VISUAL AESTHETICS IN VIDEO GAMES AND THEIR EFFECTS ON PLAYER MOTIVATION

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ABSTRACT OF THESIS

Submitted in partial fulfillment of the requirements for the degree of Master of Science in Game Science and Design in the Graduate School of the College of Arts, Media and Design of Northeastern University

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Video games have been around for a while and are arguably one of the most popular forms of entertainment. Visuals and aesthetics are one major aspect of video games that appeal to players; from old-school 8-bit graphics, to the more realistic 3D graphics of modern games, players have nowadays an ample choice of visual styles in the video games they play. However, to date, the way in which different visuals and graphics impact people’s motivation to play video games remains mostly underexplored. In this thesis, I explore how different types of visual styles and aesthetics impact players’ motivation to play video games. I focus on three main types of visual styles and aesthetics in video games, namely (1) **realistic** (i.e., when graphics in video games are as close as possible to reality, for instance *Mortal Kombat* or *Resident Evil 2 Remake*), (2) **stylized** (i.e., cartoonized graphics like *Fusion Fall*), and (3) **abstract** (i.e., when graphics are minimal, for instance *Tetris*). I surveyed 45 participants on the above visual styles, their preferences, and motivation on playing video games inspired by the Artistic Preference Scale (APS) and the Gaming Motivation Scale (GAMS). Results from the survey show that players prefer realistic visual styles overall and over abstract styles. With the present thesis, I contribute game design with preliminary results on how the preference of visual styles in video games impact players’ motivation and provide design recommendations for game designers.
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INTRODUCTION

Video games are a popular form of media, particularly among young adults, such as college students (Panelas, 1983). People’s motivation to play video games vary greatly depending on what type of experience they seek. For instance, people playing *World of Warcraft* may seek competition and challenge in multiplayer settings, while people playing horror games like *Resident Evil* enjoy thrill and puzzle-solving. As a great variety of video game genres and gameplay exist (Apperley, 2006), there is also a great variety in how video games “look”, namely the visual styles and aesthetics they use to deliver graphical content to players. From simple 2D graphics to realistically-modeled 3D worlds (Keo, 2017), video games nowadays can satisfy almost any player’s aesthetic or “artistic” preference. However, although many studies have been conducted with the purpose of identifying motivational factors stemming from a game’s genre and the challenges presented, less focus was given to how the visual styles and aesthetics in video games affect the player’s motivation. That is why the focus of this study will be to analyze how the visual design, art, and aesthetics in video games may affect a player’s decision to play, and continue playing video games. In this study, visual design, art, and aesthetics refer to any objects and elements depicted on screen that define video games visual styles, namely abstract, stylized, and realistic. Previous work (Keo, 2017) argued that all players have inherent preference for one of the three above mentioned visual styles in video games. In this thesis, I explore how the preference of different visual styles impact players’ motivation to play video games. Results of a survey based on the Gaming Motivation Scale (GAMS) and with an art preference section inspired by the Artistic Preference Scale (APS) will be analyzed to tie
both motivation and visual styles preferences. Understanding the correlation between preference of visual styles and game genre when it comes to keeping a player motivated will be useful to game designers in more systematically leverage a particular visual style to further motivate and engage players.

BACKGROUND

This thesis investigates how art and aesthetics in video games impact players’ motivation to start and continue playing video games. Hence, we briefly review previous work on motivation and aesthetics in video game design. Next, we explain motivation and its underlying factors.

Motivation and Video Games

Motivation has been studied extensively in various areas, including motivation to play sports video games (Cianfrone, 2011), the motivation to learn topics of computer science through serious games (De Lima, 2015), and assessing intrinsic motivation, external and identified regulation and amotivation in sports like basketball (Guay et al., 2000). In this thesis, I investigate the relationship between people’s preference of visual aesthetics in video games and how (and if) their preferences impact their motivation to play games.

