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Visual detail and its effects on character attachment in video games

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By Carl Sommer

Entitled
VISUAL DETAIL AND ITS EFFECTS ON CHARACTER ATTACHMENT IN VIDEO GAMES

For the degree of Master of Science

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Head of the Departmental Graduate Program Date
VISUAL DETAIL AND ITS EFFECTS ON
CHARACTER ATTACHMENT IN VIDEO GAMES

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Submitted to the Faculty
of
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by
Carl Sommer

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of
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ABSTRACT

Sommer, Carl M.S., Purdue University, August 2016. Visual Detail and its Effects on Character Attachment in Video Games. Major Professor: David Whittinghill.

The video game industry has been experiencing a trend toward independent game developers making their own games, as well as large companies opening smaller divisions to work on smaller games. This can be looked at from a purely financial perspective, given that smaller games will inevitably consume a smaller budget; however, there is also good reason to believe there can be substantial creative benefits to companies indulging in this trend. This research is concerned with the effect that visual detail can have on a players emotional attachment to characters in video games-otherwise known as character attachment. While intuition may often tell people that more is more, this paper considers the possibility that less may, in fact be more. However, upon developing a game with four different levels of visual detail and testing participants who were only exposed to one version of the game, no significant relationship was found between character attachment and the level of visual detail. Possible explanations for the lack of observed effects are detailed and discussed.
CHAPTER 1. INTRODUCTION

Character attachment is the phenomenon that establishes a players connection to a character in a video game. Although, it is a relatively new subject, it has evolved from several older theories from media studies and psychology. Due to the relative infancy of this area of research, there have been very few studies looking at specific variables within a game environment that may affect a player's level of character attachment. This study will look specifically at how the visual richness of detail affects a player's level of character attachment.

A game was developed for this study that featured four different levels of visual richness of detail. While each version of the game was the same in regard to narrative and gameplay, the art assets were changed in each version. One version had minimalistic characters in minimalistic environments. One had minimalistic characters in a richly detailed environment. Another had richly detailed characters in a minimalistic environment. The final version had richly detailed characters in a richly detailed environment.

Each player was assigned to one of the four different versions of the game and asked to answer a survey rating their self-described levels of character attachment as well as their narrative immersion and game flow. The narrative immersion and game flow metrics were used primarily to determine if the game was likely to facilitate character attachment at all. After the surveys were completed, the results were analyzed to determine whether a significant relationship could be found between character attachment and the level of visual richness of detail.
1.1 Scope

This study was limited to the study of 2d browser-based video games. It was also not designed for mobile use. Additionally, while visual richness of detail could theoretically be an infinite spectrum, only four versions of the game were made and they only looked at the combinations of rich-minimal environments with rich-minimal characters.

Finally, participants were only asked to assess the game on its character attachment, gameflow and narrative immersion scores. These metrics will be discussed in further detail later.

1.2 Significance

Character attachment appears to be a relatively under-studied field; in fact, no articles examining the direct impact that visual richness of detail has on character attachment were discovered. This has become a particularly relevant variable to consider, given the sheer breadth of art styles and levels of visual richness of detail being implemented in games today. When developers make games with less detail, it oftentimes seems to be a simply financial decision. However, this study makes the assumption that less detail can also provide a creative advantage to the game. If players can develop a greater emotional connection to the characters in a game with less richness of detail, this validates the independent game industrys exploration of simple art styles as both an artistically sound decision as well as a financially sound decision.

1.3 Research Question

Is visual richness of detail associated with the observed level of a players character attachment in video games?
1.4 Assumptions

- It will be assumed that game enjoyment (gameflow), narrative immersion and character attachment must all be studied in order to reliably establish if the game is capable of fostering a sense of character attachment, regardless of the level of visual detail.

- It is also assumed that research with connections to parasocial interaction and identification may be used to support this study, given that few studies were found that relate directly to character attachment.

1.5 Limitations

- This paper is primarily concerned with the effect that visual richness of detail has on character attachment. Thus, the primary variables involved are visual richness of detail and character attachment. However, because the character attachment metric used contains many similarities to existing metrics used for measuring narrative immersion and enjoyment there is a risk that these are significant confounding variables. Therefore, they will be included in the study for control purposes.

