at all" to 5 "absolutely right." The three items used to measure entertainment value showed satisfactory internal consistency for all game descriptions and gaming scenarios (for all: Cronbach's $\alpha > .908$) and they were summed to form a single entertainment value index. In the case of the 34 additional male participants of sub-sample two, entertainment value was assessed using the item "I could entertain myself well with this game [scenario]" on a six-point scale ranging from 1 "not right at all" to 6 "absolutely right." To make entertainment scores of both groups of participants comparable, scores were standardized using a z-transformation in both sub-samples.

After rating the games' entertainment value, participants completed the Bem Sex Role Inventory (BSRI, Bem, 1974). At the end of the experiment, participants reported age, sex, the average number of times they play video or computer games per week, and the average length of a usual gaming session.

## MEASURES

### Bem Sex Role Inventory (BSRI)

The Bem Sex Role Inventory (Bem, 1974) was used to assess the participants' sex role orientation. The BSRI consists of 60 adjectives forming three scales of 20 items each: (a) the masculinity scale (acts like a leader, aggressive, ambitious, analytical, assertive, athletic, competitive, defends own beliefs, dominant, forceful, has leadership qualities, independent, individualistic, makes decisions easily, masculine, self-reliant, self-sufficient, strong personality, willing to take a stand, willing to take risks), (b) the femininity scale (affectionate, cheerful, childlike, compassionate, does not use harsh language, eager to soothe hurt feelings, feminine, easy to flatter, gentle, gullible, loves children, loyal, sensitive to the needs of others, shy, soft spoken, sympathetic, tender, understanding, warm, yielding) and (c) the social desirability scale (adaptable, conceited, conscientious, conventional, friendly, happy, helpful, inefficient, jealous, likable, moody, reliable, secretive, sincere, solemn, tactful, theatrical, truthful, unpredictable, unsystematic). Participants were requested to indicate how well each quality describes them on a 7-point scale ranging from 1 ("never or almost never true") to 7 ("always or almost always true"). Both the

masculinity scale (Cronbach's $\alpha = .79$) as well as the femininity scale (Cronbach's $\alpha = .76$) showed satisfactory internal consistencies. For this study, the self-rating means for all masculine and all feminine items were calculated (ranging from 1–7). Participants who scored higher on the masculinity scale than on the femininity scale were considered to have a predominantly masculine sex role orientation. Those who scored higher on the femininity scale were considered to have a predominantly feminine sex role orientation.

## RESULTS

### Hypothesis 1

To test for differences in perceived entertainment value between men and women, independent-samples t tests were conducted for the entertainment value ratings of male and female participants for all game descriptions and gaming scenarios. The results are summarized in Table 3.

Rated masculine in the pretest, Game Three (GTA: San Andreas), Game Four (Crysis), Game Five (Urban Chaos) and Scenario One (Pursuit) were judged significantly higher by men than by women regarding entertainment value. Game One (The Sims) and Game Two (My Veterinary Clinic), that have been rated feminine in the pretest, were judged significantly higher in entertainment value by women than by men. No significant differences were found for Scenario Two (Interviewing a witness). Thus, women rated those games categorized as "feminine" in the pretest higher in entertainment value than men. Moreover, men gave higher ratings to gaming Scenario One and those games rated "masculine" in the pretest. Obviously, the participants' gender and the dominance of male versus female avatar attributes required in the described situation influenced the perceived entertainment value. Thus, hypothesis 1 is supported by the data.

To control for the influence of game experience on the evaluation of the presented game descriptions, ANCOVAs with sex as a fixed factor, the frequency of playing games per week as covariate and the entertainment ratings as dependent variables were computed for all five games and the two game descriptions. With the exception of Game Three (GTA: San Andreas), where no significant main effect of sex could be replicated ($F(1,142) = 3.856$, $p = .052$, $\eta^2 = .026$), the pattern of results remained unchanged when controlling for game experience, which again supports hypothesis 1.