Self-Determination Theory (SDT) describes motivation as serves as the basis by providing a definition of extrinsic and intrinsic motivations and basic need factors that affect motivation as a
whole. The factors that affect motivation are autonomy, competence, and relatedness. According to SDT, these factors are what individuals will strive to attain (Deci & Ryan, 2012).

Previous work highlights the importance of motivation in video games. However, this motivation has been assessed through behavior and interactions within the games (Ryan et al., 2006) and not from the perspective of visual elements on their own.

Next, the underlying factors of intrinsic motivation are described in further detail based on definitions by Deci and Ryan (2012).

**Autonomy**

Autonomy pertains to an individual’s control over their own decisions and actions, and those who find themselves lacking in autonomy will see themselves motivated to increase it by finding ways to be able to control outcomes of situations. Based on this definition, it can be argued that video games allow for a good deal of autonomy, as the player is the one who decides what they will do in each situation by way of being able to use a controller to manipulate their character’s actions in-game. Even in games where events are scripted and unavoidable, such as the quick time events in Bayonetta (2009), players can still decide if they will make their character succeed by performing the required action or simply do nothing and allow their character to fail. Unlike, for example, literature, where the autonomy consists of the reader’s individual mental depiction of the events they read about (McFarlane, 2007), video games can allow direct control over events presented in game within the boundaries set by developers.

**Competence**
Competence pertains to the feeling of doing well at any given task, but for the purposes of this study, the focus of competence will be that shown in video games. Put simply, a high level of competence will indicate a high level of skill. People who are highly motivated by competence may find themselves drawn to video games, as the nature of most games is based on acquiring a skill and developing it through repetition of the skill. Consumption of video games requires more motivation through competence than consumption of most other media due to the active role of the player, as opposed to the more passive role with other media, such as film or literature.

**Relatedness**

Pertaining to relatedness is the way that individuals socialize and feel themselves to be part of a group. Games can help achieve the need of relatedness through interactions with others, whether they are real people or scripted characters in the game designed to feel real. Outside of the games themselves, players are brought together because of their common interest in the games. Many strong communities are built around the common interest of video games, as can be seen in internet forums like Reddit.

All of these factors fall into the Basic Psychological Needs Theory (BPNT) (Ryan & Deci, 2017), which argues that individuals that find themselves fulfilling their basic psychological needs will positively affect their wellness. When any of the factors are missing, be it competence, autonomy, or relatedness, an individual’s motivation to fulfill this need to maintain a state of wellbeing rises. They are pushed to take action by their need to ensure that the factor of competence, autonomy, or relatedness can be fulfilled.
Also relevant to motivation is Maslow’s Hierarchy of Needs (Maslow, 1943), which states that there are certain types of needs, shown in Figure 1, that have precedence over others as shown on a scale of needs, and until the lowest levels of needs are not fulfilled, individuals will not be motivated to fulfill those higher on the scale. The scale of needs includes, in order from lowest to highest, physiological needs, need for safety, need of love and belonging, need for esteem, and, finally, the need for self-actualization. Each one of these alter behavior to intrinsically motivate an individual to fulfill the needs on this scale, until self-realization is achieved.
Motivation can be intrinsic or extrinsic, with extrinsic motivation being divided into four categories: external regulation, introjected regulation, identified regulation, integrated regulation. (Ryan, 1995)

*External Regulation* refers to behavior performed because of an external force, be it a reward or coercion.

*Introjected regulation* comes from the need for acceptance, whether it be self acceptance or from others and is driven by anxiety or guilt.

*Identified regulation* refers to actions decided by the individual based on what they intend to achieve or the action’s relation to personal goals. In other words, if an action will not help the individual achieve a goal, then the person will not be motivated to perform it.

*Integrated regulation* refers to activities or actions performed because of their relation to the individual’s identity and sense of self.

Another category Ryan (1995) presents is amotivation, which is when an individual lacks any sort of motivation, whether extrinsic or intrinsic, and lacks a sense of competence or autonomy in the activity they are performing. Items pertaining to not only amotivation, but all previously explained categories of motivation are included in the GAMS, which is part of the instrument distributed in this study.