1.6 Delimitations

- The most significant factor to be restricted in this study is the sheer variety of possible levels of visual richness of detail. This study has been restricted to one version of the game with all game art as minimalistic, one version with minimalistic characters and richly detailed environments, one version with rich characters and minimal environments and a final version with all assets having rich detail. In the end, only four versions of the game were tested. This game will not include photorealistic visuals.
1.7 Definitions

**Character Attachment:** An individual's feelings of (a) friendship and (b) identification with a video game character when an individual (c) is willing to suspend disbelief, (d) feels responsible for the game character, and (e) feels in control of the game characters actions (Lewis, et al. 2008, p. 516).

**Gameflow:** A model of enjoyment in video games (Sweetser & Wyeth, 2005).

Narrative Immersion: A sense of presence within and connection to a story.

**Identification:** A psychological perception of being one with a character.

**Parasocial Interaction:** A psychological friendship developed with a character.

**Visual Richness of Detail:** How much information about a character or environment can be discerned from the artwork. (i.e. racial information, gender information, geographic setting, etc.)

1.8 Summary

Given the extent of what still remains to be learned about the phenomenon of character attachment, this chapter identifies one particular question to ask and the extent to which it was studied, including assumptions, limitations and delimitations as well as the scope of the study. The next chapter will address the background of the study and identify specific gaps in the research, which justify this study.
CHAPTER 2. LITERATURE REVIEW

As the field of game studies has progressed, more and more people are discussing the motivations a player has to play video games. Everything from academic papers (King, Delfabbro & Griffiths, 2009) to mainstream books (Schell, 2008) have examined what players are looking for when they play video games. Although there are a wide variety of responses to this question, a common theme recurring in many of these studies is the game characters and the tendency that players have to develop emotional connections to those characters. While many of these papers speak about this specific motivation in rather vague, sometimes disjointed terms, several concrete and validated theories have emerged.

This thesis is mostly concerned with the theory of character attachment and the theoretical building blocks that make its base; specifically, parasocial interactions and identification. It is important to compare and contrast these foundational elements since they are both established and validated principles that exist in game studies and both are necessary elements in the phenomenon of character attachment. A player has the opportunity to either develop a parasocial relationship with a character, identify with a character or both. Simultaneously, if they are developing one of these emotional connections with a character, they are likely to be developing a sense of character attachment as well.

2.1 Character Attachment

Character attachment was initially defined by Lewis, Weber and Bowman (2008) as “the connection felt by a video game player toward a video game character” (p. 515). This definition, and its accompanying rating scale was first
proposed as a way to unite the fields of media study with a coherent description and testable metric of how a player relates to a character (Lewis et al, 2008).

Character attachment was derived primarily from the studies of parasocial interaction and identification, which will be discussed further in later sections of this chapter. Although Lewis’ team recognized the relevance of these areas of character-connectedness, they argued that in the field of video games, a player’s relationship is not purely a parasocial one, nor is it only a matter of players’ identification with a character. Rather, they created a metric for determining a player’s level of emotional connection to a character that is derived from both of these fields of study. Additionally, they concluded that in order to truly develop a strong sense of character attachment, a player must be able to “suspend disbelief”, “feel responsible for the game character, and feel in control of the game character” (Lewis, et al., 2008, p. 516).

### 2.2 Parasocial Interaction

Parasocial Interaction was originally defined in 1956 by Horton and Wohl as “the seeming face-to-face relationship between spectator and performer” (Horton & Wohl, 1956). This phenomenon was originally studied in the media context of radio, television and film; however they provisioned that the concept could be extended to other media. While they specifically referenced puppet characters as a possible extension to their theories, other authors have developed reliable reason to believe that the idea of parasocial interaction extends naturally into digital media, specifically video games (Klimmt, Hartmann, Schramm & Vorderer, 2003; Chung, DeBuys & Nam, 2007).

Parasocial interaction (PSI) tends to manifest itself when the player, viewer, listener, etc. begins to develop social expectations towards a media personality/character. When a player starts playing a new game, they are expecting the continued presence of certain characters that they have been introduced to.
They may begin to appreciate things about certain characters, such as the character’s voice or animated mannerisms, similarly to how they may appreciate aspects of a real-life friend. Thus, they are expecting to indulge this appreciation as they interact with a character. This often means that the player experiences a sense of loss if a character that they have established a positive PSI relationship with is eventually killed in the game.