To control for the influence of the participants' prior experience with the games used as experimental stimuli on the evaluation of the entertainment value of the respective games, ANOVAS with participants' sex and prior experience with the game as fixed factors and the entertainment ratings as dependent variables were computed. The significant effect of the participants' sex on the ratings of entertainment value was replicated only for Game Two (My Veterinary Clinic) ($F(1,108) = 4.822$, $p = .030$, $\eta^2 = .042$), Game Four (Crysis) ($F(1,108) = 4.728$, $p = .016$, $\eta^2 = .044$), and Game Five (Urban Chaos) ($F(1,108) = 5.556$, $p = .011$, $\eta^2 = .052$) when controlling for prior experience with the games.

### Hypothesis 2

Both male and female participants created avatars with feminine attributes in Game One (The Sims) and Game Two

*Table 3. Mean scores for entertainment value ratings by male and female participants*

| | Mean rating of entertainment value | | t | df | p |
|---|---|---|---|---|---|
| | men | women | | | |
| Game One: *The Sims* (feminine) | -0.168 | 0.172 | -2.056 | 140 | .042 |
| Game Two: *My Veterinary Clinic* (feminine) | -0.179 | 0.172 | -2.109 | 140 | .037 |
| Game Three: *GTA: San Andreas* (masculine) | 0.194 | -0.200 | 2.393 | 140 | .018 |
| Game Four: *Crysis* (masculine) | 0.330 | -0.340 | 4.238 | 140 | < .001 |
| Game Five: *Urban Chaos* (masculine) | 0.248 | -0.251 | 3.058 | 140 | .003 |
| Scenario One: Pursuit (masculine) | 0.170 | -0.198 | 2.216 | 140 | .028 |
| Scenario Two: Interviewing a witness (feminine) | -0.037 | 0.038 | -0.447 | 140 | *n.s.* |

*Note. To assure comparability, scores in sub-sample one and two were standardized using a z-transformation.*

(My Veterinary Clinic), and avatars with masculine attributes in Game Three (GTA: San Andreas), Game Four (Crysis) and Game Five (Urban Chaos; see Table 4). Both men and women created avatars in gaming Scenario One (Pursuit) chiefly with masculine attributes, while they designed avatars in Scenario Two (Interviewing a witness) mainly with feminine attributes (see Table 4).

According to these findings, participant sex did not have an influence on the choice of avatar features. For all games and gaming scenarios, male and female participants set the same priorities in avatar design. They created avatars with male attributes for those games and gaming scenarios rated "masculine" in the pretest and avatars with female attributes for games and gaming scenarios rated "feminine." According to these results, the situational requirements expressed in the respective descriptions primarily regulated the participants' choice of avatar features. This occurred independent of their sex, which supports hypothesis 2.

In the analysis presented above, participants' strategy for avatar design was tested using paired-samples t tests separately for all games and gaming descriptions. To evaluate the overall selection strategy and all avatar design decisions simultaneously, a 2-factor MANOVA was computed with participant sex and the stimulus pretest result ("game requires primarily masculine features" = 1; "game requires primarily feminine features" = 2) as the fixed factors and the sum of masculine and feminine avatar features as dependent variables. The data were therefore restructured. Every avatar designed by the participants was

*Table 4. Mean scores for masculine and feminine avatar attributes by male and female participants*