**Visual Styles**
While the previous section highlighted concepts of motivation relating to this study, this section will present related concepts pertaining to visual styles in video games. When referring to these graphical styles, the terms “visual aesthetics” and “visual styles” are used throughout this thesis. Common graphical styles in video games were studied in a paper by Keo (2017) and were analyzed to determine how each style was used to create different game content and experiences. The focus was mainly on how styles have changed over the years, emphasizing how the growth of technology has had an impact on the way games look. Keo mentions that designers capitalize on the fact that different players will feel attracted toward different types of visual styles, and use this knowledge to their advantage when creating video games. Three distinct categories for visual styles are presented, these being abstract, stylized, also called “caricaturism” (Järvinen, 2002), and realistic, along with subcategories for each. Abstract visual style presents all objects and components of the game in very simplified forms, whether they be represented in 2D or 3D. In abstract style, a player character may be represented as a simple geometric shape, such as a rectangle like in Thomas was Alone (2012). Puzzle games, such as Tetris commonly make use of this style by presenting its elements in simple geometric shapes. For the purposes of this study, this definition supported by Keo (2017) will be used going forward when “abstract style” is mentioned.
Objects and characters presented in stylized form will make use of exaggerated features. However, these exaggerated features do not necessarily correspond only to children’s entertainment. Keo (2017) explains:

“Despite the style’s similarity with cartoons, however, stylized games are not always intended for younger audiences (Egenfeldt-Nielsen 2015). A good example of this kind of a game would be Super Meat Boy (2010) which had colorful and cute cartoony art style, but combined the game-play with gory elements.”

This means that serious or dramatic themes can be represented in a less serious manner than more lifelike depictions of the same elements. This is a characteristic trait of a stylized aesthetic.
Within this category of stylized games, there are many game styles that can be included. Stylized games can be rendered in three dimensions (3D) or two dimensions (2D). The graphics can be cel-shaded, which is when 3D objects are made to look two-dimensional by using flat colors, making them seem like a cartoon. They can also be based on pixel-art, a style that has its roots in early games from past decades but is still popular in games to this day, seen in games such as Stardew Valley (2016).

In the realistic style, its main goal is to represent objects as close to their real life counterparts as possible. In this style, the closer objects look to reality, the better. It is this style that designers tend to emphasize when they want to showcase the graphical power of a video game system. However, they are very resource-intensive and require more work to achieve effectively, and not
every game genre can work well with a realistic style (Keo, 2017). Additionally, this is a style that has been able to be represented in high fidelity in games only in recent times. In the past, when attempting to achieve this style, games did not seem as close to photorealism as games today. Technology has advanced to the point where graphics rendered in real time can aim to achieve a realistic style effectively while, in the past, it was limited to mostly pre-rendered content, seen in games such as Doom (1993) and Mortal Kombat (1992). Evidently, lack of power did not prevent designers from attempting to achieve a realistic style and succeeding in doing so with the available resources.

![Screenshot of Mortal Kombat (1992)](image)

Figure 4: Screenshot of Mortal Kombat (1992)

Examples of all styles of visual (abstract, stylized, and realistic) can be found in Appendix A. These images were used in the instrument for this specific study.

Lee et al. (2015) present in their paper a way to browse video games based on visual style and mood. 19 video game experts were asked to evaluate their interaction with the tool and
concluded that the tool, named Vizmo, would be useful for research on aesthetic aspects. Evidently, visual styles in games are important enough to qualify as their own category when it comes to identifying them. No work is presented on how these aesthetics affect players themselves.

**Motivation and Visuals**

Birk et al. (2016) studied the effect of intrinsic motivation when identifying with an in-game avatar. 126 participants played a custom endless runner game and through their custom avatar, showed that identification translated into motivated behavior. Identification with characters has shown to affect how individuals like or perceive a character and increases enjoyment of the media containing these characters. Likewise, playing a game with personal avatars allows players to project their identity onto the character, therefore motivating them to play further. In this study, a character creator was built in which players could personalize aspects of a character's look and personality. When using these custom characters built with greater identification in mind, players show more interest in the tasks they are given and display increased immersion, autonomy, invested effort, enjoyment, and positive affect. This particular study demonstrates that visual elements play a significant role in motivating the player. However, visual style and aesthetics does not seem to be evaluated at any point in the study.