Additionally, PSI may manifest itself through conscious interactions with the player in their own head. For example, a player may find themselves comparing their own ideas and beliefs to those expressed by the character. They may even find themselves expressing a response to the words or actions of the character.

These are just a few of the manifestations of PSI in the context of video games. They have been adapted and summarized from Cole and Leets’ reliable metric for determining character attachment in television viewing (1999).

Although, since there are such a wide variety of game genres and character types, it has become somewhat contested as to what extent PSI can be applied to video games. Kavli (2012) makes the distinction between the avatar and the player character to help distinguish the likelihood of whether or not PSI is an applicable relationship between players and characters.

The avatar is commonly seen in open world games such as RPG’s. In such games, the player has some directions and goals assigned to the character that they are expected to work towards; however, he or she is largely free to incorporate their own goals and objectives into the life of their character as they play. This makes it easy to facilitate a shared sense of objectives that helps bring the life of the player and the life of the character together. At this point, the player is more than likely identifying with their character (the avatar) rather than developing a PSI relationship.

On the other hand, the player character is “an already defined persona that the player controls” (Kavli, 2012, p. 87). This can often be seen in story-driven strategy games, or adventure games. In such games, it is clear what the goals of the
character are. The player may begin to grow sympathetic in their efforts to help the 
character achieve their goals; however, a sense of separation and distinction tends to 
exist. This separation is necessary for the development of parasocial interactions.

Of course, the actual controllable character is only one type of character in a 
game. Kavli’s analysis of the avatar and the player character is focused on 
controllable characters, but the possibility remains for PSI or other emotional 
responses to be developed with the non-player characters inhabiting the game world.

The significance of PSI should not be underestimated. It is both a 
foundational factor in character attachment as well as a significant draw towards 
the video game genre as a whole. According to Koenig and Lessan (1985), audience 
members who develop parasocial interactions with media figures tend to view their 
favorite television personality as closer to them than they would view a real-life 
acquaintance. Given that this principal is likely transferable to games, this is a 
powerful phenomenon that is likely to play a very important role in video games.

2.3 Identification

While parasocial interaction treats a media figure as a separate entity to be 
addressed and to form a parasocial relationship with, identification refers to the 
psychological “merging of minds” between the viewer, reader, player, etc. and the 
character. Particularly the “merging” of goals that often develops between player 
and avatar, as discussed previously (Oatley, 1999; 1994). Cohen puts it simply, 
when he explains; “the current conceptualization of identification focuses on sharing 
the perspective of the character; feeling with the character, rather than about the 
character” (Cohen, 2001, p. 251).

Identification is also characterized by the sense that a player is directly in 
control of the character. This sense of control is also a pivotal factor in the 
gameflow model proposed by Sweetser and Wyeth (2005). A player may lose 
awareness of their surroundings as they fixate entirely on their actions to control the
character and the immediate responses to their control input (Sweetser & Wyeth, 2005). This fixation on a player/character’s actions and the games’ responses to those actions often leads to the player developing a sense of actually being the character they control.

Additionally, as the player begins to identify connections and similarities between the character and themselves, the gap of separation between them may appear to grow thinner. This may manifest itself in the sharing of in-game goals, as well as in a developed sense of empathy towards the situation of the character. For example, if the plot reveals a devastating twist to the characters past or future, the player may feel concern on behalf of the character, regardless of whether or not the plot detail affects the actual goals of the character in the game.

While these are some of the primary manifestations of identification, the concept is not restricted to such manifestations. In a 2012 study, Van Looy, Courtois, de Vocht and de Marez established and validated a scale that gives a comprehensive look at how players may develop a sense of identification towards game characters (Van Looy et al., 2012).

Another consideration is that identification does not demand that the player and character have the same level of awareness to the in-game situation. Zillman (1994) discusses the fact that, in drama, an audience member oftentimes has more information regarding the character’s situation. However, a player can still identify with the character in this situation. If a player/audience member is identifying with a character, all of the knowledge presented in the scenario is presented from that character’s point of view. This gives the player/audience member an empathetic reaction, that may lead to the player plotting out a new course of action on behalf of the character, in anticipation of the character actually learning this new information (Zillman, 1994).

It is easy to see how this connection can be made to the open-world RPG, avatar example provided earlier; however, identification is not restricted to such experiences. Much like parasocial interaction, identification with media figures has
its roots in formats such as television and literature and has been adapted into the field of video game studies. Therefore, it should be acknowledged that a player may grow to identify with any character in the game. The sense of control discussed by Van Looy et al. (2012) is very much specific to identification with the avatar; however, much like in other passive media formats, non-controllable characters can still be identified with.