| | | *M* masculine avatar attributes | *M* feminine avatar attributes | *T* | *df* | *p* |
|---|---|---|---|---|---|---|
| Game One: *The Sims* (feminine) | men | 4.52 | 5.57 | -3.453 | 67 | .001 |
| | women | 4.12 | 5.79 | -6.161 | 64 | < .001 |
| Game Two: *My Veterinary Clinic* (feminine) | men | 4.27 | 5.60 | -3.540 | 65 | .001 |
| | women | 4.09 | 5.65 | -4.581 | 66 | < .001 |
| Game Three: *GTA: San Andreas* (masculine) | men | 6.12 | 2.82 | 10.248 | 65 | < .001 |
| | women | 5.67 | 3.44 | 5.972 | 65 | < .001 |
| Game Four: *Crysis* (masculine) | men | 7.29 | 1.52 | 17.860 | 68 | < .001 |
| | women | 7.10 | 1.69 | 20.037 | 68 | < .001 |
| Game Five: *Urban Chaos* (masculine) | men | 7.12 | 1.82 | 15.239 | 66 | < .001 |
| | women | 6.85 | 1.82 | 18.230 | 67 | < .001 |
| Scenario One: Pursuit (masculine) | men | 6.95 | 1.59 | 17.253 | 65 | < .001 |
| | women | 6.86 | 1.42 | 20.543 | 67 | < .001 |
| Scenario Two: Interviewing a witness (feminine) | men | 3.78 | 6.52 | -9.803 | 70 | < .001 |
| | women | 3.75 | 6.49 | -9.219 | 68 | < .001 |

*Note. Differences between the mean scores of masculine and feminine avatar attributes were tested with paired-sample t tests separately for male and female participants. Varying degrees of freedom are due to missing data.*

taken as a separate unit of analysis in that 2-factor MANOVA. Thus, the scores of avatar features of all seven avatars designed by each participant were taken as separate cases for the analysis, resulting in 994 cases. The MANOVA showed a significant main effect of participant sex on the scores of masculine ($F(1, 979) = 5.147$, $p = .023$, $\eta^2 < .001$) but not on feminine ($F(1, 979) = .462$, $p = .497$, $\eta^2 < .001$) avatar features. Furthermore, a significant main effect was found for the game requirements (pretest rated) on the scores of masculine ($F(1, 979) = 649.550$, $p < .001$, $\eta^2 = .050$) as well as feminine ($F(1, 979) = 1044.341$, $p < .001$, $\eta^2 = .179$ ) avatar features. No interaction effects between participants' sex and game requirements were found for the scores of masculine ($F(1, 979) = .001$, $p = .979$, $\eta^2 < .001$) and feminine avatar features ($F(1, 979) = .307$, $p = .580$, $\eta^2 < .001$). As reported above, the data demonstrate a significant main effect of participant's sex on the choice of masculine avatar features. Although significant, the effect size of the influence of sex on the choice of male avatar features is very small ($\eta^2 < .001$). In contrast, both significant main effects of game requirements on the choice of masculine and feminine avatar features show substantial effect sizes. Accordingly, participants' overall strategy for choosing avatar features was primarily influenced by the situational requirements in the given descriptions. Hypothesis 2 is supported by the results.

To control for the influence of general game experience on the overall selection strategy of avatar features ANCOVAs with game requirements (pretest rated) as fixed factor, the frequency of playing games per week as covariate and the sum of masculine and feminine avatar features

as dependent variables were computed. The effect of game requirements on the choice of masculine ($F(1, 979) = 646.196$, $p < .001$, $\eta^2 = .050$) and feminine $F(1, 979) = 1048.556$, $p < .001$, $\eta^2 = .179$) avatar features remained significant when controlling for game experience.

To test for the effects of prior experience with the games used as experimental stimuli, a MANOVA with game experience as fixed factor and the sum of masculine and feminine avatar features as dependent variables was computed. Prior experience neither had a significant main effect on the sum of masculine ($F(2, 756) = 2.750$, $p = .065$, $\eta^2 = .001$) nor on the sum of feminine avatar features ($F(2, 756) = .768$, $p = .464$, $\eta^2 < .001$).