**RELATED WORK**

Several past studies laid the groundwork in the topics of motivation and visual aesthetics in video games. It is important to note that while these topics have been studied extensively in the
past, most of these works deal with only one of them and not in the correlation of these in terms of video game preference.

High quality visuals in media are emphasized to be of importance regarding consumers’ perception (Atkins, 2006). Audiences’ perception of a game can be positively influenced if its visuals are of high quality. This can be exemplified by the success of Wipeout Pure on the PSP, which offered home-console grade visuals on a handheld platform. Aside from this, cosmetic downloadable content, such as interface skins, was also a factor to consider in its success, as it extends the appeal of the game by giving players more ways to customize the game as they please.

A study by Tondello and Nacke (2019) evaluated its participants based on player traits, and one of the traits deemed significant was “Aesthetic Orientation” which they explain as follows:

“Players who score high on this trait enjoy the aesthetic experiences in games, such as exploring the world, observing the scenery, or appreciating the quality of the graphics, sound, and art style. On the other hand, players who score low might focus more on the gameplay than the aesthetics of the game.”

They go on to say that this preference for aesthetics will have an impact on the type of game they play, and is important enough to consider as a significant influence on preference.

In the article by Canossa et al. behavioral datasets are generated from players and are used as interpretational means to gain insights on the psychology of the players. As the title suggests, these will be specifically Minecraft players. While previous research has shown that there are
solid correlations between in-game behavior and personality, most of these use techniques that consider only the in-game behavior data to make their assessments. Using only behavioral datasets with established theoretical frameworks, in this case the Reiss Motivation Profiler, additional meaning and information could be extracted from these datasets. The important point made in this study is that conducting the study about one specific game may limit the type of participant due to the type of player which would prefer this game, stating: “It could be that the ludo-aesthetic affordances offered by the game attract a certain type of player.”

Focusing on combining personal innovativeness, personal involvement, and intrinsic and extrinsic motivations to explain usage intention for social network games, Chang and Chin (2011) use an extended technology acceptance model. As social networks are increasingly becoming more tied to games, they are a good subject for the intention of the study. This model was tested with data that was collected from users that could potentially be interested in using a social network game. MANOVA and multiple regression analyses were conducted to identify key causal relationships, and were expected to show that the personal innovativeness and personal involvement would have a positive effect on intrinsic and extrinsic motivations, which then influence the intentions to use the social network games. The results showed that ease of use was a key factor in determining motivation.

Cianfrone (2011) intended to modify the Sport Video Game Motivation Scale (SVGMS) and then to verify its validity. The factors included in the scale (Competition, Diversion, Enjoyment, Fantasy, Interest with Sport, Social Interaction, and Sport Knowledge Application) were kept and three more were added, but only one of these additions was kept, that being Team
Identification. These were the factors that are said to affect motivation in a sport context, specifically in video game form. The modifications were tested through literature review, adoption of pertinent theories, and a test of content validity conducted by experts in the field and a sample of sport video game players. After the scale was modified, this revised version was administered to players of two popular sports video games, being NCAA Football and Madden NFL. In future investigations of the topic, this new scale could be implemented as it showed good validity and reliability.

A paper by Craveirinha analyzes the impact that adding game elements can have on players’ artistic valuation of games. They hypothesize that aesthetic experiences are incompatible with certain game elements, such as challenges, rewards, and penalties. 76 subjects were recruited to test two different variants of an artistic video game, one with the game elements and one without. When the game elements were added, players were more focused on the completion of these tasks rather than with the meaning of the art displayed. Overall, the game’s visuals were viewed with less importance than the goals that the players were presented with.

