Perceived Digital Game Realism: A Quantitative Exploration of its Structure

Abstract

A quantitative exploration is presented of the concept of perceived digital game realism, based upon the frameworks described by Malliet (2006), and Shapiro, Peña-Herborn, and Hancock (2006). The concepts and categories outlined in both studies are complemented with an additional literature study and subjected to an exploratory factor analysis. Principal axis factoring was performed on items completed by 385 respondents whose ages ranged between 15 and 19 years. Seven factors of perceived game realism were identified: simulation, freedom of choice, character involvement, perceptual pervasiveness, authenticity regarding subject matter, authenticity regarding characters, and social realism. These findings are to a considerable extent congruent with the theoretical framework.

1 Introduction

The relationship between the virtual worlds of digital games and the real world of everyday life has attracted the attention of scholars for over two decades. The academic investigation of digital games as cultural forms has produced results on subjects such as player-game relationships (Hartmann & Vorderer, 2010; Klimmt, Schmid, Noser, Hartmann, & Vorderer, 2006; Myers, 1984), virtual identification (Klimmt, Hefner, & Vorderer, 2009; Konijn, Bijvank, & Bushman, 2007; Turkle, 1995; Williams, Consalvo, Caplan, & Yee, 2009), immersion (Herrington, Reeves, & Oliver, 2007; McMahan, 2003; Murray, 1997), and agency (Frasca, 2001a; Laurel, 1993). Economists have been fascinated with the virtual economy that characterizes MMORPGs such as World of Warcraft (Castranova et al., 2009), or with the possibilities for marketing or advertising these worlds offer (Nelson, Hecjo, & Yaros, 2004). From a political point of view, the impact of virtual decision-making on real-life empowerment has been investigated and debated (Castranova, 2005; Cover, 2004; Frasca, 2001b; Laurel, 1993). Others have explained the attractions of electronic game play in terms of mental processes wherein the player’s personal identity is mapped to the narrative or ludic reality created within a game (Grodal, 2000; Jansz, 2005).

Although many authors with backgrounds in different disciplines have empirically investigated related constructs, the explicit study of digital game realism has mainly been performed from a theoretical or qualitative perspective (Bell,
2003; Galloway, 2004; Juul, 2005). As has recently been demonstrated, there is a growing need for a more accurate understanding of the subject in research that focuses on the psychological or social characteristics of electronic game play from a quantitative point of view. Many content analyses of digital game play have been performed, accounting for game realism as a function of the realism that is included in a game’s graphics (Dietz, 1998; Provenzo, 1991; Smith, Lachlan, & Tamborini, 2003). Experimental setups and survey designs have been used to investigate the difference between realistic and unrealistic depictions of violence, and have operationalized this difference in terms of the graphical qualities of the games that are debated (Anderson & Dill, 2000; Ivory & Kalyanaraman, 2007). Others have pointed out that a larger framework is needed that extends these notions to include rule-based and narrative aspects as well (Consalvo & Dutton, 2006; Malliet, 2006). In research on digital game-based learning, these aspects have also been forwarded as determinants of an effective gaming experience where learning outcomes such as cognitive development are achieved (Nadolski et al., 2008). Finally, a good understanding of social realism and perceptual realism (McMahan, 2003) or of elements relating to the realism of puzzles and problems (Hung & Van Eck, 2010) could help game developers in designing experiences that are meaningful, instructive, or engaging.

2 Literature Overview: Perceived Realism as a Multidimensional Construct

The investigation of perceived media realism does not focus on the ontological question of whether a media text is realistic, but on the sociopsychological question of whether a media text is perceived as realistic by its target audience. This is important because research suggests that user perceptions can be better predictors of behavioral outcomes than the features of the medium itself (Potter, Pashupati, Pekurny, Hoffman, & Davis, 2002). The construct of perceived realism has received considerable attention from media scholars because the belief exists that it plays a central role in the cultivation and social learning effects associated with heavy media use (Busselle & Greenberg, 2000; Potter, 1988; Shapiro, Peña-Herborn, & Hancock, 2006).

Two published studies have been performed with respect to the dimensional structure of perceived game realism (Malliet, 2006; Shapiro et al., 2006). Malliet identifies five constituents of perceived game realism: factuality, authenticity, character involvement, perceptual pervasiveness, and digital games as a virtual experience. Shapiro et al. make the distinction between four elements that are constitutive of the overall illusion of reality created during digital game play: typicality, character types, character judgments, and emotion. In this section a theoretical typology of perceived game realism will be presented, based upon both studies and an additional literature review. Six constituents will be debated: factuality, authenticity, social realism, character involvement, perceptual pervasiveness, and simulational realism.

2.1 Factuality

In television research, factuality has been considered a main constituent of perceived realism for over two decades. Different authors have used different definitions and operationalizations for this concept. Potter (1986, 1988), following Hawkins (1977), refers to the construct as “magic window realism,” the belief that television provides a literal and unmediated view of the real world. Potter (1986, 1988) discerns another, related construct: that of “perceived utility,” which can be thought of as the degree to which consumers consider the messages conveyed within a medium valuable and educational in real life. Another related construct is that of “identity”; if one perceives a similarity between a fictional character and one or more persons in real life, there is a considerable chance that one will label the representation as true or realistic (Potter, 1988).

The common denominator in these different definitions of factuality is the literal congruence between the diegetic world of the media screen and the real world of everyday life. While most research on this aspect of media realism has been performed in the context of television research, a number of researchers have translated it to the domain of digital game studies. Implicitly, in
many investigations on the psychological effects of violent game play, the theoretical argument has been formulated that the more a virtual act of violence resembles a real act of violence, the more it is expected to instigate a social learning effect (Anderson, Gentile, & Buckley, 2007; Cooper & Mackie, 1986). Explicitly, Malliet (2006) described factuality as an important contributor to a game’s overall impression of reality. Especially in specific contexts such as the army or sports, his respondents reported having a lot of confidence in the game developers’ ability to mimic the acts of a real-life sports activity or warfare situation. Shapiro et al. (2006) point out that the detailed presentation of real-life locations and settings may contribute to the impression of factual realism created in a digital game.

2.2 Authenticity

Although the idea of the media screen as a window upon reality constitutes one of the first and most persistent conceptions of media realism, many authors have recognized the need to study the subject from a larger perspective. Dorr (1983), for instance, points out that very often the construction of a real life-like media environment is not a prime concern to the producers of televised fiction. Similarly, Hawkins (1977) argues that the spectators of a television show usually do not expect it to reflect daily life. Unrealistic as it might be on a factual level, a product of media fiction is nevertheless attributed a degree of realism because it demonstrates similarities with daily life. Such media texts are not referred to as real, but as probable, typical, or plausible under certain circumstances (Hall, 2003). Shapiro and Chock (2003, 2004) make a distinction between “the absolute perceived reality” and “the relative perceived reality” of a media text. The first notion refers to the perceived statistical likelihood that a depicted event could happen in the real world (and as such refers to the factual realism of a media text). The latter notion refers to a hypothetical sense of reality. With respect to digital game realism, the argument has been forwarded that players are offered a highly personalized and subjective experience that is not necessarily referred to as real, but rather as authentic (Bell, 2003). Shapiro et al. (2006) observe that the addition of elements that are typical of everyday life enhances the illusion of reality created in a digital game story. Malliet (2006) adds to this that the makers of a game may succeed in expressing an emotionally convincing or poetic message. As a consequence, game titles such as *Baldur’s Gate* (Bioware, 1998) or *Final Fantasy* (Square, 1987) can be perceived as emotionally realistic or authentic, even though the main action takes place in a fantasy setting.

2.3 Social Realism

In the definition provided by Galloway (2004), social realism deals with aspects of authenticity: aspects that highlight a perceived similarity between a person’s social life and the actions or storylines that unfold in a digital game. Galloway (2004) defines realistic games as “those games that reflect critically on the minutia of everyday life, replete as it is with struggle, personal drama and injustice.” Galloway’s definition corresponds closely to a number of notions that have been forwarded in television research, including social expectations (Hawkins, 1977) or social realism (Busselle & Greenberg, 2000; Wright, Huston, Reitz, & Piemyat, 1994). Other authors have focused on the intrinsic social characteristics of online or LAN-based game play, and have argued that in-game social relationships can be constructive of a game’s overall reality impression (Castranova, 2005).

2.4 Character Involvement

Several concepts have been used in order to explain the experience of acting out a character in a digital game environment, most notably presence (Klimmt & Vor derer, 2003; Lec, 2004), telepresence (Minsky, 1980), virtual presence (Sheridan, 1992), immersion (Murray, 1997), engagement (McMahan, 2003), and virtual introjection (Van Looy, 2005). A central issue within each of these theories is the observation that games should be considered a lean-forward medium, where the player is not only a spectator but also an active contributor to the actions that take place (see Jansz, 2005). Call-eja (2007) explains the experience of realness created in
a game in terms of an overall process where the player is simultaneously identifying with a character and acting out this character. Konijn et al. (2007) found empirical support for the assertion that a stronger identification with the main protagonist in a shooting game results in an enhanced sense of player immersion and consequently, in a stronger effect of post-game aggression. Similarly, a number of studies have demonstrated that the player’s moral orientation toward the narrative has an impact on the enjoyment derived from playing violent games (Klimmt et al., 2009; Hartmann & Vorderer, 2010). Shapiro et al. (2006) distinguish three aspects that are relevant in the context of perceived realism based upon character involvement: the presence/absence of personalized player characters, the degree of moral judgment required, and the degree to which unexpected emotions are encountered during game play.

### 2.5 Perceptual Pervasiveness

Graphical realism is probably the one characteristic of digital games that attracts the most attention in public debate. Over the last couple of years, several video game titles have been heavily criticized for offering increasingly realistic depictions of violent activity (Anderson & Dill, 2000; Farrar, Krcmar, & Nowak, 2006; Carnagey, Anderson, & Bushman, 2007). In self-regulating rating systems such as the Pan European Gaming Information (PEGI) system or the American Entertainment Software Rating Board (ESRB) system, graphical explicitness is used as a main criterion for assigning labels to games. Graphical realism is also the aspect of digital game realism that is most often highlighted in video game effect research. The logic behind this appears to be that the greater the ability of a game to create a compelling, realistic experience, the stronger the impact that this game will have on the attitudes and behaviors of adolescent players (Malliet, 2006). Malliet, following Hall (2003), defines perceptual pervasiveness as “the degree to which a text creates a compelling visual illusion, independent of the degree to which the content of the text may relate to real-world experience” (p. 637). This definition extends beyond the strict notion of graphical realism and also accounts for the accurate representation of real-life movement, facial expressions, locations, and sounds. From this perspective, the audiovisual qualities of futuristic games such as *Halo: Combat Evolved* (Bungie Studios, 2001) have been described as overwhelming, and have been accounted for as realistic even though the locations and characters do not resemble locations or characters that exist in real life (Malliet).

### 2.6 Simulational Realism

Digital game theory has emphasized the importance of studying the programmed rules of games and the different types of behavior that are made possible within these rules (Eskelinen, 2001; Frasca, 2003; Juul, 2005). Games have been described as realistic because they consist of real rules that players actually interact with (Juul). This type of game realism encompasses a number of aspects, all relating to the notion that game play is a relevant experience in a person’s daily life, bearing equal importance to any other activity one might perform.

A first notion that has been given strong importance from this point of view is that of the digital game as a laboratory experience (Frasca, 2003; Jansz, 2005). Players are given the opportunity to safely experiment with the outcome of different types of behavior, without being exposed to any real-life risks. As such, a game’s degree of realism is often judged as a function of the accuracy to which the programmed rules reflect the rules that govern daily life behavior (Malliet, 2006). A second feature that characterizes the virtual experience offered in digital games is that of freedom of choice. Players of digital games enjoy a considerable degree of freedom in the virtual world, and are given the opportunity to make choices. The more these choices reflect the choices one encounters in daily life, the more a game is described as simulationally realistic (Malliet). Thirdly, the argument has been made that, in a digital environment, the user is offered the illusion of an unmediated experience (Bolter & Grusin, 1999). Especially with younger generations, who have grown up with digital media and who have come to accept many digital applications as social artifacts, these applications are being communicated with as...
if they are part of real life (Turkle, 2005). This is in line with studies conducted at the Center for the Study of Language and Information at Stanford University, indicating that the interactions of people with technology are “fundamentally social and natural, just like interactions in real life” (Nass & Reeves, 1996, p. 5). Similarly, the point has been raised that virtual worlds should be considered hybrid places: virtual because they only exist in a digital form, but at the same time real since they succeed in invoking recognizable structures of real places (Dodge, 1999, p. 4). Finally, Shapiro et al. (2006) explain that the pace and complexity of a game may impact the player’s perceptions of realism. Highly complex games may require a strong mental effort by the player in order to correctly judge the developers’ intention to create a realistic environment. In games of lower complexity, the player will make a correct judgment of the developer’s intentions more easily.

3 This Study: Methods

In order to explore a possible underlying structure of perceived game realism, several high schools located in both rural and urban Flanders were contacted and administered a standardized questionnaire. Respondents filled in the questionnaire in an assembly setting while being monitored in order to avoid consultations between students. Flemish youngsters whose age ranged between 15 and 19 years were targeted, as studies indicate that a large majority of this age group plays digital games (OIVO, 2010). According to Shapiro (2003), the reality judgments of these respondents are multi-dimensional and more strongly influenced by conceptual and abstract elements, surpassing the mere physical characteristics of the medium.

In order to examine the internal consistency of the scales and to evaluate the intelligibility of the items, a pretest was conducted with 84 respondents.

Subsequently, a sample was drawn of 521 Flemish respondents. Principal axis factoring with oblique rotation (direct oblimin) was performed on the items on which all participants had answered. Thus, only respondents who had answered all relevant questions were included in the analysis ($N = 385$). Following Kline (1994), the sample size was considered adequate for performing an exploratory factor analysis with this number of variables. Since the use of eigenvalues often results in substantial overfactoring or underfactoring, the decision was made to use parallel analysis to determine the cutoff point. A visual inspection of the scree plot was used to support this decision. Finally, following Field (2005), all items with factor loadings below .5 were deleted. In sum, the decisions made are in line with the methodology prescribed by Fabrigar, Wegener, MacCallum, and Strahan (1999), Preacher and MacCallum (2003), and Kline.

3.1 Measurements

Because most scales concerning perceived media realism have been constructed in the context of television research, a video game-specific instrument was developed. If possible, items originating from television research were adapted to fit in an electronic game context. In other cases new items needed to be constructed.

3.1.1 Factuality. The subcategories of factuality were derived from Potter’s (1986, 1988) concepts of “magic window realism,” “utility,” and “identity,” and modeled to fit in a digital game context. Each subcategory was assessed using a five-point Likert scale, ranging from “totally not agree” to “totally agree.”

3.1.2 Social Realism. A five-point Likert scale measuring the concept of “social realism” was based on items used by Hawkins (1977) and Wright et al. (1994).

3.1.3 Authenticity. Theoretically, the construct of authenticity was split among the categories of “plausibility,” “absolute perceived realism,” and “relative perceived realism.” Plausibility and absolute perceived realism were measured using a five-point Likert scale containing six items. Relative perceived realism was operationalized by means of five items. All items in this cate-

1. Listwise deletion was used as suggested by Field (2005). As such, an entire record is excluded from the analysis if a participant has missing data for one variable. Given that (1) 73.8% of the respondents filled in the entire questionnaire, (2) 92.7% filled in more than 90% of the relevant questions, and (3) nonresponse on variables seems random, we believe this nonresponse rate is not problematic.
3.1.4 Character Involvement. At the time the investigation was performed, no single scale incorporated elements of physical presence, social presence, and self-presence as operationalized by Lee (2004). A new five-point scale was constructed based on empirical studies found in the general literature on the construct of presence (e.g., Poels, de Kort, & Ijsselsteijn, 2007).

3.1.5 Perceptual Pervasiveness. Six items on a five-point Likert scale were rated by respondents to gather the required information for perceptual pervasiveness.

3.1.6 Simulational Realism. A new five-point Likert scale was formed with response categories ranging from “totally not agree” to “totally agree.” Each subcategory discussed above was operationalized by means of three or more items.

4 Results

4.1 Pretest

The mean age of the participants was 16.62 years. The division between different types of education was as follows: 65% attended a General Secondary School, 35% attended a Technical Secondary School. The division between boys/girls was 60%/40%.

The prestudy was designed to test the internal consistency of the scales, and to verify whether the participants understood every question. Seven items were removed because the respondents indicated that they did not understand those questions very well. In general, most scales proved to be one-dimensional. Nevertheless, some items were removed because they did not load on the presumed factor. Each concept qualified for at least three items. The highest possible reliability scores are shown in Appendix A. The results suggest that the scales were constructed with mixed success, a finding for which three explanations can be given. First, the possibility exists that the items were not coherent, which implies a threat to the validity of the scales. Second, it is possible that the discerned constructs are incorrect and are not valid constituents of perceived game realism. Third, a small and unrepresentative sample was used to examine issues such as internal reliability and consistency. Given that the second possibility cannot be ruled out, the decision was made to use the same questionnaire, with the exception of the removed items mentioned previously.

4.2 Exploratory Factor Analysis

The final sample consisted of 385 Flemish high school students. The mean age of the participants was 16.78 years, and the boys/girls ratio was 61.6%/38.4%. A distortion concerning gender exists, which can be attributed to the predominance of male oriented courses in Technical Secondary Schools. The division between the different types of education was as follows: 43.7% attended a General Secondary School, 46.4% attended a Technical Secondary School, and 9.9% attended a Vocational Secondary School. Prior to performing the exploratory factor analysis, the suitability of the data for factor analysis was assessed. Closer examination of the correlation matrix exposed many coefficients above .3. The Kaiser-Meyer-Olkin Measure of sampling adequacy is .893, exceeding the minimum recommended value of .6 (Kaiser, 1970). Finally, the Bartlett’s Test of Sphericity (Bartlett, 1954) reached significance, supporting factorability of the correlation matrix.

Principal axis factoring revealed 12 factors with eigenvalues larger than 1. The parallel analysis, however, showed only seven factors with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (48 variables × 385 respondents). This, in combination with a closer visual inspection of the scree plot, suggested retaining only seven factors. The seven-factor solution, included in Appendix B, explained a total of 49.93% of the variance. The contribution of the different factors to the total variance is reported in Table 1.

The analysis of the seven-factor solution will be briefly discussed first. Subsequently, a number of general findings will be reported.
4.2.1 The factor solution. The most important factor was composed of six items from the construct of simulational realism. The subdivisions that were made within the category of simulational realism thus partly collapse into one factor, especially those items have been retained that deal with the degree of realism associated with free exploration of the game world. As such, the factor corresponds closely to the idea of the digital game as a laboratory experience, as forwarded by authors such as Frasca (1999, 2001b, 2004), Jansz (2005), and Turkle (1995). Recent research has also suggested that the meaningfulness of the video game world can contribute to an increased feeling of presence, thereby increasing the perceived realness of the experience indirectly (Ribbens & Vanden Abeele, 2008; Witmer, Jerome, & Singer, 2005). In summary, this factor refers to the need for creating a credible simulation in order for a video game to be judged realistic.

The second factor consisted of items used to operationalize the concept theoretically put forward as freedom of choice. When important decisions are left to the player, a feeling of co-authorship might arise (Kücklich, 2003) invoking a higher sense of realism. Hence, being able to do whatever you want increases the overall sense of realism created within a digital game. This coincides with the findings of Malliet (2006).

The third factor corresponds with the theoretical concept of character involvement. The items retained especially contain references to physical presence, social presence, and self presence. According to this factor, for a game to be labeled realistic, players should have the impression that they are part of the game, an impression Bolter and Grusin (1999, p. 31) refer to as “immediacy.” This sensation is increased when players strongly believe that the characters in a digital game are actual persons. Because of the high congruence between the predefined concept of character involvement, the term character involvement is used to describe this factor.

A fourth factor of perceived game realism consisted of items referring to the graphical qualities of computer games. These items all stress the importance of compelling graphics as contributors to an overall reality impression. Players do not necessarily judge a game’s representational accuracy, but rather the sensory intensity and impressiveness of the experience (Hall, 2003; Busselle & Greenberg, 2000). As explicated in the theoretical framework, perceptual pervasiveness is situated mainly on a representational level.

Factors five and six made it necessary to rethink the theoretical conceptualization of authenticity in terms of three subconcepts: plausibility, absolute perceived realism, and relative perceived realism. The fifth factor consisted of items referring to a credible presentation of subject matters, which relates to the notion of absolute perceived realism. This factor supports the idea that players make a statistical judgment of the subject matter dealt with in order to ascribe a degree of realism to a game. Interestingly, this statistical judgment is restricted to subject matter only. This may indicate that players do not make an overall judgment of the credibility of a digital game, but make a judgment of different elements separately. This idea is further supported by the structure of the sixth factor.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial eigenvalues</th>
<th>Percent of variance</th>
<th>Cumulative percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulational realism</td>
<td>11.167</td>
<td>23.265</td>
<td>23.265</td>
</tr>
<tr>
<td>Freedom of choice</td>
<td>3.295</td>
<td>6.865</td>
<td>30.130</td>
</tr>
<tr>
<td>Character involvement</td>
<td>2.832</td>
<td>5.900</td>
<td>36.030</td>
</tr>
<tr>
<td>Perceptual pervasiveness</td>
<td>1.937</td>
<td>4.035</td>
<td>40.065</td>
</tr>
<tr>
<td>Authenticity regarding subject matter</td>
<td>1.719</td>
<td>3.581</td>
<td>43.646</td>
</tr>
<tr>
<td>Authenticity regarding characters</td>
<td>1.532</td>
<td>3.191</td>
<td>46.837</td>
</tr>
<tr>
<td>Social realism</td>
<td>1.486</td>
<td>3.095</td>
<td>49.931</td>
</tr>
</tbody>
</table>

Table 1. Initial Eigenvalues and Variance Explained of the Seven-Factor Solution
The sixth factor joins up with the fifth factor. Each item refers to the need for a credible depiction of the video game world. One aspect is emphasized in the majority of the items: the design of characters that are real and life-like. It should be noted that this factor mainly features items relating to the characters of one specific game, namely The Sims (Maxis, 2000). While this finding can be partially attributed to the phrasing of the questions, it is remarkable that more general items referring to the authenticity of the characters were not used in the analysis because they did not account for a solid factor solution.

Based upon the analysis of factors five and six, we argue that the distinction between the subcategories plausibility, absolute perceived realism, and relative perceived realism cannot be maintained in the context of digital game research. The analysis provided two reasons for this. First, “relative perceived realism” items were not withheld in the final factor solution. Second, it appears that players do not make a distinction between the plausible nature of characters and the statistical likelihood of the occurrence of those characters. In the light of these results, it is questionable that the fifth factor, consisting only of items relating to a game’s absolute perceived realism was correctly interpreted. It seems more plausible that factors five and six are similar, even though each has a focus on different aspects of the video game world. In sum, authenticity is retained but is split up into two categories: authenticity regarding subject matter and authenticity regarding characters.

The last factor generated by the factor analysis referred to digital game realism in terms of a perceived congruence between the video game world and the real world. Games are considered realistic if they deal with subjects, events, and characters that bear similarities with real-life subjects, events, or persons. Implicitly, a connection can be observed between this factor and Galloway’s (2004) operationalization of social realism. Digital games appear to invoke a stronger sense of realism if they succeed in reflecting the personal situation of the player. In addition, research suggests that social realism can contribute to an increased feeling of being there and, as such, indirectly influence a realism judgment (Lombard & Ditton, 1997; Ribbens & Vanden Abeele, 2008). Since all items refer to an analogy between the real world and the virtual world, the term social realism is maintained.

4.2.2 General Remarks on the Factor Solution. To conclude the Results section, a number of general findings are discussed. First, none of the presented constituents of the factuality construct came forward as strong factors during the analyses. As such, corroboration was found for the observation that, as opposed to television, electronic games do not necessarily offer a magic window on reality.

Second, several factors bear a (strong) link with the ideas put forward in game theory. With regard to the factor of simulation, for instance, one can easily find traces to behavioral rules and simulation-based game play (Frasca, 2001b). The factor of freedom of choice can be related to the notion of play as pleasure (Frasca) and to the active participation of the player (Eskelinen, 2001; Kücklich, 2003). In addition, most other factors can be interpreted both from a representational and ludologist (i.e., game player) point of view. Our results therefore strongly suggest that theoretical constructs emanating from traditional media research cannot be easily translated to the domain of a new medium such as the digital game.

Third, a number of significant correlations are observed between the factors that were identified. Three relationships are notably strong. The simulation factor correlates strongly with the character involvement factor \( (r = .449) \). This should not be surprising, given the observation that during game play one has to take up the role of the player before one is able to engage in meaningful interactions. Second, the simulation factor correlates with the factor “authenticity regarding characters” \( (r = .340) \). Intuitively, this association can again be easily understood because the act of stepping into a virtual character can be seen as a precondition to the act of ascribing credibility to the other virtual characters.

Third, a significant relationship exists between the factors of authenticity of characters and social realism \( (r = .349) \). In the theoretical section, the observation was made that both factors bear a number of obvious resemblances. In line with the theoretical framework, the analysis supports the assertion that the concepts should be treated as distinct, yet related.
Finally, the internal consistency of the factors generated by the EFA can be considered reasonably good. Table 2 indicates that only in the case of freedom of choice, authenticity regarding subjects, and social realism, the alpha values fall below .70. These items can therefore serve as a possible starting point for the construction of more valid scales. In turn, this should be beneficial for future quantitative explorations of perceived digital game realism.

5 Conclusions

Although the study of media realism is not new, we believe that recent developments in digital games research demand new and constant research efforts that further our understanding of the boundary between the virtual and the real, especially as it is now widely held that games have distinct characteristics compared to traditional media such as television. Several research approaches have been directed toward aspects of perceived game realism, but little is known about its dimensional structure. This stands in contrast with the literature on television realism or on game-related concepts such as presence or involvement. With this research, we have provided a quantitative exploration of the constructs that constitute perceived game realism. In the first section, a typology was developed based upon a literature review. Subsequently, this typology was validated by means of an explorative factor analysis. To a large degree, the typology holds out and further support is provided for the view that perceived game realism is a complex, multidimensional construct. Preconceived factors such as perceptual pervasiveness, character involvement, social realism, and authenticity have been fully or partially identified as constituents of perceived game realism. A number of unexpected findings came forward as well. Constructs that had only partly been accounted for, such as the digital game as a laboratory experience or freedom of choice accounted for a large part of the explained variance. The results of this study indicate that the rule-based characteristics of an electronic game count as better contributors to its overall reality impression than its audiovisual characteristics. The three most important factors that came forward in the analysis were simulational realism, freedom of choice, and character involvement. Graphical aspects such as perceptual pervasiveness or narrative aspects such as authenticity accounted for a substantially smaller amount of the explained variance.

Comparing these results with previous conceptualizations of realism, the biggest difference lies in the absence of the factuality factor. This finding should not be surprising, because Malliet (2006) already pointed out that digital games are only rarely ascribed a general sense of factual realism. Rather than that, very specific characteristics of specific (types of) games, such as the modeling of armory in America’s Army, are considered realistic under certain circumstances.

6 Discussion

The abovementioned observations may help explain the relatively low amount of total variance the analysis provided (only 50%, leaving 50% of the overall construct’s variance unexplained). First, because the majority of research regarding perceived media realism has thus far been performed in the context of television research, many of the scales we used were in fact adaptations of instruments that have been developed with respect to television realism. As a result, a number of game-specific variables may have been under-represented.
in the empirical part of this study. More specifically, we believe the construct of simulational realism should be further explored, hence adding more weight to the rule-based characteristics of the medium. The aspects of simulational realism have frequently been studied from a cultural/philosophical point of view, but also bear a strong relevance in the empirical debate on the social impact of digital gaming. This paper therefore makes a plea for a further quantitative examination of the perceptions that gamers have toward the characteristics of the environments that constitute their favorite digital games.

Second, the decision was made to study digital game realism in general. As such, we did not take into account the fact that different respondents may have different mental models of the concept “digital games” as a consequence of individual experiences and tastes. The aggregation of these mental models in the analysis may have produced a substantial amount of random variance affecting the total variance explained. In line with digital game theory, we believe it can be fruitful to limit the scope of this type of research to one specific genre or type of game content. Preliminary analysis of data from a revised survey on perceived realism in Half Life 2 shows promising results with an increased total variance explained (Ribbens & Malliet, in press).

Additionally, it would be interesting for future research to examine the relationships between gaming preferences, personality variables, and sociodemographic variables on the one hand and the proposed dimensions of perceived game realism on the other hand. A clearer view of these relationships, as well as on the moderating role perceived realism plays in the learning effects that are associated with digital game play, will refine current research and might create a more healthy atmosphere to discuss the societal impact of digital games. Especially the finding seems important that elements relating to the game rules and the processes of player involvement are stronger constituents of perceived game realism than graphical or representational elements. While research on digital gaming effects has shown considerable interest in graphical representations of violence-related aspects, the results of this study indicate that the observed realism of digital games cannot be traced back to graphical realism only. While the factor of perceptual pervasiveness significantly contributes to the overall explained variance, other aspects appear at least equally relevant to include in the models that have been tested by means of experimental research or content analysis. Following previous research on perceived game realism, we support the claim that realism should not be considered a mere function of visual or narrative aspects, but that game aspects should be investigated more intensively. The same remark counts in the context of design-based research that focuses on the development of educational virtual environments or engaging playing experiences in general. While within these domains simulational aspects of the play experience have been accounted for more intensively already, research on realism of the gaming experience is mainly oriented to the realism of graphical elements or to digital game characters.

In conclusion, this paper attempts to make a first step toward a better empirical understanding of the perceptions and expectations of adolescent players. Making this step required performing a translational move, wherein the practical applicability of constructs such as simulational realism, social realism, immersion, or digital involvement was explored and subjected to a formal test. Even though further research is required in order to develop a fully functional framework for upcoming research, a number of strong and operational constructs already came forward, bearing relevance to both researchers interested in the theoretical aspects, and researchers interested in the sociopsychological mechanisms that are associated with electronic game play.

References


### Appendix A

#### Table A1. Highest Possible Cronbach’s Alphas of the Preconceived Constituents of Perceived Video Game Realism (Pretest)

<table>
<thead>
<tr>
<th>(Sub) dimension</th>
<th>Highest possible alpha</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factuality: magic window realism</td>
<td>.5482</td>
<td>4</td>
</tr>
<tr>
<td>Factuality: utility</td>
<td>.8116</td>
<td>4</td>
</tr>
<tr>
<td>Factuality: identity</td>
<td>.5509</td>
<td>6</td>
</tr>
<tr>
<td>Social realism</td>
<td>.5927</td>
<td>5</td>
</tr>
<tr>
<td>Authenticity: plausibility</td>
<td>.8142</td>
<td>4</td>
</tr>
<tr>
<td>Authenticity: absolute perceived realism</td>
<td>.7587</td>
<td>5</td>
</tr>
<tr>
<td>Authenticity: relative perceived realism</td>
<td>.5193</td>
<td>4</td>
</tr>
<tr>
<td>Character involvement</td>
<td>.8822</td>
<td>11</td>
</tr>
<tr>
<td>Perceptual pervasiveness</td>
<td>.7537</td>
<td>3</td>
</tr>
<tr>
<td>Simulational realism: experimentation</td>
<td>.7110</td>
<td>6</td>
</tr>
<tr>
<td>Simulational realism: freedom of choice</td>
<td>.5561</td>
<td>3</td>
</tr>
<tr>
<td>Simulational realism: social artifacts</td>
<td>.7012</td>
<td>3</td>
</tr>
<tr>
<td>Simulational realism: video games as virtual experience</td>
<td>.6286</td>
<td>3</td>
</tr>
</tbody>
</table>
## Appendix B

**Table B1. Structure Matrix of the Factor Analysis**

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Video games offer an interesting world in which you can discover aspects of your identity.</td>
<td>0.709</td>
</tr>
<tr>
<td></td>
<td>(Simulational realism: experimentation)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Video games are realistic because they allow me to discover how to handle certain emotions.</td>
<td>0.667</td>
</tr>
<tr>
<td></td>
<td>(Simulational realism: experimentation)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Video games are useful to learn about the consequences of certain actions in the real world.</td>
<td>0.658</td>
</tr>
<tr>
<td></td>
<td>(Simulational realism: experimentation)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Online MUDs and MMORPGs such as World of Warcraft and Second Life offer an environment to discover</td>
<td>0.617</td>
</tr>
<tr>
<td></td>
<td>aspects of one’s identity. (Simulational realism: experimentation)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A computer cannot really be considered a machine, because it can reliably show the consequences of</td>
<td>0.616</td>
</tr>
<tr>
<td></td>
<td>actions in the real world. (Simulational realism: social artifacts)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Video games are similar to real life because in both learning how to control a situation is a</td>
<td>0.504</td>
</tr>
<tr>
<td></td>
<td>central theme. (Simulational realism: video games as a virtual experience)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Video games need to give a large amount of freedom to the player, because in real life you have to</td>
<td>0.627</td>
</tr>
<tr>
<td></td>
<td>make choices as well. (Simulational realism: freedom of choice)</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>Item</td>
<td>Factor</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>8</td>
<td>It is the freedom of choice that makes video games realistic. (Simulational realism: freedom of choice)</td>
<td>0.607</td>
</tr>
<tr>
<td>9</td>
<td>While playing a video game, I have the feeling that I’m in the middle of all the action. (Character involvement)</td>
<td>-0.770</td>
</tr>
<tr>
<td>10</td>
<td>While playing a video game, I leave reality and I feel wrapped up by the video game. (Character involvement)</td>
<td>-0.758</td>
</tr>
<tr>
<td>11</td>
<td>While playing a video game, I’m the character on the screen. (Character involvement)</td>
<td>-0.708</td>
</tr>
<tr>
<td>12</td>
<td>While playing a video game, I have the feeling that I take up the role of the character I play. (Character involvement)</td>
<td>-0.706</td>
</tr>
<tr>
<td>13</td>
<td>While playing a video game, I feel the emotions that the character on the screen experiences. (Character involvement)</td>
<td>-0.590</td>
</tr>
<tr>
<td>14</td>
<td>While playing a video game, I have the feeling that my supporters and adversaries in the video game are real people. (Character involvement)</td>
<td>-0.586</td>
</tr>
<tr>
<td>15</td>
<td>While playing a video game, I have the feeling that the objects in the video game are real. (Character involvement)</td>
<td>-0.586</td>
</tr>
<tr>
<td>16</td>
<td>Strong graphical abilities are an absolute condition to make a video game resemble the real world. (Perceptual pervasiveness)</td>
<td>0.828</td>
</tr>
<tr>
<td>17</td>
<td>The quality of the graphics is very important to achieve realism in a video game. (Perceptual pervasiveness)</td>
<td>0.744</td>
</tr>
<tr>
<td>Number</td>
<td>Item</td>
<td>Factor</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>18</td>
<td>The first thing that pops to mind when asked about the realism in video games, are the graphics. (Perceptual pervasiveness)</td>
<td>0.629</td>
</tr>
<tr>
<td>19</td>
<td>The subject matters in most video games occur in real life. (Authenticity: absolute perceived realism)</td>
<td>0.650</td>
</tr>
<tr>
<td>20</td>
<td>The subject matters used in video games are credible. (Authenticity: absolute perceived realism)</td>
<td>0.525</td>
</tr>
<tr>
<td>21</td>
<td>The way people deal with each other in simulation games such as The Sims is the way people handle each other in real life. (Authenticity: absolute perceived realism)</td>
<td>-0.786</td>
</tr>
<tr>
<td>22</td>
<td>A character from a simulation game such as The Sims acts like someone I know in real life. (Factuality: Identity)</td>
<td>0.674</td>
</tr>
<tr>
<td>23</td>
<td>Characters from a simulation game such as The Sims can exist in real life. (Authenticity: plausibility)</td>
<td>-0.654</td>
</tr>
<tr>
<td>24</td>
<td>The characters in video games are typical for people in reality. (Authenticity: absolute perceived realism)</td>
<td>-0.514</td>
</tr>
<tr>
<td>25</td>
<td>The things that happen to people in video games, resemble the things that happen to people in real life. (Social realism)</td>
<td>0.616</td>
</tr>
<tr>
<td>26</td>
<td>The things that happen in video games resemble the things that happen in real life. (Social realism)</td>
<td>0.599</td>
</tr>
<tr>
<td>27</td>
<td>The characters I see in video games are similar to people in real life. (Social realism)</td>
<td>0.584</td>
</tr>
</tbody>
</table>

Note. KMI = .893. Bartlett’s Test of Sphericity = .000. All factor loadings below .5 were deleted. Items with high cross loadings (<.200) were removed from the analysis.