## Hypothesis 3

To test for the effect of sex role on the choice of avatar features, participants were categorized according to their femininity and masculinity scores assessed with the BSRI. For this purpose, separate self-rating means for all masculine and for all feminine items were calculated (ranging from 1 to 7) for every participant; individuals scoring higher on the femininity scale than on the masculinity scale were considered to have a predominantly feminine sex role orientation, whereas those scoring higher on the masculinity scale were considered to have a predominantly masculine sex role orientation. Consequently, 57 participants were classified as having a masculine sex role orientation and 83 as having a feminine sex role orientation. Two participants were excluded from the analysis because their femininity and masculinity scores were identical, making categorization impossible. Paired-samples t tests were computed for the mean sums of masculine and feminine avatar attributes for participants with masculine and feminine sex role orientation separately for every game and gaming scenario (results are provided in Table 5).

Both participants with masculine and feminine sex role orientation created avatars with feminine attributes in Game One (The Sims) and Game Two (My Veterinary Clinic) and with masculine attributes in Game Three (GTA: San Andreas), Game Four (Crysis) and Game Five (Urban Chaos; see Table 5). In gaming Scenario One (Pursuit) mainly avatars with masculine attributes were created, whereas in Scenario Two (Interviewing a witness) subjects predominantly created avatars with feminine attributes independent of participant sex role orientation.

Accordingly, avatar feature choice was not influenced by participant sex role orientation. Instead, situational requirements expressed in the respective descriptions primarily impacted participants when they chose their avatars' features, independent of their individual sex role orientation. Thus, the results found for male and female participants are replicated for those with masculine and feminine sex role orientation.

Similar to the data analysis conducted for hypothesis 2 and in order to test the overall selection strategy of avatar features, a 2-factor MANOVA was computed with participant sex role orientation (1 = masculine; 2 = feminine) and the stimulus pretest result (1 = "game requires primarily masculine features;" 2 = "game requires primarily feminine features") as the fixed factors and the sum of masculine and feminine avatar features as dependent variables. Therefore the data were restructured in the same manner reported for hypothesis 2, again resulting in 994 cases. The MANOVA

*Table 5. Mean scores for masculine and feminine avatar attributes by participants with masculine or feminine sex role orientations*

| | Participants' sex role orientation | *M* masculine avatar attributes | *M* feminine avatar attributes | *t* | *df* | *p* |
|---|---|---|---|---|---|---|
| Game One: *The Sims* (feminine) | masculine | 4.36 | 5.65 | -4.604 | 53 | < .001 |
| | feminine | 4.28 | 5.71 | -4.887 | 76 | < .001 |
| Game Two: *My Veterinary Clinic* (feminine) | masculine | 4.23 | 5.71 | -3.663 | 52 | .001 |
| | feminine | 4.14 | 5.58 | -4.289 | 77 | < .001 |
| Game Three: *GTA: San Andreas* (masculine) | masculine | 5.95 | 2.97 | 9.765 | 54 | < .001 |
| | feminine | 5.86 | 3.26 | 6.835 | 74 | < .001 |
| Game Four: *Crysis* (masculine) | masculine | 7.24 | 1.67 | 17.370 | 54 | < .001 |
| | feminine | 7.15 | 1.55 | 19.581 | 80 | < .001 |
| Game Five: *Urban Chaos* (masculine) | masculine | 6.81 | 2.04 | 12.792 | 53 | < .001 |
| | feminine | 7.11 | 1.65 | 20.174 | 78 | < .001 |
| Scenario One: Pursuit (masculine) | masculine | 6.95 | 1.41 | 18.889 | 54 | < .001 |
| | feminine | 6.87 | 1.56 | 18.794 | 76 | < .001 |
| Scenario Two: Interviewing a witness (feminine) | masculine | 3.66 | 6.59 | -9.404 | 54 | < .001 |
| | feminine | 3.81 | 6.50 | -9.985 | 82 | < .001 |

*Note. Differences between the mean scores of masculine and feminine avatar attributes were tested with paired-sample t tests separately for participants with masculine or feminine sex role orientations. Varying degrees of freedom are due to missing data.*

showed no main effect for participant sex role orientation on the scores of feminine ($F(1, 965) = .087$, $p = .768$, $\eta^2 < .001$) or masculine ($F(1, 965) = .023$, $p = .879$, $\eta^2 < .001$) avatar features. In contrast, a significant main effect was found for the game requirements (pretest rated) on the scores of feminine ($F(1, 965) = 991.885$, $p < .001$, $\eta^2 = .174$) as well as masculine ($F(1, 965) = 615.122$, $p < .001$, $\eta^2 = .049$) avatar features. No interaction effects between participant sex role and game requirements were found for the scores of feminine ($F(1, 965) = .024$, $p = .877$, $\eta^2 < .001$) and masculine avatar features ($F(1, 965) = .078$, $p = .780$, $\eta^2 < .001$). Accordingly, participants' overall strategy for avatar feature choice was independent of their own sex role, but significantly influenced by the situational requirements expressed in the descriptions and thereby supporting hypothesis 3.

## Hypothesis 4

Mann-Whitney U tests were computed for every game description and gaming scenario to detect differences in the choice of the avatars' biological sex between male and female participants (see Table 6). The results indicate that men chose male avatars significantly more often than women did. Further, women chose female avatars significantly more often than men did. These findings hold for all game descriptions as well as for Scenarios 1 and 2.

Accordingly, the participants' sex significantly influenced the choice of their avatars' biological sex, resulting in a preference for same-sex avatars. Thus, hypothesis 4 is supported.

*Table 6. Mean ranks for avatars' biological sex chosen by male and female participants*

| | Participants' sex | *N* | Mean rank of avatars' biological sex | Man-Whitney *U* | *p* |
|---|---|---|---|---|---|
| Game One: *The Sims* (feminine) | men | 72 | 54.21 | 1275 | <.001 |
| | women | 70 | 89.29 | | |
| Game Two: *My Veterinary Clinic* (feminine) | men | 72 | 61.99 | 1835 | .001 |
| | women | 70 | 81.29 | | |
| Game Three: *GTA: San Andreas* (masculine) | men | 72 | 61.86 | 1826 | <.001 |
| | women | 70 | 81.41 | | |
| Game Four: *Crysis* (masculine) | men | 72 | 63.92 | 1974 | .001 |
| | women | 70 | 79.30 | | |
| Game Five: *Urban Chaos* (masculine) | men | 72 | 63.93 | 1975 | .001 |
| | women | 70 | 79.29 | | |
| Scenario One: Pursuit (masculine) | men | 72 | 65.94 | 2120 | .006 |
| | women | 70 | 77.21 | | |
| Scenario Two: Interviewing a witness (feminine) | men | 72 | 61.49 | 1799 | <.001 |
| | women | 70 | 81.80 | | |

*Note. The scale ranges from 1 = "male" to 2 = "female". Higher mean ranks indicate a higher tendency to choose avatars with the female biological sex.*

## DISCUSSION

The purpose of this study was to examine which strategy participants apply to create avatars in computer and video games. Altogether, the results illustrate the noteworthy interdependence between game contexts, participant sex, strategies for avatar creation, and entertainment experience. Confirming our first hypothesis, participants evaluated the presented game and gaming scenario descriptions to be more entertaining if they encompassed a context designed to be mastered by an avatar with attributes of their own gender. Regarding features, participants designed their ideal avatar according to the requirements presented in the game and gaming scenario descriptions. Supporting the second and third hypotheses, these results occurred independently of participant sex and sex role orientation. Participating men and women

chose avatar features previously rated male when they expected to play games prejudged as "masculine." Conversely, both men and women preferred female features for avatars in games previously rated as "feminine". These results suggest that in terms of avatar attributes, video game players prefer avatars designed to meet the requirements of the games. Yet when it comes to biological sex, men preferred male avatars and women favored female avatars, therewith supporting the fourth hypothesis.

The results of this study allow a wider generalization on computer-mediated communication. Previous studies show that people react differently to different types of avatars and agents (Nowak & Rauh, 2008; Yee & Bailenson, 2007). The user's learning results, their interest as well as emotional variables such as empathy are influenced by the avatars' and agents' character and their visual representation (Bailenson, 2006; Bailenson & Beall, 2005; Ku et al., 2005; McQuiggan & Lester, 2007). The study presented in this article accordingly shows that the avatars' sex and their gender attributes are crucial for effects in computer-mediated communication: If players have the freedom to alter an avatar's sex and to influence their character in terms of gender, they prefer an avatar similar to their own sex role orientation. This might allow the conclusion that computer-mediated communication with same sex agents and avatars leads to better results in terms of learning, collaborating, and acceptance of virtual representations.

Also, the results of our study contribute to a better understanding of entertainment experiences and of the relationship between game players and avatars. In the increasingly popular segment of casual games, many games such as puzzle or card games do not feature avatars (International Game Developers Association, 2006). But for other game genres, the variability of avatars is of growing importance. For massively multiplayer online role-playing games (MMORPGs) such as "World of Warcraft," avatars–and the possibility to create individual avatars–play an important role for their popularity (Chan & Vorderer, 2006).

In line with previous studies our results support the assumption that similarity between players and game characters can enhance the player's entertainment experience (Hsu, Lee, & Wu, 2005). In addition to the work of Ogletree and Drake (2007), who demonstrate that men are more likely to select male avatars, whereas women are more likely to choose female avatars, our study shows that games are rated more entertaining if they require game characters with attributes that are perceived as being typical for one's own gender. The positive effect of gender similarity on entertainment is not only due to the sex of the avatar, but also to the game context requiring masculine or feminine attributes.

This result is particularly interesting from the perspective of game design. Content analyses (Children Now, 2000, 2001; Dietz, 1998; Smith, 2006) show that the majority of video and computer games feature male characters. Female characters are often presented in a sex-stereotyped way and as victims or subordinate to male characters (Children Now, 2001; Dietz, 1998). If female characters appear in a leading role in video games, such as Lara Croft in "Tomb Raider" or Sonya Blade in "Mortal Combat," they often face tasks and challenges that require primarily masculine attributes like physical strength. The results of our study offer an explanation why such games are not more popular among

women than similar games with male main characters: Even though the sex and appearance of game characters like Lara Croft is female, they have to act like male characters in order to be successful in these games. Graner Ray (2004) states that women are not satisfied playing manly characters for various reasons. First, they are not familiar with the dominant and very physical roles masculine characters very often play in computer games. Second, women are primarily interested in activity-based games instead of goal-oriented games. They might reach a feeling of accomplishment by transferring real life cognitions to a virtual world. Our results underline that games do not necessarily become more interesting to women by the appearance of female game characters as long as the game still requires primarily masculine attributes.

Furthermore, this may explain the preference of women for role-playing aspects of games compared to the achievement and competition aspect of games (Hartmann & Klimmt, 2006a; Lucas & Sherry, 2004; Yee, 2007; Yee & Bailenson, 2007), and the increasing number of women playing MMORPGs (Griffiths et al., 2003, 2004). Online role-playing games such as "The Elder Scrolls IV: Oblivion" or "World of Warcraft" allow players to choose male or female characters and to change their appearance according to individual preferences (Chan & Vorderer, 2006). Players can moreover choose among several classes of characters featuring different attributes and various professions requiring different skills. This means that in many (online) role playing games players can decide to develop characters with other than primarily masculine attributes, for example, healing skills. Role playing games also allow players to choose among a considerable number of main and side quests. These quests (e.g., locating hidden items in the game environment, defeating an enemy) vary in terms of the skills or attributes required to master them. Thus players cannot only adjust the game character, but also the basic nature of the game demands. This may attract women in particular, because they do not have to focus on tasks that require primarily masculine attributes.

A similar explanation can be found for the enormous popularity of "The Sims" series among women. In these games, players can design their characters with respect to sex and physical appearance, and also with respect to personality traits. Female "sims" do not only look like females, but can act according to female sex roles, too.

Of course, game requirements as well as the players' own sex does not fully determine the experience of entertainment and the strategies applied to avatar creation. Prior research shows that the exposure to computer and video games depends on a variety of factors, for example, motivations and expected gratifications (Sherry, Lucas, Greenberg, & Lachlan, 2006; Yee, 2007) or personality traits (Hartmann & Klimmt, 2006b; Slater, 2003). Motivation or personality traits also impact what kind of game content is perceived as entertaining, and can as well influence strategies of avatar creation. For example, the motivation to engage in social interaction in online gaming could override the requirements of an otherwise competitive game and lead to the design of a particularly attractive avatar instead of an avatar with high physical strength or magic abilities (cf., Yee & Bailenson, 2007). The interdependence between possible factors determining avatar creation is a promising direction of future research on the use of video and computer games and virtual worlds.

Note that there are some limitations to this study and a hint of caution should be given when interpreting results: Participants received game descriptions as stimuli and they were subsequently asked to imagine an avatar they would like to play with. Although registering which avatars participants create in real games could measure designing behavior more directly, we decided to use this type of experimental manipulation for reasons of internal and external validity. Regarding internal validity, games allowing avatar creation often encompass very distinct features. In some games players can only change their avatar's appearance, in others appearance and biological sex, and in less restricted games personality traits and physical attributes can even be adjusted. Using existing games would thus limit stimulus comparability, because games have different contexts and task requirements in terms of their scope of avatar feature choices. Moreover, the influence of the presented game context on entertainment ratings would have been confounded with features such as graphics, game control mechanisms or sound, which differ from game to game.

In order to assure high external validity, game descriptions were based on existing games. We tried to remove all cues leading to an identification of the games, because recognizing the games behind the description may have influenced the participants' choices. Some game descriptions might be familiar to experienced game players even without direct identification cues. Thus we asked the participants whether the game descriptions sounded familiar to them and whether they had played such games before. It turned out that for The Sims and GTA: San Andreas the effect of sex on the rating of entertainment value was no longer significant when controlling for prior knowledge. Thus, additional knowledge about games may reduce the effect of sex on entertainment ratings. The presented descriptions highlight masculine or feminine task contexts as cues for the evaluation of the games' entertainment potential. The effect of these cues obviously decreases if the games are very popular like The Sims and GTA: San Andreas, and if the participants possess additional information about the games. In this case, the participants might have rated the entertainment value of the games not only based on the described masculine or feminine task context, but also based on additional information about the games such as graphics, humor, or story. Game playing experience in terms of individual playing time (hours per week) was also controlled for. The main effects remained significant except for the entertainment ratings of Game Three (GTA: San Andreas).

In sum, the results of our study shed light on who users of video and computer games want to be in these games. Similarity between players and their avatars increases entertainment experience, but only as far as similarity does not prevent from successful play. From that notion, the question arises whether people apply different strategies to create an alter ego for virtual worlds like Second Life or for games with a less competitive setting. In the absence of narrowly defined game requirements, it might be of minor importance to create an avatar with features designed to master goals set by the context. Moreover, besides gendered attributes, other aspects such as personality traits may come into play. To this end, further research is needed to answer these questions.

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## NOTE

1. Although often used interchangeably by laypersons and scientists alike (Pryzgoda & Chrisler, 2000), the terms sex and gender have distinct connotations. While the term sex is focused on biological differences between men and women, gender refers to the socially and culturally based differences in traits and behaviors of males and females (Diamond, 2002; Gentile, 1993; Pryzgoda & Chrisler, 2000; Unger, 1979). Accordingly, the term sex implies biological mechanisms (Unger, 1979) and encompasses "traits or conditions that are causally biologically linked to the condition of being male or female" (Gentile, 1993, p. 120), whereas gender comprises "nonphysiological

components of sex that are culturally regarded as appropriate to males or to females"(Unger, 1979 p. 1086). The term sex role refers to the degree an individual has "internalized society's sex-typed standards of desirable behavior for men and women" (Bem, 1974, p. 155), that is, the individual's self-concept with respect to masculine and feminine behaviors.

## APPENDIX A

Descriptions of the computer games used in this study. The official names (in parentheses) were not presented to participants.

### *Game One (The Sims)*

In this game it is your job to manage a neighborhood inhabited by a variety of different game characters–their lives are in your hand. Create a character and build a house for it. Help your character to make a career, earn money, make friends and fall in love–or turn its life upside down! There is no right or wrong in this game. Test your character's skills by confronting it with the blows of life–challenging and entertaining situations. Family and friends, career and chaos–you're the only one who can help your character to get through all of this!

### *Game Two (My Veterinary Clinic)*

This is an exciting game where you can run your own veterinary clinic. You examine and medicate fully-grown and baby animals, from puppies to foals. Bit by bit you can build and equip new vivariums, buy new medical instruments, and even found a horse clinic. While building your career you can earn lots of awards.

### *Game Three (Grand Theft Auto: San Andreas)*

Five years ago you managed to escape from the problems of Los Santos, a city in the state of San Andreas that is drowning in gang wars, drugs, and corruption. A city in which movie stars and millionaires try to get out of the way of dealers and gangs as much as they can. Now–we're in the early 90s–you have to go back. Your mother has been murdered, your family has broken apart and your old friends are on the road to perdition. But shortly after returning to your old home, a bunch of corrupt cops are chasing you for a murder you didn't commit. You have to get away and the trip must lead you through San Andreas to rescue your family and gain control over the streets.

### *Game Four (Crysis)*

In the year 2019, a massive asteroid crashes into an island chain belonging to North Korea. The country's government isolates the whole island chain immediately, claiming the secrets of the mysterious asteroid for themselves. The United States send an elite team of the Delta Force Operators to analyze the situation and to send a report to the Pentagon. As the tensions between the USA and North Korea start to escalate, the asteroid bursts open and reveals a huge, extraterrestrial spaceship, more than 2 kilometers high. It is surrounded by a huge dome of energy, which freezes most parts of the island. The invasion of the earth has begun. The two rivaling nations form an alliance to stop the

aliens and to save the human race. The allies fight epic battles against the aggressive aliens. While hope is waning rapidly, you are guiding an elite troupe through the deep jungle, frozen landscapes and, eventually, into the heart of the aliens' ship where the ultimate battle with the enemy forces is fought in zero gravity.

*Game Five (Urban Chaos)*

A city at the verge of total chaos is terrorized by a gang. You and your elite crew T-Zero, especially trained for the war against terror, are the last hope in this fast-paced game. Take over the role of a T-Zero member, get a reputation, expand your armory and make life miserable for the gang members. Intense hostage scenarios: Keep your nerves to place the perfect shot. Take over control and command America's best firemen, paramedics, and policemen.

## APPENDIX B

Descriptions of gaming situations. The titles (in parentheses) were not presented to participants.

*Scenario One (Pursuit)*

You are about to arrest a wanted criminal. The suspect is fleeing through the cellars and backyards of the neighborhood. You can't follow him with your car and you are on your own with no backup in sight. To arrest him, you will have to chase him on foot. Hurry up: The suspect is aggressive and will resist his arrest; he is probably even carrying a gun!

*Scenario Two (Interviewing a Witness)*

You have to interview a witness in a homicide, the victim's widow. The old lady has observed the murder. During the first encounter with the police right after the deed, she was very scared and not willing to provide any information. Obviously she doesn't like the police. However, the information is very important. Hence you have to contact the old lady again and try talk to her.

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