A paper by De Lima (2015) explores the impact of the use of digital games on users, specifically on the motivation to learn about topics such as computer science. It compares the experiences of players with educational or serious games with more mainstream games. Two educational games with a focus on software engineering were compared to a mainstream racing game and the experience of players with each was evaluated using the Game Experience Questionnaire (GEQ) and an adapted version of the Intrinsic Motivation Inventory (IMI). It was observed that a player’s predisposition was a factor in the experience, meaning that those who were more
inntrinsically motivated were seen to have a better experience. Having a well-defined scenario in the serious game was also deemed to be a factor that positively affected a player’s experience with the game.

Donovan et al. present a study focused on unifying the language for classifying video games according to their visual styles. Artistic style “facets”, terms that describe how a visual look can be perceived, were developed in this study. These go into detail about a game’s style, technique, and dimension relative to the artistic expression of the game. Terms used range from photorealism, rotoscoped, and 3D.

In the paper by Guay et al. (2000) the Situational Motivation Scale (SMS) was designed and validated. Its purpose is to assess the construct of intrinsic motivation, identified regulation, external regulation, and amotivation. Five studies were conducted with participants being French Canadian college students, and 150 athletes from 16 collegiate basketball teams to evaluate the measure of the scale. Results of the five different studies show that the SMS is composed of four internally consistent factors, and that the construct validity of the scale is supported by correlations with other constructs of different, current theories. In general, the findings suggested that the SMS represents a brief and versatile self-reporting measure of situational intrinsic motivation, identified regulation, external regulation, and amotivation.

Johnson and Gardener (2010) present a study focused on relationships between personality, video game preference, and gaming experiences. 235 participants were given a survey about their recent game experiences and also were administered the Player Experience of Need
Satisfactions (PENS). Evidence is shown of links between personality and game genre preferences.

One study by Kahn et al. (2019) designs a new scale used to determine player motivations while also examining its validity across two distinct gaming genres and cultures, drawing from data collected from 18,627 players of the Multiplayer Online Battle Arena League of Legends, and 18,819 players of the Chinese Massively Multiplayer Online Game Chevalier’s Romance Online. With the information gathered, six types of player motivations were found: socializer, completionist, competitor, escapist, story-driven, and smarty-pants. These typologies were consistent with previous research on player motivations while also offering new insights into people’s motivations to play video games and how these motivations can be used to infer and predict players’ in-game actions.

In a study by Melhart et al. (2019), a large dataset of gameplay data was collected from players of the game *Tom Clancy’s The Division* to predict the motivation of players just from observations made from this data. The players were asked to report their levels of competence, autonomy, relatedness, and presence using the Ubisoft Perceived Experience Questionnaire (UPEQ). The relationship between the gameplay data and the four motivation factors was inferred after processing the survey responses and later using preference learning methods. The main findings show that gameplay data can be used to accurately predict motivation of a player as shown by the UPEQ.

Vahlo & Hamari (2019) use the Self-Determination Theory to develop the Intrinsic Motivations to Gameplay (IMG) inventory and was validated within 3 separate studies. Each study resulted in
a more updated version of the IMG based on the results and feedback of the participants. The final IMG was composed of 23 items and was based on the Self-Determination Theory, measuring competence, relatedness, and autonomy, as well as fun and immersion. However, the IMG model does not take into account that players may be motivated by the visual aesthetics, as it only focuses on gameplay content.

The research by Wyeth et al. (2013) explores motivation in young children playing a video game and how it is affected by their engagement in different activities and by having two separate experiences within the game. The game was played using the Stomp system, which uses a mat on the floor to interact with elements in the game, and was deemed to be appropriate as a form of input for its audience of very young children. Elements of SDT were monitored in the participants, being their competence, autonomy, and relatedness. One of the two experiences offered seemed to be less successful than the other, pointing towards motivation being affected by what a game’s goals and mechanics are.