Identification also plays an important role in both the gameplay experience as well as a player’s character attachment. A 2007 study established that the stronger a player’s sense of identification with the game character is, the greater they enjoy the game (Hefner, Klimmt & Vorderer, 2007). This should elevate the need for designers and writers to create characters that a player will identify with.

### 2.4 Character Attachment Scale

This study incorporates Lewis, Weber and Bowmans’s 2008 metric for determining character attachment. The first category of the table consists of Identification/Friendship responses that were derived from the concepts of identification and parasocial interaction. Because these principles are so fundamental to the character attachment metric, it is important to be aware of the similarities and differences that exist between the two and how they are incorporated into the character attachment metric. Figure 2.1 shows a breakdown of the items listed from the Friendship/Identification section and how they fall into the respective categories of parasocial interaction and identification.

### 2.5 Immersion and Narrative

Although a level of character attachment can be reliably measured, it is still a fundamentally subjective concept, given that it relates to a player’s emotional connection to a character. With this in mind, it is important to look at some of the
other subjective reactions that a player may have towards the game and the effect they could have on character attachment.

The quality of a game’s story is generally agreed to be a subjective part of a game; however, it has been established that simply having a story in a game increases a player’s sense of identification to a character, their sense of presence in the environment and their physiological arousal (Schneider, Lang, Shin & Bradley, 2004).

It can also be reasonably inferred that the story and a player’s character attachment are closely linked. This can be seen through metric that was developed in 2009 to measure player immersion in a game’s narrative. Many of the items included are very closely related to the idea of character attachment, including several items related to a player’s control over a character and their empathy towards their character (Qin, Fau & Salvendy, 2009).

In addition to narrative immersion, player immersion in the game itself is another somewhat subjective factor that is closely related to character attachment. While metrics such as gameflow exist to rate a player’s immersion in the game, many of the categories may produce different responses from player to player. What
one player may consider challenging another player may not—or if one player
considers the game to have clear goals, another player may disagree.

Because factors such as a player’s sense of control are important to narrative
immersion, as well as gameplay immersion (gameflow) and character attachment, it
can be assumed that if a player does not have a self-reported sense of immersion in
the narrative or the gameplay, it will effect their levels of character attachment.

2.6 Visual Richness of Detail

All of the aforementioned factors may have an influence on character
attachment and each factor has its own area of study to determine what may
influence that factor, it has yet to be determined whether visual richness of detail
has a direct impact on character attachment.

In Rules of Play, Salen and Zimmerman make the case that the more
realistic a game's graphics are, the more conducive the game is to the player's
immersion in the game world (Salen & Zimmerman, 2009). With immersion
potentially having an effect on character attachment, it can be hypothesized that
the visual richness of detail will have an effect as well.

In Scott McCloud’s (1993) analysis of cartoons and the attraction they have
to people, he also describes an idea that visual richness of detail may affect
identification.

The cartoon is a vacuum into which our identity and awareness are
pulled an empty shell that we inhabit which enables us to travel in
another realm. We don't just observe the cartoon, we become it! (p. 36)

Essentially, he is suggesting that the more “cartoon-ey” the visual style is,
the greater the opportunity is for a player to identify with a character; thus, they
are more likely to build a greater sense of character attachment. While the two
hypotheses are at odds, regarding which level of visual richness of detail will result
in a greater sense of identification, they both support the fundamental research
question of this paper—that visual richness of detail may have an effect on character attachment in games.

2.7 Summary

This chapter served as an examination of the psychological backgrounds behind character attachment, as well as a platform to examine previous studies on the phenomenon of character attachment. This chapter identified the significance that character attachment likely has on game enjoyment, due to its association with identification and parasocial interaction principles. It also identified the need for further research to examine how specific variables such as visual richness of detail need further testing in order to understand character attachment better. The next chapter will go into greater detail about how this specific study was carried out in order to determine whether or not visual richness of detail has an effect on character attachment.
CHAPTER 3. METHODOLOGY

The game that the participants played was developed in the Construct 2 engine and published in HTML 5 and Javascript. This allowed the game to be hosted on the internet and remain compatible with most modern browsers-no additional software required. The files were hosted on personal server space.

Participants were sent to an initial URL which did not reveal the version of the game they were about to play, but would simply check the sequence of the game visited most recently and send the current visitor to the next version. Each version of the game was hosted at a different URL. When the game was completed, it would send visitors to a Qualtrics survey URL which was specific to the version of the game each participant had just been directed from.

No time was recorded for actual participants playing the game; however, based off of the time taken by playtesters, it generally took a first-time player about 15-30 minutes to complete the game if they were reading all of the dialogue-which was requested.

3.1 Sampling Methods

Participants in this study were recruited from classes in the Computer Graphics Technology department at Purdue University. Each participant was directed to a link which sent them to one of the four versions of the game. The link consisted of a short PHP script that checked which version of the game was visited most recently (1, 2, 3 or 4) and sent the current visitor to the next version of the game in the sequence. When a visitor went to version four, the next visitor was directed to version one. This was intended to keep the sample sizes equal; however, if anyone did not finish the game, or when the researcher visited the link to ensure
that it was still functioning properly, the sequence continued. This caused an
unequal number of finished surveys for each version. The final samples for each
version of the game were: Version one (15), version two (9), version three (10) and
version four (12).

3.2 Experimental Setup

There are four separate versions of the game. The gameplay and dialogue
were identical between each version, the only differences were found in the art
assets. This provided four unique levels of detail for the game. One version of the
game featured minimally detailed characters in a minimally detailed environment.
One version of the game had minimally detailed characters in a very detailed
environment, one version had very detailed characters in a minimally detailed
environment and the final version will featured very detailed characters in a very
detailed environment. The differences can be seen clearly in Figure 3.1. This gave
players a wide range of opportunities to develop varying levels of character
attachment to various combinations of visual detail in the game.

Figure 3.1. This provides an example of how games were divided
into the categories of rich vs. minimal detail for characters and
environments.
3.3 Experimental Analysis

After players completed the game, they were asked to fill out a self-assessment of their character attachment using Lewis, Weber and Bowman’s metric (Lewis et al., 2008). They also completed a narrative immersion metric and the gameflow metric. All of these were asked in a five-point Likert scale format for them to judge how well they agreed or disagreed with each statement. Not all of the metrics were originally developed in Five-point Likert Scale format; however, they were all easily conducive to this format.

A few questions were removed from the original metrics for this study. In the gameflow metric, question two from the Challenge category was removed because it was worded in such a way that it expected players to predict if the game was sufficiently challenging to other players. This was deemed an unreasonable expectation due to the fact that the participants had no prior exposure to this game and consequently, had no awareness of how others may view the game. Also, all of the questions related to Social Interaction on the gameflow metric were removed since this game contained no elements of social interaction. Finally, questions 4-6 in the “Empathy” category were removed from the narrative immersion metric since they asked questions about how the player viewed their character when they were not playing the game. This was also deemed an unreasonable request, since the players’ had no time to consider this between finishing the game and starting the survey.

Additionally, players were asked demographic questions including questions about their general video game usage. They were also asked three open-ended questions at the end:

- What did you like or dislike about this game?
- Who was your favorite character in the game?
- What did you like or dislike about your favorite character?

These questions were included primarily for the sake of the developer.
Each metric was originally divided into categories of questions. For example, the gameflow metric consisted of four categories—Identification/Friendship, Suspension of Disbelief, Control and Responsibility. Each participant’s answers to each question within a category were averaged giving them an overall score for every category within each metric. An overall average score was also derived from the average response to all questions within a metric. Therefore, every participant was given an overall character attachment score (CA), narrative immersion score (NI) and gameflow score (GF). These were the main variables considered in response to the visual richness of detail (RD) which was classified simply with a 1, 2, 3 or 4.

Because there was enough reason to believe that character attachment was affected by NI and GF, these scores were taken primarily to determine whether or not this game could be considered appropriate for measuring CA. Essentially, if a game version did not score high enough in either GF or NI, the game itself may not be considered a valid tool for measuring character attachment. The game needed to score above a 3.0 in both narrative immersion and gameflow in order to be considered in the study. Given that a rating of 3.0 on a Likert scale corresponds to a participant neither agreeing nor disagreeing with a statement, it was determined that the game may still be conducive to character attachment with an overall score of at least 3.0 in these categories.

If the scores were high enough, then the final CA scores were tested using an analysis of variance to determine if there was a significant difference in character attachment among the four different versions of the game.
CHAPTER 4. RESULTS

As discussed in the previous section, the questions from each metric were originally categorized into groups. The gameflow metric consisted of the following groups: concentration, challenge, player skills, control, clear goals, feedback and immersion. The narrative immersion metric consisted of curiosity, concentration, comprehension, control, challenge and empathy. Finally, the character attachment metric consisted of: identification/friendship, suspension of disbelief, control and responsibility. Each group was categorized in the data analysis and each individual’s responses to each question in a group were averaged to determine a participant’s total rating for that particular group of questions. A total score was also calculated for each participant’s average response to all questions within each metric. An example of how the dataset was constructed can be seen in Figure 4.1. This represents how all nine respondents playing version two responded to each question in the character attachment metric on a scale of 1-5. Each “average” column describes the average of their responses to all questions within each category. The final column-labeled “total”, represents their overall average response to all questions in the character attachment metric. This shows their final CA Score that was ultimately used as the dependent variable of the study.

Additionally, the average scores for all participants’ responses were calculated for each category. Refer to Figure 4.2 for further reference. This chart breaks apart each group of questions for the character attachment metric, the narrative immersion metric and the Gameflow metric. The columns divide the scores into the four levels of detail and the final column represents an average score across all levels of detail within each group of questions.

The red cells are intended to clearly label any set of questions that did not score at least a 3.0 average. All of the questions in the metrics were worded as
positive statements. (i.e. “I consider my character a friend of mine.”) Therefore, a participant who responded with a three was stating that they neither agreed nor disagreed with the statement. If on average, the participants disagreed with a statement (Average score was less than 3.0) the cell was highlighted red. It is important to highlight such instances in order to discover the ramifications this may have had on the study. This will be discussed in more detail in the following section.

**Figure 4.1.** This shows all nine version-two participants’ responses to each question as well as their averages.

**Figure 4.2.** This shows the average of all participants’ responses for each category of questions as well as the overall average scores for each metric.
Because version three did not score above a 3.0 in both narrative immersion and gameflow, it was determined that it was not likely to be a good measurement tool for determining character attachment. However, multiple analysis of variance tests were conducted. Some ANOVA tests included the results of version three and some did not. The results of the tests conducted can be seen in Figure 4.3.

<table>
<thead>
<tr>
<th>Does Richness of Detail Affect</th>
<th>With V3</th>
<th>Without V3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character Attachment</td>
<td>p = 0.1863</td>
<td>p = 0.1705</td>
</tr>
<tr>
<td>Narrative immersion</td>
<td>p = 0.1304</td>
<td>p = 0.6956</td>
</tr>
<tr>
<td>Gameflow</td>
<td>p = 0.2586</td>
<td>p = 0.7759</td>
</tr>
</tbody>
</table>

Figure 4.3. This shows the results of the significance tests to see if visual richness of detail had an effect on character attachment. This includes the tests that included the results from version 3 as well as the tests that did not include the results from version 3. The cell colors refer to whether or not significance was found.

Across all versions of the game, the study consisted of a total of 33 males, 12 females and one agendered participant. There were 29 white/Caucasian participants, three Hispanic/Latino participants, five black/African American participants and nine Asian/Pacific Islander participants. Although the gender and ethnicity samples were very skewed, a significance test was conducted anyways. Participants were also asked how frequently they played video games. Three respondents said they never played video games, ten respondents said they played at least once a month and ten said they played at least once a week. Finally, 23 respondents said they played games daily. Another significance test was conducted to determine if how frequently participants played video games had an effect. In each case, no significance was found. The results of these tests can be seen in Figure 4.4.

Finally, because no official studies currently show a direct relationship between the character attachment metric and the gameflow or narrative immersion metrics, an ANOVA was measured to determine if a connection could be found.
Figure 4.4. This shows the results of the significance tests that looked at the relationship between demographics and character attachment. The cell colors refer to whether or not significance was found.

between these variables. Table 4.5 shows the relationships found in the context of this study.

Figure 4.5. This shows the results of the significance tests that looked at the relationship between gameflow and character attachment as well as narrative immersion and character attachment. The cell colors refer to whether or not significance was found.
CHAPTER 5. CONCLUSION

Ultimately, no significant difference was found to determine that the level of visual richness of detail had an effect on a player’s character attachment in this game. This could be for a number of reasons. It may simply be the result of a small sample size without a diverse enough representation of the population playing each version of the game. However, another possibility could simply be that the game itself was ultimately not entirely effective at developing character attachment. These options will be explored in more depth in the following sections.

However, a significant relationship was found between gameflow and character attachment in the context of this study. Despite concerns that this game may not be conducive to character attachment or that the sample size was not large enough, this remains a somewhat significant finding.

Despite the fact that the gameflow metrics and character attachment metrics share much of the same foundational principles, there are currently no direct studies showing the relationship between the two concepts. While the character attachment scores may have been relatively low, this study does show that they increase as the gameflow scores increase. With this being the case, it is likely that a larger sample size would only show further evidence for this trend.

5.1 Discussion

When referring back to Figure 4.2, one can see that the “Total Averages” column does a good job at describing the game itself across all levels of visual richness of detail. From this table we can easily determine a few overarching points:

1. The game doesn’t facilitate identification/friendship well across all versions of the game.
2. The game does not generate the player’s curiosity well across all versions of
the game.

3. The game does not maintain the player’s concentration in versions of the game
with rich environment detail.

4. The game does not encourage much empathy towards the characters in any
versions of the game.

5. The game was not sufficiently challenging.

6. The game was not particularly immersive across all versions of the
game-especially not in versions with rich environment art.

7. Version three scored noticeably worse than the others—it was the only version
that did not score at least an average gameflow and narrative immersion score
of 3.0.

5.1.1 Identification/Friendship

Although every group playing each version of the game scored above a 3.0 on
their overall CA rating, this is the category of CA questions that was primarily
founded upon the principles of identification and parasocial interaction. The current
theories revolving around visual detail are related to its effects on player
identification with a character (McCloud, 1993; Salen, Zimmerman, 2009);
therefore, with this factor scoring as low as it did, it may be reasonable to conclude
that this game is not a good measurement tool for determining whether or not
visual richness of detail effects character attachment in games. Perhaps the most
likely reason for the low scores across three of the two groups was simply that the
character dialogue was not written well enough.
5.1.2 Curiosity

This is another category which scored lowly, possibly due to the overall quality of the game’s dialogue and story. It should also be noted that in 2004, Pace determined a relationship between a player’s curiosity and their levels of immersion in games (Pace, 2004). The effects of this relationship will be discussed later.

5.1.3 Concentration (NI)

This showed some interesting results. The average concentration scores in versions one and two were 3.6 and 3.259, respectively. Each of these versions had a minimalistic environment. The average scores of versions three and four—which both consisted of rich environments, was 2.167 and 2.944, respectively. This may prompt the question of whether or not visual richness of detail in the environments affects concentration in games. When a significance test was run to determine a difference between concentration in all four RD groups, no significance was found (p = 0.0849). However, when the same test was run to determine if a difference could be found between minimal environments (versions 1 and 2) and rich environments (versions 3 and 4) a significant relationship was found. Table 5.1 shows the results.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Versions 1/2</strong></td>
<td>3.438</td>
<td>0.75</td>
<td>24</td>
</tr>
<tr>
<td><strong>Versions 3/4</strong></td>
<td>2.894</td>
<td>0.929</td>
<td>22</td>
</tr>
</tbody>
</table>

Figure 5.1. This shows the results of the significance tests that looked at the relationship between environment detail and concentration.
It is not clear why this is, however a similar situation was found between the visual detail of environments and a player’s immersion-this will be discussed further in the Immersion section.

5.1.4 Empathy

Ermi and Mayra determined a link between immersion and identification with a game’s character (Ermi & Mayra, 2005). Additionally, Sweetser and Johnson established that players begin to feel a sense that they are actually involved in the story if the narrative is immersive (Sweetser & Johnson, 2004). Identification has a strong connection to empathy. Therefore, with the lower scores in both the Identification/Friendship category of the CA metric as well as the Immersion category of the GF metric, it is clear that we are seeing a trend-most of the lowest scoring categories are associated with player identification. This also may simply be the result of the game’s narrative simply not being engaging enough to facilitate a sense of identification.

5.1.5 Challenge

The low scores relating to the game’s challenge could have been predicted fairly easily. It was necessary that players finish the game in order to respond to the metrics provided. Therefore, the game was designed with the intention that all players be able to complete it in a reasonable amount of time. This insisted that the game not rely on common mechanics involving hand-eye coordination. The primary alternative design was to make the game puzzle-based. However, it also required the puzzles to have a fairly limited number of solutions so that players having difficulty solving a puzzle would be guaranteed to try all options within a relatively short period of time. While it was necessary to make the game easy to finish, it certainly resulted in lower ratings for the challenge category.
5.1.6 Immersion

The immersion scores were lower in versions of the game with rich environments, so an ANOVA was used to determine if the difference was significant and the results were similar to those found in the concentration tests. Figure 5.2 shows a breakdown of how versions one and two showed significantly higher immersion scores than versions three and four.

<table>
<thead>
<tr>
<th>Does Environment Richness Affect</th>
<th>Immersion</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versions 1/2</td>
<td></td>
<td>3.175</td>
<td>1.011</td>
<td>24</td>
</tr>
<tr>
<td>Versions 3/4</td>
<td></td>
<td>2.452</td>
<td>1.114</td>
<td>22</td>
</tr>
</tbody>
</table>

Figure 5.2. This shows the results of the significance tests that looked at the relationship between environment detail and immersion.

It is not entirely clear why there is a significant difference being found between the levels of environment detail and the self-reported levels of concentration and immersion. Perhaps one explanation is that players have an expectation that if the environment is richly designed, it requires at least as much animated motion as the character has. In all versions of the game, the characters were constantly in motion, even if they were in an idle state. However, only some of the environments consisted of constant animations. The minimal environments were almost entirely left to the imagination of the player therefore, they could theoretically perceive as much motion as they wished. On the other hand, when the environment detail was fully provided for them, but the environment motion was not fully provided, it may have been more difficult to concentrate on or become immersed in the game.
5.1.7 Version Three

Version three had the lowest scores in general. However, it should be noted that when asked “Who was your favorite character?” three of the ten participants in version three responded that they didn’t like any characters in the game. This is compared to only 1/36 participants from all of the other versions of the game that responded this way. Because the sample sizes were fairly small and they were not kept entirely even, this may simply be a coincidence.

It should also be noted that some of the playtesters with exposure to every version of the game expressed particular interest in this version over the other versions.

5.1.8 Connections

Aside from the game’s challenge, a noticeable trend could be seen throughout the lowest scoring categories-immersion is connected to Identification/Friendship, Curiosity, Concentration and Empathy. Curiosity, Concentration and Empathy are all derived from the narrative immersion scale which had a large research basis in identification theory. If the dialogue for the characters was simply not written well enough for the players to identify with them, it stands to reason that many factors of narrative immersion would suffer. Furthermore, the connections that each of these categories has with immersion would understandably lead to a negative impact in that area as well.

Compare these scores with the factors that scored higher such as:

- Control (CA): 3.837
- Comprehension (NI): 3.96
- Control (NI): 3.93
- Feedback (GF): 3.906
Clear Goals (GF): 4.239

These higher rated factors tend to be more related to game design concepts such as keeping the player in control of the gameplay and keeping the player aware of their goals as well as their progress towards these goals.

There is a strong likelihood that this game simply needed a larger sample size or that the game itself was not appropriate for determining a player’s levels of character attachment. However, the results are ultimately, inconclusive.

On the other hand, this study may in fact show us is that visual richness of detail does not affect character attachment. If this is the case, companies still may have a strong motivation to use minimalistic art assets, which are cheaper and easier to produce, without risking a player’s propensity to develop character attachment.

5.2 Future Work

Although the results were inconclusive, this study may still be worth exploring with a larger sample size. However, because the quality of the game’s story and dialogue may not be high enough to make this game an effective tool for measuring character attachment, it is important to consider how the fundamental aspects of this study and the experimental design used could be replicated in other games.

It may be worth exploring this concept in modified games that are currently on the market and highly regarded. Perhaps a game could be modded to include 3D models with varying levels of detail. Some players can explore those worlds with highly detailed models while others would explore those worlds with minimalistic models. All participants would fill out the same surveys, as they did in this study. Ideally, this could happen in a game with well-established, but somewhat generic game mechanics, such as a first-person shooter. This may remove people’s ability to explicitly identify what source game that they are actually playing. This also
ensures that players are evaluating a game that is already accepted by the video-game community as one that is immersive and that has a strong narrative.
LIST OF REFERENCES
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