In summary, visual aesthetics in games have generally been treated as a superficial trait of a game and not a determining factor in influencing a player’s actions and/or decisions. Because of this, the focus will be mainly on graphics and visuals in this thesis. Additionally, when studying motivation, the Self Determination Theory is prevalently used and is why it was an influencing factor in this study. The work presented in this section influenced the direction taken with this study in terms of the type of questionnaire used, how much attention and importance was given to the visual presentation of a game, and how motivation is an important aspect in the study of video games. Assessment of the level of motivation was also inspired by the work in this section.
METHOD

Participants

Participants were recruited through an online forum dedicated to answering surveys. A total of 45 people participated, ($M_{age} = 25.16$ years, $SD_{age} = 7.19$ years) 23 of which were male, 18 which were female, and four that identified as “other”. Only two of the four that identified as other provided a label, one being agender and the other being non-binary. No compensation was offered in return for participation. Participants from 14 countries participated, with 46.6% of the participants residing in the United States of America.

Instrument

An instrument in the form of a survey that measures individuals’ affinity towards certain art styles, favorite game genre, and motivation to play games was created on Qualtrics based on the Gaming Motivation Scale (GAMS) and inspired by the Artistic Preference Scale (APS). The instrument includes 24 questions. Of these, the GAMS is included in its entirety to evaluate player motivation. The GAMS is comprised of 18 items divided into each of the six types of motivation, with 3 items allocated to each of the six types. 15 questions are included in which players state their preference for art style divided into 5 images each for abstract, stylized, and realistic styles chosen according to the specifications of Keo (2017) and Jarvinen (2002) (See Appendix A for all images used) in a seven-point likert scale ranging from “like a great deal” to “dislike a great deal”. The questions for visual style are presented in random order to each participant to minimize bias. Afterwards, a list of video game genres is presented to be ranked in
order of the participants’ preferences. The genres included are platformer, shooter, fighting, rhythm, role-playing, visual novel, strategy, and sports.

**Procedure**

Participants were recruited through an online forum in which they could access the link. They were first shown a consent form informing them that participation was completely voluntary and that they were free to end their participation early if they felt uncomfortable in any way. If they decide they want to participate, they are shown the rest of the questions in the survey. The first section includes demographics information and, after this, participants are asked to complete the GAMS. After filling out the GAMS, participants are presented with 15 images of video games shown in random order, all corresponding to one of the 3 visual styles (abstract, stylized, or realistic). On a likert scale, participants are asked to rate how much all 15 pictures they are shown appeals to them. The scores on this section depicting the images will show how much the participant likes an abstract, stylized, or realistic style. When this section is finished, participants rank a list of video game genres in order of their preference.

**RESULTS**

Analytics provided by Qualtrics and analysis done in SPSS were used to analyze the results of the survey. Graphs were created using Wolfram’s Mathematica. Based on the 45 participants that completed the survey, scores were given to each of the three visual categories. Each image could be scored from -3 to 3, with -3 representing a strong dislike for the image and 3 representing a strong like. Since there are a total of 5 images, each participant visual style could reach a
maximum score of 15 and a minimum score of -15. Table 1 presents the specific values for each style. Analysis of the GAMS scale was carried out similarly, with each section referring to the types of motivation administering a score, with the minimum score possible being 3 and the maximum score possible being 21. Each individual response can be scored from 1 to 7 by the participant, where 1 corresponds to “Strongly Disagree” and 7 corresponds to “Strongly Agree”. A score of 3 would indicate that the participant demonstrates complete disagreement in all three questions corresponding to a certain type of motivation. A score of 21 indicates complete agreement in all three questions. Table 2 presents all scores with their specific values.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>Variance</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Abstract</td>
<td>-1.71</td>
<td>-15.00</td>
<td>8.00</td>
<td>34.87</td>
<td>5.91</td>
</tr>
<tr>
<td>2. Stylized</td>
<td>5.09</td>
<td>-5.00</td>
<td>14.00</td>
<td>23.24</td>
<td>4.82</td>
</tr>
<tr>
<td>3. Realistic</td>
<td>5.82</td>
<td>-4.00</td>
<td>15.00</td>
<td>21.04</td>
<td>4.59</td>
</tr>
</tbody>
</table>

On average, preference for stylized and realistic visuals scored similarly to each other and had a higher minimum score than preference for abstract visuals did, which scored negatively on average, indicating a level of dislike for the images shown. Abstract games also had a lower maximum score than stylized or realistic games did. This is notable because, according to Keo (2017), mobile games are the ones to implement this art style more frequently in today’s market and these are generally developed with a broader audience in mind. For detailed histograms for preference of each visual style, refer to Appendix B.

Table 2
Scores for Motivation Types and their Mean, Min, Max, Variance, and Std. Deviation, n=45

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>Variance</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intrinsic Motiv.</td>
<td>16.49</td>
<td>8.00</td>
<td>21.00</td>
<td>7.94</td>
<td>2.82</td>
</tr>
<tr>
<td>2. Integrated Reg.</td>
<td>10.71</td>
<td>3.00</td>
<td>20.00</td>
<td>25.01</td>
<td>5.00</td>
</tr>
<tr>
<td>3. Identified Reg.</td>
<td>12.44</td>
<td>3.00</td>
<td>21.00</td>
<td>17.22</td>
<td>4.15</td>
</tr>
<tr>
<td>4. Introjected Reg.</td>
<td>6.02</td>
<td>3.00</td>
<td>15.00</td>
<td>9.80</td>
<td>3.13</td>
</tr>
<tr>
<td>5. External Reg.</td>
<td>11.04</td>
<td>3.00</td>
<td>21.00</td>
<td>30.22</td>
<td>5.50</td>
</tr>
<tr>
<td>6. Amotivation Reg.</td>
<td>7.18</td>
<td>3.00</td>
<td>16.00</td>
<td>16.06</td>
<td>4.01</td>
</tr>
</tbody>
</table>

From the data on Table 2 it is clear that, on average, the motivation type that participants most commonly identified with was intrinsic motivation since an average of 16.49 is close enough to the maximum score of 21. Amotivation was on average the motivation type that participants least identified with. These results show that most people will play games because they want to and, in general, once they don’t feel driven to play anymore will not keep playing. Similarly, introjected regulation is low on average since most people are not obligated to play games and will not feel guilt if they stop playing. This result makes sense because people will normally play games as a break from responsibilities and to have a good time, not because they have a responsibility to play the game.

A majority of responders (63.64%) ranked role-playing games as their favorite genre. 68.18% ranked sports games as their least favorite genre. The image taken from Qualtrics with more detailed results is included in Appendix C.

To analyze the relationship between the different types of motivation and the different types of visual styles, the scores obtained from the survey in each category (stylized, abstract, and
realistic) were mapped to a graph. Three graphs were made, one for each of the visual styles, each depicting the relationships with the different types of motivation. Reiterating, the scores for motivation go from 3 to 21, and the scores for visual style go from -15 to 15. Each point on a graph, depicted by a number, represents each participant’s score on the visual category compared to their score in each of the factors of motivation. Having these factors visually represented means that for each participant, there are six points on the graph. One for each of the motivation factors, allowing for a detailed comparison. It is important to note that a small degree of randomness was added to the scores to prevent excessive overlap, but the actual scores are all whole numbers, even though the graph presents values in between. All of these graphs were made using Wolfram’s Mathematica.

Figure 5: Realistic vs. Motivation
In Figure 5, we observe the aforementioned scores in more detail, and can see that, in general, when preference for realistic visuals is higher, external regulation (represented by the black 5’s) tends to increase as well. This tells us that, within this sample size, when players prefer a realistic visual style, they may be motivated by rewards or other aspects other than the game itself.

However, intrinsic motivation, represented by the red 1’s on the graph, which are located near the top of the graph for many participants, indicating that the desire to play games is generally high and remains that way regardless of preference of visual style. Also noteworthy is that all of the lowest preference values for realistic visuals came from female participants (represented by a number with no underlining or strikethrough) while most of the highest scores came from males (underlined numbers).
In Figure 5, the relationship of motivation and preference for abstract visuals is presented. As with the previous Figure (Figure 4: Realistic vs. Motivation) we observe how intrinsic motivation is generally high regardless of preference for an abstract visual style. Since a large part of the results are to the left of the graph, it is concluded that there is not a high preference for abstract visuals, and many participants reported either an indifference or a clear dislike of the style.
As with the previous figures, the stylized vs. motivation graph (Figure 6) shows that intrinsic motivation is generally high regardless of visual preference. Introjected motivation is also generally low and has little to no overlap with intrinsic motivation. In this instance, males seem to present the lowest scores in preference for stylized visuals. There is a higher concentration of values around the 9 on the scale for visual preference, indicating that many participants responded favorable to the style.
DISCUSSION

In light of this study’s findings, particularly the relationship seen between extrinsic motivation categorized by external regulation and visual aesthetics, it is possible to state that the visuals will affect the way players interact with a game based on what they see on-screen. Game designers would do well to keep these relationships in mind when deciding on the content of their games and the visual style that will be used (Keo, 2017). As the results show that realistic graphics tend to motivate players extrinsically (within the category of external regulation) it could be that the focus given to a game is on the visuals and the gameplay content is not prioritized. Players may see themselves attracted to the photorealistic look of the game but not particularly enjoy the gameplay loops presented. While graphics are an element that attract players and keep them interested in a game, graphics alone will not create a good game that will entice players (Shelley, 2001). A general takeaway from this thesis is that game creators should make sure that their gameplay mechanics and concepts should be the main attraction of their game with visuals enhancing the experience. A proper balance of visuals versus gameplay content may ensure that players see themselves motivated to play more intrinsically. This will improve the overall experience and make it feel less like an obligation according to Deci and Ryan’s (2012) definition of intrinsic motivation.

LIMITATIONS AND FUTURE WORK

A significant limitation in this thesis is that the images used in the survey were not nearly enough to encompass all variations of the main visual styles presented throughout the thesis. In future iterations of the study, more images would be included to get a more accurate reading on
participants’ preferences. Further work can be done at a lower level on relating visual aesthetics with motivation in its different types, as there are indications in this thesis of one influencing the other. More emphasis can also be placed on the difference between 2D and 3D games as the survey used did not differentiate between the dimensions of the game presented in its images. As for participants, the sample size may not have been representative of video game users in general, as respondents came from an online forum. It would also be worthwhile to also include visual preferences in media other than video games, such as film or physical art, and see how these preferences vary, if at all, between mediums. Finally, having the visual preference detached from the experience of gameplay itself was purposely done to evaluate the preference on its own, but more research should be done to verify if this corresponds to general game preferences not tied to visuals alone.

**CONCLUSION**

Regardless of visual preference, the motivation to play games tends to stay consistent across the board. While the values of the type of motivation seem to stay consistent, they are not simply repeated from one graph to another. This is evidenced by the fact that some graphs have, for example, the lower values in preference represented by males and in others the lower values come from female participants. Evidently, men and women have different tastes in games when it comes to visual aesthetics but similar motivations overall to play games.
REFERENCES


Abstract 1

Abstract 2
Abstract 3

Abstract 4
Abstract 5

Realistic 1
Realistic 2

Realistic 3
|       | 45% | 44% | 43% | 42% | 41% | 40% | 39% | 38% | 37% | 36% | 35% | 34% | 33% | 32% | 31% | 30% | 29% | 28% | 27% | 26% | 25% | 24% | 23% | 22% | 21% | 20% | 19% | 18% | 17% | 16% | 15% | 14% | 13% | 12% | 11% | 10% | 9% | 8% | 7% | 6% | 5% | 4% | 3% | 2% | 1% | 0% | 0% |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Sports|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Energy|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Food|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Fruits|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Vegetables|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Other|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Total|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |