Horror game design – what instills fear in the player?

A study on the effects of horror game design theories and level design patterns on player behaviour in a horror environment.

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Skräckspelsdesign – Vad ingjuter skräck hos spelaren?

En studie om nivådesign och skräckspelsteorier på spelarbeteende i skräckspelsmiljö.

Abstract

This research paper aimed to study how to make a scary horror game and what in turn makes these games scary. This study utilizes an original game called The House specifically designed and created by us. This is done in order to study the effects of implementing level design and navigation patterns and horror game design theories in an original horror game on player behaviour and reaction in relation to these theories. The study was done with the use of 10 participants, who each took part in a 15 minute play session, and were later interviewed using the data gathering method stimulated recall. The result of the study shows that level design had no significant effect on the amount of fear that the participants expressed. The implementation of proven horror game design theories proved successful at contributing to the general horror experience, and combining elements of level design and horror game theories in horror game design proved successful at scaring the participants.

Keywords: Level Design, Horror, Video Games, Stimulated Recall, Original Game

Abstrakt

Denna forskningsstudie syftade till att studera hur man skapar och designar ett skrämmande skräckspel och vad som gör ett skräckspel skräckinjagande. Denna studie använder ett originellt spel vid namn The House som var specifikt utformat och skapat av oss. Detta gjordes för att studera effekterna av implementering av nivå design och navigationsmönster samt skräckspelsteorier på spelarens beteende och reaktion i relation till dessa teorier. Studien gjordes med användning av 10 deltagare, som var och en deltog i en 15-minuters spelsession och intervjuades senare med hjälp av datainsamlingsmetoden stimulated recall. Resultatet av studien visar att nivådesign inte hade någon signifikant effekt på mängden rädsla som deltagarna uttryckte. Implementeringen av beprövade teorier om skräckspelsdesign visade sig framgångsrika då de bidrog till den allmänna skräckupplevelsen, och att kombinera element av nivådesign och skräckspelsteorier i skräckspelsdesign visade sig mycket framgångsrika att skrämma deltagarna.

Nyckelord: Nivådesign, Skräck, Videospel, Stimulated Recall, Originalspel

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Introduction

Fear is a vital human response to any possible danger that finds its roots in human evolution. It is said that without fear we would not have the ability to protect ourselves against threats that could possibly result in a life or death scenario, more so in the ancient world (Fritscher, 2019). Fear in today's society can be seen in popular media, for example in video games in a game genre called horror games. It is said that it is a challenge for video game developers to understand the physiological phenomenon that is fear which can lead to games that fail to enhance this emotion in the players that choose to take part in the experience (Ntokos, 2017, p. 33).

This research paper intends to understand fear in horror games based on horror game design theories and patterns on the design of the game levels in order to understand how to make a horror game that actually has a successful chance at introducing fear in the players. This in order to create a clear picture for developers and players alike how to create and design a horror experience and what specific elements that can be implemented in horror games in order to actually make a horror game that instill fear in the players that experience the game.

Related research

The related research will be separated into two main categories, which are Level design and fear and immersion. The reason for this is that the research that we found either focuses mainly on level design or horror games. We therefore felt a need to separate the research into two main categories. The elements of each category presented below will be used as a base for the creation of our research object and will be discussed in relation to one another in order to answer the research question.

Level Design

El-Nasr and Milam (2010) conducts research on differences in level design between different games and how they use push and pull mechanics to guide the player through the levels based on different patterns. Push and pull mechanics is described as methods that game designers can use to describe the player movement patterns in a game (Els-Nasr and Milam, 2010, p. 139), as further described below. Five push and

pull movement patterns were induced in this conference paper for an in depth analysis of level design within 21 different games (El-Nasr and Milam, 2010, p. 140).

- **Path movement and resistance pattern**

  Path movement is described as the narrative goal or purpose for the player to finish a mission or a quest. This also includes a resist movement challenge, which is something that blocks the player's path, like a key that unlocks a door or any form of barrier (El-Nasr and Milam, 2010, p. 140).

- **Pursue AI pattern**

  Bases movement in response to friendly or hostile characters within the game. Also includes movement tactics in combat to neutralize or avoid threats (El-Nasr and Milam, 2010, p. 140).

- **Path Target pattern**

  Directs and orients the player movement to a visible target present in that specific level. Can be a visual landmark or anything that attracts the players attention in a specific direction (El-Nasr and Milam, 2010, p. 140).

- **Collection pattern**

  This pattern is defined by the rewards for navigating through the level. This includes picking up objects like money, ammunition or special items placed within the level (El-Nasr and Milam, 2010, p. 140).

- **Player is Vulnerable pattern**

  Relates to when players are vulnerable. It is said that players adapt their movement and that there is an additional challenge and variety that enhances a specific combat scenario. This includes when players take cover in order to regenerate health or to hide from enemies (El-Nasr and Milam, 2010, p. 140).

These patterns are taken into consideration in this research, as the two levels that are created will guide the player and use these patterns as a framework for the design of the levels in our game. The patterns are examples of push and pull mechanics, and are used as a basis for player movement and navigation through a specific level. This will help us to orient the player around our levels and understand possible player behaviour and movement in different situations in the game. Using the different patterns and using previously recorded game sessions and Youtube walkthroughs for each of the 21 games, the first ten minutes of gameplay were analyzed. The result is discussed around three different configurations that derived from the patterns which were: Combat gore and variety, Environmental resistance and mixed goal without vulnerability. Based on the result, it is concluded that this research can be used by designers when constructing levels and missions (El-Nasr and Milam, 2010, p. 145).

Level structure and appearance

Feil and Scattergood (2005, p. 64) states that as a level designer, it is important to consider player movement in level design in general. Furniture or other world objects must be placed so that the player can maneuver around them. It is also mentioned that structures in the game should be believable based on physics and appearance. This is said to increase the players immersion for the player (Feil and Scattergood, 2005, p. 65). In combination with the patterns presented by El-Nasr and Milam (2010), the design of the level for the research object will take movement and placement of objects into consideration. The levels that we will create for our research object will be designed based on different gameplay patterns in order to pull and push the player through them. This is primarily in order to create a level that has some relevance to previous research conducted by El-Nasr and Milam (2010) as well as to create a level that features well established gameplay patterns to improve the gameplay experience in our levels. This should help us further understand the impact of level design in horror games and to see if that has any possible effect on the horror experience. It is further presented that architecture is the most powerful tool to create immersion. It is stated that it helps to heavily reinforce immersion and that the setting of the game should be researched in order for the level designers to understand the type of world or level that they are designing and building to ensure that the architecture adds the atmosphere intended for the game (Feil and Scattergood, 2005, p. 66). This was taken into consideration when designing and creating the levels for the game used for this research.

Linear and open level designs

Furthermore, Feil and Scattergood (2005, pp. 73-74) mentioned linear and non linear gameplay in levels. Levels that are linear are optimal for telling a story, since linear gameplay will help to tell the story it is meant to be told due to the lack of player freedom and choices. This is said to possibly create frustration since the player must follow the path that the level designer has created for them, even though it could be optimal for telling a specific story (Feil and Scattergood, 2005, p. 73).
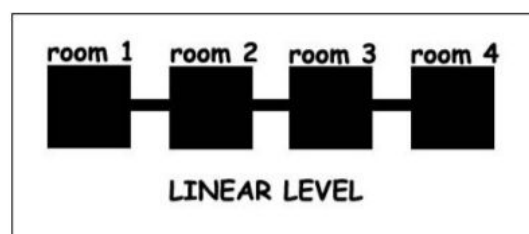
Figure 1 - Linear levels as described by Fiel and Scattergood (2005, p. 73).

According to Fiel and Scattergood (2005, p. 74) non linear gameplay is described to give a much better gameplay experience for some games. It is said that these games allow for circular movement since the player will not be interrupted by as many obstacles. It is however mentioned that a lot of nonlinear levels might be considered linear anyway, since every action that the player makes must be planned for in advance, which in turn ads more work in making the reactions for these possible actions (Feil and Scattergood, 2005, p. 74).
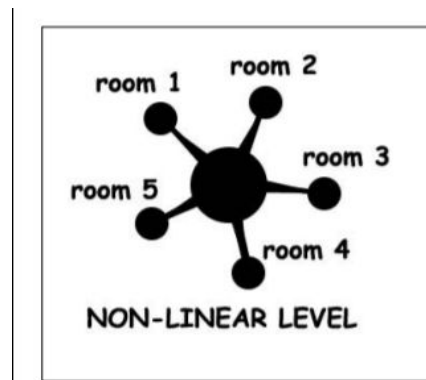

Figure 2 - Non linear levels as described by Fiel and Scattergood (2005, p. 74).

The game created for this research has one simple and linear level, with few environmental props and pathways for the player to navigate through, as well as one open level and non-linear level, with more detailed environments and several pathways for the player to choose. The traits of each different type of level design as described by Feil and Scattergood (2005) is the base for the design of the levels. The open level has more open spaces and the possibility to take different paths throughout the level. The traits of these level design theories were implemented in the design of the game made for this research to see if level design could have a possible impact on the horror experience.

Fear and Immersion

Player manipulation patterns

Boonen and Mieritz (2018) paper is about examining and identifying elements that are used to manipulate the agency of the player in horror games in order to see how they can be used to evoke horror within the player. Boonen and Mieritz (2018) define agency as an experience that occurs when desired player actions correspond to those supported by an underlying computational model. A small number of distinct horror video games was analysed through a qualitative approach and a model was developed

(2018, pp. 1-2). They have developed an Agency Parameter Model, it illustrates a hierarchical relationship between different categories used to manipulate agency. The three overarching categories are: Player Character Parameters(Psychological and Physical), System Parameters(Technical and Material) and Player Parameters (2018, pp 4-6).

Player Character Parameters: Concerns the factors that pertain to the player character.

System Parameters: Covers the constraints and affordances emerging from the games system and world.

Physical Parameters: Are what limits or enables the player from taking actions which are outside of or within the physical capabilities of the player character.

Boonen and Mieritz (2018, pp. 6-7) write that in the game *Left 4 Dead 2* (2008) the constraints are the zombies that limit the players freedom, one zombie cannot do much but a horde of zombies can greatly limit the players freedom of movement. The player can also be pinned down, dragged or get poisoned. This further constricts the player, all of the constraints in the game are dynamical, meaning that they are not in a fixed location and can move. The other game Boonen and Mieritz (2018, pp.6-7) write about is *Little Nightmares* (2017) which uses static constraints, meaning they are at a fixed location and cannot move. The player character is proportionally smaller than the game world which allows for interesting actions the player can take, for example, they can run through small passages and holes trying to escape the larger enemies that the player cant take down.

Psychological Parameters: Limit or enable the players actions through the player characters psychological capacity. In the game *Amnesia* (2010) the players character has a sanity bar that decreases when the player stays in darkness or is looking at the enemy, this poses numerous constraints on the player. The player can increase the sanity by being exposed to the light, due to the fact that the sanity goes up and down it is a dynamic Psychological Parameter (2018, p.7).

Material Parameters: Objects or enemies that restrict player movement, can also be environmental obstacles. Material parameters can be ammunition for weapons which are in the game *Dead Space*(2008). The player has to go through the level and kill the monsters while also managing his ammunition as it is scarce. If the player can manage their resources well then they will not have a lot of problems with the enemies but if they are low on bullets then the player will have to be careful where they want to go and how they want to deal with the enemies (Boonen and Mieritz, 2018, pp. 7-8).

Technical Parameters: Instances where player actions are simply not supported by the games computational model. In the game *Until Dawn*(2015) the player has limited choices in how to affect the game, the player cannot make a different action than the

one that is presented. Boonen and Mieritz (2018, p. 8) write the game *Layers of Fear*(2016) and how the game mechanics limit the player in exploration because many doors close behind them.

Player Parameters: Are an expression of the players abilities to execute their intended actions. In action-oriented games like *Left 4 Dead 2* (2009) challenges the players skill through its combat and action elements (2018, pp. 8-9). The player has to solve various puzzles, navigate the environment and escape enemies in the game *Little Nightmares* (2017).

Atmosphere

King (2015) conducted research on atmosphere in horror games and how it can be created to enhance the general game experience. Atmosphere is described as setting the mood, tone and style presented by the game scene (King, 2015, p. 1). It is mentioned that aspects such as lighting, sound, environment design and gameplay narrative can, if they come together in the right way, create a truly scary gameplay experience for the player (King, 2015, p. 1). King (2015, p. 5) states that fear of the dark is ideal for creating a threatening atmosphere. The lack of visibility for the player puts them on edge and they are forced to use their imagination (King, 2015, p. 5). Elements that obstruct visibility in general, for example fog, as mentioned by King (2015), further helps to create an effective horror atmosphere.

For the study conducted by King (2015), an original horror game was created that utilized the previously mentioned elements of atmosphere in order to understand its effectiveness. The results of the study indicated that the game created for the study lacked the implementation and combination of the previous mentioned elements and therefore partially failed in creating the desired atmosphere. King (2015, p. 38) further states that the impact of atmosphere on immersion could have been further explored. The game created for our research will therefore utilize these contributing factors on atmosphere to further evaluate on this topic, and the effects of these presented elements on player immersion and fear will be explored.

Auditory hallucinations

Demarque and Lima (2013) similarly studies horror games. The researchers focus mainly on audio and auditory hallucinations and what effects they could have on the player. Auditory hallucinations is said to be a form of disorder that makes players perceive as if they are hearing something when in fact they are not (Demarque and Lima, 2013, p. 19). The study itself aims to understand how auditory hallucinations

affect players in horror games. A simple horror game was developed specifically for the study. In the game, auditory hallucinations come in different forms such as ghostly voices and other unidentified noises (Demarque and Lima, 2013, p. 24). Ten participants took part in the experiment and then played two versions of the same game, one with auditory hallucinations and one without. A game that features auditory hallucinations have elements of unknown voices or noises that the player can hear, whereas there are no such elements in the other version. The participants then filled out a questionnaire with questions related to how they felt and the level of immersion experienced by the player. The result of the study showed that fear behavior and fear emotions were significantly affected by auditory hallucinations and that immersion, although affected, was not nearly as impacted by auditory hallucinations (Damarque and Lima, 2013, p. 25). Even though that was the case, it is concluded in the study that auditory hallucinations are an important element in horror games to increase fear and immersion in players (Damarque and Lima, 2013, p. 25). It is stated that immersion is a key factor to create fear in the players and that immersion can affect the players responses to Auditory hallucinations (Damarque and Lima, 2013, p. 25). Auditory hallucinations will therefore be utilized in our game to see its effect on fear and immersion.

Neuhold (2014) mentions the contribution of audio in survival horror games. It is stated that our auditory perception is always present around us, which means that the auditory space that surrounds us possesses the ability to immediately immerse the listener (Neuhold, 2014, p. 8). Immersion is also defined as, quoted by the author: "as losing one's self-consciousness and sense of time by so to say completely being absorbed. It is therefore a psychological state characterized by perceiving oneself to be enveloped by, included in, and interacting with an environment that provides a continuous stream of stimuli and experiences."(Neuhold, 2014, p. 3-4) It is further said that sound not only gives information about the origin of the sound, but about the environment that it travels through (Neuhold, 2014, p. 8). Neuhold (2014) writes that audio can lead players through the environment similarly to El-Nasr and Milam (2014). However, they focus primarily on level design and not audio. The conclusion from these statements is that audio in combination with different patterns in level design could help to guide the player through a level, while at the same time making the player feel immersed.

Dynamic audio and adaptive music are considered crucial for survival horror games. Three factors that are mentioned to create fear and suspense when it comes to sound. These are loudness, timing and localization (Neuhold, 2014, p. 12). It is also stated that involvement plays a crucial role in the subject (Neuhold, 2014, p. 13). Neuhold (2014) further concludes that music and sound is a crucial contributor to spatial and

micro involvement, but further insight is required to understand how these contribute to immersion.

Defining fear

Fear can be defined as an emotional response to perceived threats (Fritscher, 2019). In relation to our game, we focused on player reaction and emotional response to all of our implemented horror and level design elements. On the topic of fear, Ntokos (2017) presents a tool that can be used for defining different states of fear. Ntokos states that there is a need to categorize fear in order to help developers come together based on a common understanding of what fear can be in horror games (Ntokos, 2017, p. 33). It can, according to the author, help define the meaning of the word "scary" and that this tool can help developers who do not agree on what can be scary since fear is already pre-determined by the tool developed by Ntokos (2017). The tool presents ten levels of fear with each their own detailed description on what classifies under that fear level (Ntokos, 2017, p. 40).

1. **Calmness**
   Player is in a state of calm and can freely explore without the sense of fear
2. **Mild Anxiety (Nervousness)**
   Players are aware of the existence of the unknown than have contributed in possibly causing death. Player is intrigued.
3. **Moderate Anxiety (Vigilance)**
   Fear is setting in. Players have to be aware of the environment.
4. **Severe Anxiety (Restlessness)**
   Fear is giving the player trouble and the player must carefully observe and be aware of the environment and surroundings.
5. **Mild stress (Tense)**
   The player is starting to fear what the player cannot see or explain. Changes in the environment can contribute to more fear.
6. **Severe stress (Distress)**
   Fear is tearing apart the players ability to think logically and survival instincts start coming into play.
7. **Mild fear (Fright)**
   Quick reflexes and survival instinct are replacing reason and logical thinking completely. The player can now become scared through minor environmental changes.
8. **Severe fear (Dread)**
   Player focuses on avoiding the threat or danger.
9. **Terror**

Player either survives or does not. Quick actions have replaced the players ability to control their actions.

10. Panic

No sense of control whatsoever. Described as a "fight-or-flight situation". The player quits the game or removes the headset and puts down the controller.

With the help of the Agency Parameter Model (Boonen and Mieritz, 2018) we could limit certain parameters to induce more fear and stress to the player. Mild stress (Ntokos, 2017)can be induced with Material Parameters (Boonen and Mieritz, 2018) by moving certain objects when the player is not looking at them and block their movement or redirect them towards something.

Immersion

Tanskanen (2018) thesis is about how immersion affects the gameplay experience and how it can be achieved. According to Tanskanen (2018), immersion is constructed from different aspects, it is an experience, a combination of different elements. The author chose to use Calleja's explanation which is that immersion is a set of elements: kinesthetic, spatial, shared, narrative, affective and ludic (2018, pp.11-12).

Kinesthetic involvement: Controlling the game character/piece.

Spatial involvement: Exploration and navigation through the game spaces and environment.

Shared involvement: Navigating and interacting with other agents in the game and the awareness of them.

Narrative involvement: Deals with the story elements of the game, both scripted and those that emerge from the gameplay.

**Affective involvement:** Various forms of emotional engagement with the game.

Ludic involvement: The choices players make in the game and the consequences of those choices.

Tanskanen (2018) writes about how to communicate the game narrative with the help of objects, architecture etc. For example a room filled with dust and cobwebs tells that it has not been inhabited for a while. World narrative creates immersion through spatial and narrative involvement. Spatial immersion can occur when the player is moving through the game world and forms an emotional attachment with the world (2018, p.17). This is why careful level and game design can facilitate spatial involvement and can help the player feel more connected to the game world. Tanskanen (2018) explains that subtle evidence is enough to start telling a story, unopened mail or dying houseplants can indicate the long absence of a resident. It is encouraged to write an environment description document, which includes detailed

descriptions of the space in order for the game environment to be cohesive (2018, p.19).

Ermi and Mäyrä (2005) write about a gameplay experience model which is made up of three different components: sensory, challenge-based and imaginative immersion. The reason for their study is to assess potential uses for the model as a tool for research (Ermis and Mäyräs, 2005, p. 1). Challenge-based immersion can be related to strategic thinking or logical problem solving. According to Ermi and Mäyrä (2005) it is the feeling of immersion when one is able to achieve a satisfying balance of challenges and abilities. Imagination immersion is achieved when the player gets absorbed in the game and the stories, or begins to feel for or identify with a game character (2005, p.8). For our study we are going to focus on Ermis and Mäyräs (2005) sensory immersion which is the audiovisual execution of games, how fitting the sounds are to the given environment. If the games visual and auditory overpowers the sensory information coming from the real world, players can become more focused on the game world (Ermis and Mäyräs, 2005, p.7).

Fromes (2007) paper shows a model of emotional response based on two different roles players occupy during gameplay. He writes about four different types of emotion: game, narrative, artifact and ecological emotions (2007, p.832). Ecological emotions are generated when a player reacts to a game the same way they would react in the real world (2007, p.833). The sudden surprise that we get when something scares us is what Frome (2007) classifies as an ecological emotion. Frome (2007) mentions fear as one of the ecological emotions and gives an example that when we get scared in a video game, we may scream in fear but we do not run out of the room in fear. This according to Frome (2007) is because our mind has a number of systems that evaluate what we perceive. When playing a game the reasoning system and visual system come at odds when we suddenly see a ghost jump at us. The reasoning system tells us that the ghost is in the game and can't hurt us in the real world, but the sudden appearance of the ghost causes us to jump with surprise as if it was part of our real environment. The ecological emotion responds to what the game represents and responds to it as if it were real (2007, p. 833).
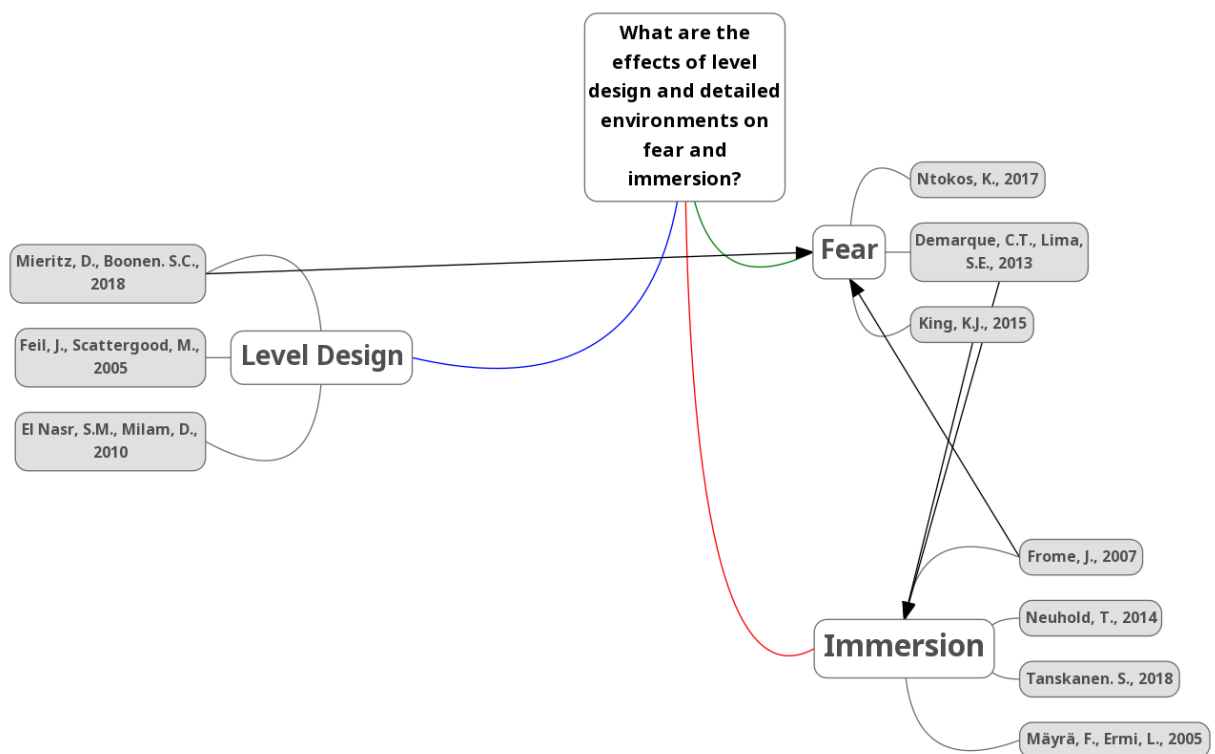
The literature map of the relevant research used in this paper. The connection between the articles and themes are presented in this map. Based on the research found, three themes were developed that are used as a base for the research.

Research question/Purpose

For this study we intend to study what contributes to a successful horror game, that being a horror game that manages to scare the players. The research question is specifically: What makes a horror game scary? The research question also has two underlying questions that need to be answered in order to further understand the design of these types of video games, which are:

1. How does level design contribute to the horror game experience?

2. What are the effects of implemented horror game design theories and horror elements on the player experience?

The purpose of this study is to understand how to design a horror game that can successfully scare and immerse the player while simultaneously trying to understand what actually resulted in the player getting scared in the first place. We hope that the result of this study will contribute to a deeper understanding in horror game design and that it can be used to design and create new horror games that successfully

implement these features and induce fear in order to create horror experiences in the future.

Methods

For this research study, stimulated recall interviews as described by Pitkänen (2015) was used as a means of data collection. For the data analysis process of the qualitative data extracted from the conducted interviews, a thematic analysis model depicted by Maguire and Delahunt (2017) was utilized. In the study, 10 people took part in a 15 minute play session separately from each other and in this research paper are referenced to as "participants". The participants were selected from Södertörn University in Stockholm, Sweden. We targeted students that had some experience in playing video games previously. The participants were between 20-30 years old, 3 participants were female and 7 male.

The House

A prototype game was developed specifically for this study in order to provide data on the stated research question. The game is called The House and is a horror game that features two different levels. One more open and advanced level, called simply level one, and one more simple and linear map, called level two. This was done in order to study if level design has any impact on the player experience as well to see if the implemented horror elements had different effects depending on the structure and appearance of that specific level. Both levels introduced the same horror elements in order to maintain a coherent design structure and to minimize any effect on the result between the two levels in terms of player reaction to specific horror events.

Features
All of the specific horror elements implemented in The House are unique in the sense that we designed and implemented some of them ourselves based on the theories of horror game design and level design. Although these elements are still entirely based on the research presented in the previous research section, stating that these types of events have an effect on horror and player navigation in the levels. These include

- Auditory hallucinations discussed by Demarque and Lima (2013).
- Theory of atmosphere by King (2015).
- Play manipulation patterns by Boonen and Mieritz (2018).
- Movement patterns by El-Nasr and Milam (2010).
- Level structure and appearance as presented Feil and Scattergood (2005).
- Definition of fear and level of fear tool presented by Ntokos (2017).
- Theory of immersion by Tanskanen (2018).
- Sound and immersion by Ermi and Mäyrä (2005).

We looked at how we could design a game by implementing these into the design of our game in order to create a game free from our own perceptions and assumptions of fear and immersion. The result of this was a combination of various different horror elements that all can relate to the research as well that fit into the general theme and design of the game.

When it comes to auditory hallucinations, various sound effects were implemented in order to increase fear as stated by Demarque and Lima (2013). We implemented auditory hallucinations that would fit the theme, world and design of our game. Auditory hallucinations in our game therefore among other things come in forms of human screams in the distance. Also things like ghostly whispers and footsteps behind walls are also implemented since all of these make sense and fit well into the design of our game. These sounds are not linked to anything and are just there to give a sense that there is something there when there is actually not. This ties directly in to what is done by Demarque and Lima (2013, p. 23) in their own research, as they also implemented auditory hallucination in the form of ghostly voices in their own game.

We further needed to make sure that the player felt immersed in our game. Immersion therefore comes the form of narrative and spatial involvement as presented by Tanskanen (2018) as well as sensory immersion as stated by Ermi and Mäyrä (2005). In *The House* the playable character is voice acting so that a form of narrative is present in the game. Players also need to explore the levels and have to think how they navigate the levels. Level two also lacks, based on Taskanen (2018), a clear world narrative, which level one has with things like more environment variation, blood splatter on the floor and broken and turned over chairs and candlelights to create a sense of realism to increase spatial involvement. This also relates to that mentioned by Feil and Scattergood (2005) and how a level should be believable based on structure, appearance and physics. We tried to implement a lot more in level one with furniture, corridor design and amount of objects that have realistically fallen over to create various forms of barriers and an underlying world narrative. Related to narrative is the subject of atmosphere as presented by King (2015). Environment design, sound and lighting were important features when setting the tone for the levels themselves. Combining that with the theories of level structure and appearance provided by Feil and Scattergood (2005) we created a level that implements and combines both features of level design and fear and immersion in order to have a game that should in theory successfully not only play well based on patterns of level design but also scare and immerse the players. This is further strengthened by the implementation of the "level of fear" tool presented by Ntokos (2017). To successively increase the level of fear in the players based on the level of fear tool we had each separate area within the levels introduce new and even more elements

intended to scare them so that every time the player progressed through the levels they would encounter something new and even more of these events each time. To implement different movement patterns presented by El-Nasr and Milam (2010) we introduced mechanics that required the player to pick up keys to progress. We also implemented batteries that the player can pick up in order to refill the flashlight that the player has in the game.

Player manipulation patterns as presented by Boonen and Mieritz (2018) are also partially implemented to fit the design of the game. Parameters like physical parameters, material parameters and player parameters are the most relevant patterns and all have a presence in our game. The parameters come in the form of a monster, which the player has to run away from and navigate around as well as navigate the environment in general with environmental obstacles being implemented as well as collecting batteries for the flashlight. This ties in to elements of level design that was implemented, specifically movement patterns like collection pattern and path movement and resistance pattern. These patterns state that players navigate though the level by picking up items placed within the level (El-Nasr and Milam, 2010, p. 140) which also refers to the batteries in the game as well as keys to the various doors that players can unlock. Also the patterns path movement and resistance pattern can be directly linked to material and physical parameters in the game with doors and obstacles blocking the players path, directly tying the implemented elements of level design and horror to each other. This means that our implemented horror elements can also be considered part of the level design.

Separating level design and horror elements

Since there are clear connections to some of the elements of level design and horror in our game, a clear definition is needed to what counts as level design and what counts as horror elements. According to Ernest W. Adams (In Eliasson, 2017, p. 4-5), the level designer constructs the experience that will be provided by the game designers, as well as designing the challenges and to set the mood in the level. Schell (2014, p. 343) further states that the level designers job is to arrange architecture, challenges and objects placed within the level to enhance the overall experience. Huaxin Wei and Chaoguang Wang (In Eliasson, 2017, p. 5) mention that the level designers job is also to guide the player through the game and decide the possibilities for the player to navigate and interact with the environment. This means that batteries and keys placed within the game world are considered, in combination with the patterns of level design previously discussed, part of the level design since they were partially implemented to guide the player to push forward through the level. It further has a clear connection to the material parameters mentioned by Boonen and Mieritz (2018) in relation to horror game design elements. However, since the batteries are required to play the game they are equally integrated in both of the levels in the game The

House. This means that the effects of these resources have been monitored to see if the other clear elements of level design have any effect on how players handle the resources between the different levels and how they reacted to various horror elements.

In short, keys, batteries and things like locked doors that block the player's path are formally considered part of the level design with underlying connections to horror elements like physiological parameters and atmosphere, specifically darkness and lighting. Therefore the resources present in the game will be considered objects of level design and will be compared in that sense based on the present theories of level design. However, the effect of these resources on the horror experience will also be separately compared with other horror game theories and the scripted horror events in the game.

Data gathering

For the data gathering process the method stimulated recall was used. According to Pitkänen (2015), using this method allows the participants to confront their actions directly while watching back on the recorded footage. It is stated that the method reduces potential forgotten thoughts of what happened because of this, making it an effective method in that sense (Pitkänen, 2015, p. 119). A downside however could be the presence of a camera and the possible effects it could have on the participants, for example making them nervous which in turn could affect their natural behaviour. It could also be the case that participants might try to explain or rationalize their actions without knowing what they were actually thinking (Pitkänen, 2015, p. 120). According to Pitkänen (2015, p. 120), there are six steps that describe the implementation of stimulated recall in game research scenarios, which makes it ideal for this research.

1. **Understanding the game**

It is considered important for the researchers to understand the game on which the research is conducted. This includes what choices players can make for example (Pitkänen, 2015, p. 120). In the case of this research, this was not a problem at all, since we ourselves created the game specifically for this research, which gives us a total understanding of the game and its systems down to its foundation.

2. **Understanding the idioculture of the gamers society**

It is stated that if the game has any social integration or if it is played in the group, this step is relevant since it might affect the playing experience. This needs to be considered in order to understand player decisions in certain social and group scenarios. Our game was an isolated experience for the player in the sense that they

played alone with a pair of headphones on during the play session. In our case, the ideoculture was not something that was considered during the data gathering process.

3. Recording the game

In this part of the process, the participants need to be informed that they are being recorded. It is mentioned that participants may feel awkward at first when being recorded but get used to it after a while (Pitkänen, 2015, p. 121). During the recording process, the researchers need to take notes of things that might be relevant for the research. It is further stated that it needs to be decided if both screen recordings and player reactions are necessary (Pitkänen, 2015, p. 121). In the case of our study, the recording of the game and both player reactions were deemed highly necessary in order to understand the effects that the game had on the players.

4. Planning the interviews

The researchers must decide which parts of the recorded material is important for the research. During the play sessions, specific points were marked in the recorded footage which was later used during the interviews. It is stated that the interviews should take place shortly after the recording session and that the recorded material should be edited in order to only contain the relevant material (Pitkänen, 2015, p. 122). In the case of this study however, the video material was not edited and the interviews took place right after the recording session. The interviews were somewhat planned beforehand with warm up questions, finishing questions and general questions that were asked depending on which situation. The warm up questions were:

- How often do you play games?
- Do you often play horror games?
- Do you like horror games?

These questions were meant to set the mood for the interview and prepare the participants for the following questions. The following general question would often depend on the situations. However, some general questions were planned beforehand that were often used in the interviews.

- What were your impressions here?
- What did you feel at this moment?
- Why did you react that way?
- Why did you choose to go that way specifically?
- What impression did this part of the level give you?

All of these questions were meant to be asked depending on the situation. Some of them were used extensively, for example "what were your impressions here?". Questions like "What impressions did this part of the level give you?" were not frequently asked since the participants would describe their general experience of parts of the levels anyway. When it comes to the finishing questions they were a bit different between the different levels. Level one had one extra finishing question. This question was part of understanding the impact of level design, specifically open level

design and player behaviour in situations where they were free to take several paths through different areas of the map.

Level one questions were:
- What impacted your decisions when navigating through different parts of the level?
- What motivated you to keep pushing through and making progress in the level?
- What were your general impressions of the level?

The level two finishing questions were just the last two of the same line of finishing questions, since there was no emphasis on different paths that the player could take, the reason being that there was only one path leading to the objective in that level.

5. Interviewing the informants using stimulated recall

The interviews followed the stimulated recall method thoroughly. According to Pitkänen (2015, p. 122), stimulated recall interviews are often semi-structured which is said to be an interview structured to accompany the video with questions that refer to specific actions in the video material. We started with some warmup questions to make the participants feel comfortable. We focused on having less of a formal interview to make it easier for the participant to express themselves however they wanted and to feel comfortable doing so, following the guidelines presented by Pikänen (2015).

6. Analyzing the interviews

The researchers then have to choose how to analyze the data to fit the goal of the study (Pitkänen, 2015, p. 122-123). The final material was later analyzed using a thematic analysis. The model for analysis that was used for this was the thematic analysis model presented by Moira Maguire and Brid Delahunt (2017) which will be presented below.

Data analysis

Like mentioned above, thematic analysis as presented by Maguire and Delahunt (2017) was used as a method of data analysis. This method is considered flexible due to the reason that it is not tied to any specific theoretical perspective (Maguire and Delahunt, 2017, p. 2). The goal of conducting a thematic analysis, according to Maguire and Delahunt (2017, p. 3) is to identify themes and patterns in the qualitative data that are relevant for the research question and to further make sense of that data. Maguire and Delahunt (2017, p. 2) mention that in the method, patterns have to be isolated from the qualitative data by the researchers. These patterns further help to develop themes that are used to later create a thematic map. According to Maguire and Delahunt (2017, p. 4) there are six phases to the thematic analysis process.

1. **Become familiar with the data**

For this process, the transcribed interviews were thoroughly read several times before the process of generating codes. This was done in order to understand what the participants said and what was deemed relevant to the research.

2. **Generate initial codes based on relevant and interesting features in the data.**

In this stage, the data need to be organised in a systematic way by coding relevant data together into small chunks of meaning (Maguire and Delahunt, 2017, p. 5). After one transcribed interview was thoroughly read, codes were generated that represent recurring and relevant terms that will further be used to create themes. This process was done on all of the transcribed material.

3. **Search for themes. It is stated that in this stage of the analysis process, the codes are grouped together into themes.**

The themes are meant to capture significant or interesting features about the data and are categorised by its significant relevance to answer the research question (Maguire and Delahunt, 2017, p. 6). In our case, codes that had things in common were grouped together to get a better overview. An example would be scared and fear as they both have horror in common.

4. **Review the themes and codes**

Maguire and Delahunt (2017, p. 8-9) mention that at this step, the themes are reviewed and the data associated with each theme is checked to see if it actually supported the theme. The codes and themes were looked through and the data was read again to see if they match together and if the themes described the data. Codes that were relevant to the formation of themes were kept while those that didn't were discarded.

5. **Name and define the themes.**

Lastly the themes should be named and defined. The connection between the themes should also be defined and clear (Maguire and Delahunt, 2017, p. 11-12). The theme names should describe the theme so that even someone who wasn't part of the study should be able to see the names and get a good initial understanding of what it is about. Two main themes were extracted from the data, with seven sub-themes, which can be seen in the thematic map presented in the result.

6. **write the report**

The final step includes writing a report with the use of the data extracted using the method (Maguire and Delahunt, 2017, p. 12).

Result

Our empirical data indicate that there are certain elements that contribute to the generall player experience. Based on the analyzed data there are certain factors of level design that contribute to the horror game experience. These include specifically Collection pattern and pursue AI-pattern by El-Nasr and Milam (2010). Participants would often base their movement around enemies as well as objects placed within the level.

> **Interviewer:** So you were trying to avoid the monster somehow?
> **Participant 7:** I tried to dribble him kind of unconsciously but also consciously since it worked ... sort of. I understood that I was luring him away from his path as well.
> *authors translation*

Level appearance in relation to world narrative and immersion by Feil and Scattergood (2005).

> **Interviewer:** Was there anything in the appearance of the level that contributed to what you felt?
> **Participant 6:** God I don't know .. I think it was eeeh... but that it was so run-down and that you could not like see since it was pitch black. I think it was kind of the whole atmosphere in general…
> *authors translation*

These elements are also in this scenario, part of what enhances the effect of some of the horror elements within the game, like darkness and atmosphere as well as immersion as stated by participants.

> **Interviewer:** Was there anything in the level appearance that you reacted to?
> **Participant 7:** Yes it is color red and the darkness. I do not know it will be a little scary as well. It was at a point I clicked on a door and then all the noise disappeared for a while ... i thought maybe I could turn off the flashlight but it felt like I was moving as well, but it was a good map actually.
> *authors translation*

However there was no significant difference observed between the two levels created for the game on player reaction and behaviour. Some differences were observed which will later be discussed, but no major difference was observed from the analyzed data that significantly impacted the result, indicating that the theories used to create the two levels are not as effective at contributing to the horror experience as other relevant theories of horror game design. The connection between these themes can be viewed in the thematic map presented below, which was derived for the analysis of the codes that were extracted from the interviews.

The effects of implementing these horror game design theories proved extremely important for the game experience. Participants would a lot of the time mention specific events that were created based on the theories used to create the game, proving their importance. The implementation of proven horror game theories that do contribute to making a scary game, were therefore, extremely successful and a major contribution to the horror experience.

Things that contributed to making the game scary were a combination and composition of various in game events and features which were, as mentioned, based on proved theories that stated that it would be successful. These are presented in the thematic map below, which includes sound, darkness and light, expectation and anticipation, atmosphere and immersion, level and environment and feelings.

Participants could however become frustrated when the flashlight ran out of battery, which led to an immersion breaking experience for them. Players would further say that darkness contributed to the atmosphere.

Interviewer: What did you feel added to the atmosphere?
Participant 4: I would say it's the music and the darkness .It was hard to see, but if it was bright, I could ofcourse see. Since there were dark corners and all of that made it hard to tell if it was dangerous or not.
authors translation

Some participants also had higher expectations in relation to some of the horror elements, and when these expectations were not met it resulted in them not becoming as scared as other participants.

Interviewer: What were your thoughts here? Feelings?
Participant 1: It was cool… I dont know… I was prepared that something more would happen, but it didn't.
authors translation

It was further shown that the motivation for participants to progress in the game was based on collecting keys and batteries and to complete the game itself.

Interviewer: What motivated you to make progress on the level?
Participant 5: It was kind of like finding the keys that were hidden to unlock the red door, because I thought as soon as I unlocked the red door the game was over, I thought so, but it turned out it was not.
authors translation

Participants stated that sound contributed to the build up of fear and they commented that the noises became scarier the further they went into the game.

Interviewer: What did you feel here then?

Participant 7: There were other footsteps than my own there, I felt like something is behind me like what the heeeell I thought I had to run but then I thought maybe it is just a sound effect trying to trick me haha. But it was hella good, I was scared. *authors translation*

All of the themes will be further discussed and analyzed based on the theories used as a foundation for the creation of the game. In the discussion section of this paper all of the quotes from the participants are translated from Swedish to English, since the interviews themselves were conducted in Swedish. Below we can see the thematic map that was derived from the developed themes. The themes include:

- Fear
- Level and environment
- Atmosphere and immersion
- Darkness and light
- Motivation and progression
- Strategy
- Sound and immersion
- Expectation and anticipation
- Feelings and build-up

All of these themes will be compared and analyzed in relation to the empirical data derived from the data analysis as well as the previously discussed research.

Thematic map

Discussion

Feelings and build-up

The majority of the participants all mentioned how they felt that we slowly built up the scares up until the point where they finally saw the monster. When designing the levels, the design was based on trying to build up the horror in stages. The last stage Ntokos (2017) presents is panic, which is described as a "fight or flight situation". Participant 6 took their hands off the controls when they first saw the monster. Participant 6 also stated that they felt that if they saw the monster earlier in the game they might not have been as scared as they were with the horror build up that was present.

> **Interviewer:** What is the whole thought process here?
> **Participant 6:** Yeah yeah I feel scammed. The scream was like the warm-up and

then ... he is just like walking there so he doesn't look so scary now when you look here, I was like: NOW I am being chased. Ush. Well I just think I was panicked, pure panic.

Interviewer: Would it have done anything if you had seen the monster before in the game. Had it made it less scary in any way?
Participant 6: Yes I think so, I just went and waited and then there were only smaller hints that soon it will be soon it will be so it like built up and i thought that soon I will have to run haha.

Participant 7: Everything is like this shows up new things all the time it builds up like you get more and more scared all the time and then the thing with the doors then .. You think there is someone there as well but aa…

Interviewer: How is it that?
Participant 7: Think that it was that you gradually built it up first it was the footsteps you asked okay it is nothing and then asked screams then it triggered a little neighbor and then it became more and more you became more receptive to it in the end as well.

Participants experienced different feelings during certain horror elements that can be connected to the presented horror game theories. Even if the participants were aware that they were playing a horror game the majority of them were curious enough to enter rooms in which they saw something strange or heard sounds coming from them. The participant hasn't experienced anything scary yet so they are rather in a calm state and can freely explore the level as stated by Ntokos (2017) their fear level is at stage 1.

Interviewer: What did you feel here? Because you went around the corner and saw something flash?
Participant 4: What stood out with that was that the door was gone, in comparison to the other doors. I was a little alerted because there might be something inside. I just wanted to be sure and see.
Interviewer: You weren't afraid of walking inside?
Participant 4: No, not like that. I was aware of it with the thought that the door was gone, but I was not afraid.

During the play session majority of the participants showed different levels of fear. Some participants seemed unfazed and showed almost no notion of being scared. According to some of the participants it could be due to the fact that they watch a lot of scary movies and are more interested in watching.

> **Interviewer:** You didn't react characteristically you were unfazed?
> **Participant 10:** You mean that I was stone-faced? Yes, but I'm stone-faced when I watch horror movies too. I think it's more interesting to watch .. How it looks then ... like how it's done. No, but I liked it.

Some participants got frustrated when their flashlight ran out of batteries and expressed that the level got too dark for them to be able to navigate through. This can contribute to breaking the players immersion and lead to a generally negative experience. If we look at the thematic map, darkness and light is connected to atmosphere and immersion. King (2015) says that lack of visibility puts them on edge but our research shows that there is a clear line between lack of visibility and barely any visibility in which the latter doesn't create an atmosphere and just frustrates the player. One participant in particular became frustrated when they died and had to start from the beginning.

> **Participant 8:** To see, because you see nothing on certain occasions. Here it was just dark so I was like where the hell should I go.
> **Interviewer:** Were there any emotions you felt in connection with darkness?
> **Participant 8:** Like fear or a little frustration because i couldn't see anything.
> **Interviewer:** Was it due to the lack of guidance?
> **Participant 8:** Yes and because I couldn't interact with many things. You can pick up stuff and open doors, but it feels like you should be able to interact with more stuff. But it may be that I'm used to other horror games, such as amnesia where you can interact with the environment.

Darkness and light

Participants would often reference darkness and light in various situations. Participants would often reference that darkness contributed to setting the mood for the whole game experience and contributed to players anticipating that something would happen when it was dark.

Participant 6: It's just because he says the flashlight is gonna run out i was like nooo.

Interviewer: How come you want the flashlight?

Participant 6: oooh I don't know, maybe because i can't see haha.

Interviewer: How come you would use the flashlight even though it's already bright here?

Participant 6: Haha i thought I would save it but i was like screw it i feel better with the light on.

Interviewer: How come?

Participant 6: Because i think it's really scary with blinking lights, so i would rather have my own light to rely on.

Interviewer: Even if it was bright you still had the flashlight on.

Participant 2: I didn't think about it. When the light is on I feel like i want to keep it on until I run out of battery completely, only because I feel safer when it is turned on because i don't want to turn it off all the time because it just feels creepy.

Interviewer: Without light it feels creepy?

Participant 2: Yeah, but it's also that you feel more safe when you have a light you can control, otherwise it's you guys controlling it which makes it feel like you can put things in the corners where there is barely any light so it feels better if i myself can shine a light there.

This is directly connected to what King (2015) mentioned about the atmosphere who states that fear of the dark is ideal for creating this hostile atmosphere (King, 2015, p. 5). This proves that we successfully managed to implement darkness as a form of horror elements since many of the participants thought it contributed to making them scared. Participants would further go on to say that they felt safe in the presence of the flashlight and light in general and would react when they were almost or completely out of battery, making them feel uneasy without the light. This also shows the connection between the material parameters of player manipulation patterns discussed by Boonen and Mieritz (2018) and the batteries as objects of level design based on the collection pattern mentioned by El-Nasr and Milam (2010). The batteries act as a necessary resource that protects the players from the darkness and has to be carefully managed in order not to run out. They further act as a middle ground between level design patterns and the presented horror game theories. Without the batteries, the players would feel uneasy and scared, and the fear of the unknown would rule.

> **Interviewer:** How come you reacted this way?
> **Participant 3:** I was out of battery. I then felt either you can use the flashlight as a weapon or there are more batteries around. It is one of those games where it's usual for the batteries to run out fast and you should not waste and all of that, but you feel so safe with the flashlight.
> **Interviewer:** How come you feel safe with the flashlight?
> **Participant 3:** Because you see, you are afraid of the unknown, it's what you cannot see that is scary. If i can see that there is a door there it is no longer uncomfortable.

> **Interviewer:** What motivated you to make progress in the level?
> **Participant 9:** You wanted to get out of the house. It was to find keys. I was mostly interested in finding batteries because I didn't know when the flashlight was going to run out.

With the batteries the players felt as if there was a need to progress in order to collect them to keep the flashlight alive. As stated by El-nasr and Milam (2010, p. 140) this relates to the collection pattern of different push and pull mechanics since the batteries act as a reward for navigating further and making progress in the level. The batteries are therefore concluded to be a successful implementation of both level design theories and horror design to create a game that has the possibility to scare the player. The use of darkness further led to the players expecting and anticipating something more than just the darkness itself. Players started thinking that in the darkness there was going to be something more which led to a lot of anticipation and expectations. In this scenario, no difference was observed between the players and their behaviour between the two levels. Participants who played both level one and level two stated that the batteries were something that they were looking for, and that they kept them pushing forward in order to find new batteries. It can be therefore concluded that darkness and light and the implementation of batteries to strengthen both horror and level design elements of the game were successful at frightening the participants and is further deemed as a major contributor to the overall horror experience.

Expectation and anticipation

A side effect of the darkness and a majority of the horror events was that players would expect something more to happen, thinking that they would get attacked, that someone was standing in the darkness or that they were in mortal danger.

> **Interviewer:** What was your reaction here?
> **Participant 2:** I thought there would be a nasty demon dude there, the light was blinking and all of a sudden when it was blinking there would be some nasty figure standing there.

There were also participants who did not actually react to some of the horror events in the game as much as some of the other participants. These participants always expected something more from the game and therefore had pretty high expectations. One participant didn't feel like the environment was threatening enough. The horror elements didn't have any effect on her and she always expected a monster of some sort in the early stages of the level. When that monster never showed up until late in the game she felt like nothing happened and she did not pay attention to the other effects much. This further means that she did not become affected by the elements of atmosphere mentioned by King (2015) as the sound effects, gameplay narrative and lighting did not seem to contribute to the participant becoming scared.

> **Interviewer:** When you first saw him, what did you feel then?
> **Participant 5:** I was expecting something to happen, because it was to… the level felt a little monotone, nothing really happened except for some screams and footsteps and stuff, so I was like: okay, there are no monsters or zombie or something that can attack me, but then I was like: okay there is a monster, so I thought it was programmed not to reach me from there.

This means that play expectation and anticipation could heavily affect their reaction to elements of the game design and horror elements. The participants who would expect something and later be disappointed by the end result of that specific scenario would not be as scared moving forward as other participants which relates to their sense of immersion and perception of the atmosphere in the level.

Atmosphere and immersion

When it comes to the atmosphere, participants would mention that the whole look and sound of the game quickly set a dark and unsettling atmosphere for them.

> **Interviewer:** What did you react to here?
> **Participant 4**: I reacted to the sound que ending and that the atmosphere… it was constantly the same volume so you are extra tense, like now something is happening. Without knowing what, like I said earlier, the atmosphere was a bit creepy since I connected this silence to something uncomfortable.
> **Interviewer:** Vad did contribute specifically to the atmosphere?
> **Participant 4:** I would say the music and the darkness. It was hard to see, and if it

> is really bright I can see everything, but since there were dark corners it was hard to know if it was a safe area or not.

Participant 4 states that darkness and music were a big contributor to the atmosphere. This also relates to anticipation and expectation, since participants also mentioned that they were expecting danger in relation to the darkness. This means that participants who would expect danger in relation to the darkness felt like there was a haunting atmosphere present in the game. This falls in line with what King (2015, p. 5) states about darkness. King (2015) says that fear of the dark is ideal for creating a threatening atmosphere, and since a lot of the participants previously mentioned that darkness contributed to the horror experience it can be concluded that these participants also felt that the atmosphere was threatening. The players who felt a threatening atmosphere also felt immersed in the game. This since they directly often referenced world narrative and spatial involvement mentioned by Tanskanen (2018). This further helped to increase the feeling of a threatening atmosphere in the participants.

> **Interviewer:** What were your general impressions of the level?
> **Participant 4:** I thought that there was in general a really good atmosphere and a well made house. You could really feel like you were in a big hotell-ish place with all the old interior in the rooms. I liked the atmosphere, it really fit in.

> **Interviewer:** In what way did the details on the level affect the experience?
> **Participant 7:** Everything from broken panels on the floor and things that move and sound contribute to the whole thing.

It can also be said that the participants who had high expectations as previously mentioned did not feel liek the atmosphere was threatening. Participant 5 mentioned that since there was no monster early on when the game was supposed to set the mood for the whole experience which concludes that there was no feeling of a threatening atmosphere in this case. This means that when the player doesn't feel any sense of atmosphere, the level of fear experienced from the other horror elements drastically declines. A majority of participants would further go on to mention sound and music and the impact it had on the horror experience as well as on immersion and atmosphere.

Sound and immersion

Sound was a major contributor to the feeling of immersion and to the general horror experience according to a large majority of the participants. Participants would try and

picture what the sound came from and would feel threatened by some of the horror events related to sound.

> **Interviewer:** What did you feel here?
> **Participant 4:** It became much worse than usual just because you heard a girl scream, it was an indicator that there was something dangerous in here. There is something here in the house and destroying things.

All the sounds would further build up the horror experience for the players, which means the level of fear tool presented by Ntokos (2017) is relevant in relation to the sound effects as well as implemented auditory hallucinations would further build up the level of fear experienced by the participants.

> **Participant 7:** I was more scared than I thought I would be.
> **Interviewer:** How come?
> **Participant 7:** I think you successively build it up, first it was footsteps and you were like okay thats not bad and then just screams that triggers it a bit more and after that more and more you were more susceptible towards the end of it I feel.

The implementations of auditory hallucinations and music in the game would also in turn affect immersion and atmosphere.

> **Interviewer:** How did the sound add to the level? How did they affect each other?
> **Participant 7:** Everything together was awesome with the underlying dark music and then the other sounds on top of that and then footsteps everything was believable that was great.

According to Ermi and Mäyrä (2005) this would fall under sensory immersion which as previously mentioned is how fitting and realistic the sound is in relation to the environment. Participants would comment on the well executed implementation of auditory hallucinations and would according to the participants themselves feel a sense of sensory immersion based on the nature of the auditory hallucinations in relation to the look and atmosphere of the levels.

> **Interviewer:** What did you feel here?
> **Participant 4:** I was worried over the creature and the sound and the voices all around. You did not know if they were going to do something or not. It was just more and more panic. It's just that with the atmosphere and music, it build up the atmosphere so creepy which made it so that I wanted to leave this area super fast.

Based on the statements from the participants, auditory hallucinations did have an impact on the sense of immersion and atmosphere, contrary to the research conducted by Demarque and Lima (2013) where they state that auditory hallucinations did not nearly impact the feeling of immersion as much as expected. Like our research however the participants were more scared by in relation to auditory hallucinations and based on our result as well as the result presented by Demarque and Lima (2013) it can be concluded that the implementation of auditory hallucinations is an effective method of instilling fear in the players, more so when it affects atmosphere and immersion which it did in our case according to the qualitative data gathered from the transcribed interviews. Many of the participants further noted that they felt a heightened sense of fear when wearing a headset.

> **Participant 6:** It doesn't look as scary nooooow when watching but it was much more scary with headphones on.

This relates to sensory immersion as mentioned by Ermi and Mäyrä (2005). They mention that if the visual and auditory aspects of the game overpowers the sound from the real world players can become more immersed since they focus more on the game. This was the case in our study. The first participant did not wear a headset while playing our game due to the lack of a headset during the first play session. Because of this he was not at all affected by the auditory hallucinations and lacked a clear sense of immersion while a large majority of the other participants were more immersed and were affected by auditory hallucinations.

> **Interviewer:** What was your reaction here?
> **Participant 1:** I could relate the sound to anything haha. Just like previous sounds I could connect the sound to anything.
> **Interviewer:** Do you think it would be different if you wore a headset?
> **Participant 1:** Yes, because then I could hear where the sound is coming from maybe.

This would further result in the participant only becoming scared from the sudden appearance of the monster and the darkness in the game, meaning that wearing a headset is a crucial part of becoming immersed in the experience and in turn be affected by the presence of auditory hallucinations and the general atmosphere as similarly stated in the theory of sensory immersion by Ermi and Mäyrä (2005).

Motivation and progression

The participants had different motivation for progressing through the game, some wanted to beat the game, some were motivated by finding keys and some just wanted to get out of the house. There was a clear collection pattern amongst the majority of the participants (El-Nasr and Milam, 2010, p. 140).

Interviewer: What motivated you to keep making progress on the level?
Participant: What motivated me was to get out of there and I wanted to survive, of course. But otherwise, I would probably say to avoid the danger. In the beginning, it was not urgent to leave, until I came to the end and found the last key. Then I ran fast as hell.

Some players found it difficult to navigate through the level because of how similar everything looked but also the fact that the second level had less light. This could be immersion breaking if the player gets frustrated.

Interviewer: What influenced your decisions as you walked around different parts of the level?
Participant: I had to find keys, the biggest decision was whether it was locked or unlocked doors. With the idea that everything looked so similar, it was difficult to find any kind of simple path in the beginning. I had a very hard time knowing if I was here or not. The only indicator was whether doors were open or not. Otherwise, I found no good way to keep track of entire areas. But I thought I could build a mind map of the area towards the end after the red door made it a little easier.

Interviewer: Did you think it was too little batteries?
Participant 2: Yes, well, it might have been the right amount of batteries, but it felt like it was getting too dark in some parts for me to orient myself. Some parts taught me to recognize them when I went through them three times and then I felt I think I was here before, but it was hard to see what was in the rooms.

Strategy

During the first part of the game players went from room to room searching for keys and exploring because they didn't think that there was anything walking around the house looking for them. After seeing the monster they changed their strategy, instead of running around the level they were more cautious about going around corners without looking. Some participants tried to come up with a strategy if the monster would manage to get in the room they were in. This relates to the pursue AI pattern

mentioned by El-Nasr and Milam (2010) and states that players base their movement in response to friendly or hostile characters.

> **Interviewer:** What was the thought process?
> **Participant 3:** I was like okay, now I am backed into a corner because now he has seen me, the doors were wide open, I do not have time to close them because he was so close so I just ran in and then I thought I will evade him around the kitchen island. If he had followed me I would have tried to walk around until I tried to run out.

> **Interviewer:** You reacted to something it looks like?
> **Participant 10:** I started going down and I thought that this is the basement but I had already been there but thought this is a magic house so it may have appeared something new there so I would just double check ... I actually planned in the beginning here to boast and not take all batteries, because I thought I would have to go back.

The collection pattern was used to reward players for navigating through the level (El-Nasr and Milam, 2010, p. 140). The first reward was the key which is used to progress through the level and the second reward was the batteries for the flashlight. Some participants pointed out that their strategy was to pick up batteries and keys and then find the door that fit the key. The participants continued the process until they finished the game. Here it can be concluded that implementing the discussed navigational patterns of level design can be effective and motivating and guiding the player through the levels. Participants would base their movement around the presented movement patterns and would look for keys and batteries which naturally lead them to push forward and later avoid the monster in the game. However like previously mentioned, this needs to be balanced or players might become frustrated as in some of our cases where participants would be frustrated since they could not find any new batteries, basically ruining the experience for them almost entirely.

> **Interviewer:** What influenced your decisions as you walked between different parts of the course?
> **Participant 1:** I tried to go to places where I had not been to pick up batteries and keys. Ehm… then I tried to avoid monsters at the same time… and then every time I got a new key I went back and tested the first door that opened.

Level and environment

According to King (2015) environment amongst other things, if done correctly, can create a scary gameplay experience. This in combination with the use of scary sounds resulted in many participants feeling afraid of just going inside a room because of how it looked. This also goes hand in hand with Ntokos (2017) 4th level of fear which is: **Moderate Anxiety (Vigilance),** fear is setting in. Players have to be aware of the environment. Because the participants start paying more attention to the rooms they are in and try to read into every detail so that they don't get suddenly surprised by a monster appearing or hearing some sounds. The players get immersed in the game through spatial involvement (Tanskanen, pp.11-12) by exploring the environment.

> **Interviewer:** What was your reaction there?
> **Participant 2:** I thought there would be some disgusting guy, the lamp flashes and then all of a sudden when it flashes you suddenly see something nasty standing. The sofas sat so it looked like there could be some cult gathering where they meet and decide who to sacrifice, so I was like aw fuck. I don't think I had any battery in the lamp then either so I thought if it goes out completely I'm fucked.

> **Interviewer:** So you were constantly expecting something ...
> **Participant 6:** yes this is the typical horror movie thing that one should focus on the late ba: reee haha. I run so damn far too haha.
> **Interviewer:** Did you feel anything special there?
> **Participant 6:** First you go in that direction, there was that scary scream and the cross. Thought I was going to the other side because it might be the quiet side and so I thought it was scary up there because it was big and open. Thought then that I was going towards the smaller room for the small room so far has been quiet, but then asked pooof, then thought that maybe there is something there as well as ba: i'm surrounded.

Cleaver position of furniture and other objects seemed to tell a story of what happened in this house, at least according to some participants. This is what facilitates spatial involvement and contributes to immersing the player (Tanskanen, pp.11-12). There was no significant difference in how scared the participants were between the two levels, but participants playing the first level did comment more on the way the level looked.

> **Interviewer:** What was it that you felt contributed to the atmosphere?
>
> **Participant 4:** I would say the music and the dark. It was hard to see if it was really bright so I see everything, but the thought of it being dark corners and everything like that, it was hard to know if this was a safe area or not. Then too, but the thought that all chairs and furniture had been put away, the walls collapsed and stuff, it felt like something had happened here, something violent. I wanted to know if it was still here, if it was safe. So that's why I got a little higher alert right then.

Some participants commented that the second level (linear level) felt pretty straight forward and they felt like they couldn't go the wrong way even if they wanted to. This signifies that there was some difference in terms of open and linear level design, although not a significant enough difference to significantly impact the result of the study.

> **Interviewer:** What were your general impressions of the level as a whole?
>
> **Participant 9:** It was pretty well constructed. I really couldn't go in the wrong direction even though I tried to go in the wrong direction with will. I wanted to see if you could fuck it up.

However, they did also mention the details in the environment, although not as much as the first level. This further signifies that the design of the levels themselves were not as important as the horror elements that were in the game.

> **Interviewer:** What was your reaction here
>
> **Participant 2:** The couches were put together so that there would be some sort of a cult where they meet and decide who to sacrifice and stuff, so I was like aah screw it.

Theoretical implications

There can be said that the discussion and the result present some relevant theoretical implications that are relevant for the subject. First of all, the research study indicated that utilizing and combining elements of level design and horror can be successful when creating and designing a horror game, as seen in the original game created specifically for this study. It is also said that level design theories on their own are not as important in horror games as other elements of horror, which can be taken in consideration by game designers. This indicates that focusing on designing a horror game solely based on things like open and linear level design and level appearance as mentioned by Feil and Scattergood (2005) would not be effective alone would not

suffice, even if Feil and Scattergood (2005, p. 65) notes that there should be, as they mention differences in storytelling and navigational differences. This means that according to this study, game designers should focus more on successfully implementing horror elements that are proven to scare the participants rather than level design, like setting an unsettling atmosphere, with dark environments and auditory hallucinations and music. According to the results of this study, the ideal situation would be combining the presented theories of level design and horror in order to create a wholesome horror experience, which really should be taken into account in the design of future horror games by game designers. It should further be noted that wearing a headset is crucial for the gameplay experience according to this study. Game designers in the future should take this in consideration and highlight it as a crucial part to truly experience the game.

Implementing and combining elements of auditory hallucinations in the form of various unidentified sounds as stated by Demarque and Lima (2013, p. 24) with darkness and atmosphere, like environment design and level design patterns like the pursue AI-pattern and the collection pattern as previously mentioned by El-Nasr and Milam (2010) as well as manipulation patterns, specifically the material pattern (Boonen and Mieritz , 2018) This pattern does, in turn, go well hand in hand with the level design patterns by El-Nasr and Milam (2010), and all of these combined should be considered a framework and a template in the design of horror games in the future.

In order to see clear differences in what is scary, future studies should create more levels that each focus on specific horror elements in order to have a clearer understanding of their effects on players. The levels could have even more significant differences between them. One level could be a lot darker, another one can be void of sound effects, third one can be without ambience sound e.t.c. Future studies should also put more focus on level design in order to understand its effects even further. Doing this will allow researchers to focus on specific horror elements instead which might generate results more suitable for understanding and designing more immersive and frightening horror games. Some research could also be done on what type of audiosource (headset/speakers) is best suited for immersing the player to further understand its impact on the horror game experience.

Conclusion

In conclusion, our research study shows that level design did not have any significant contribution to the horror game experience in terms of it being a linear level or an open level design. The research showed that detail in terms of objects being placed around the level has some contribution to the atmosphere but it did not affect the level

of fear that the participants expressed in relation to the implemented horror design theories. Participants would navigate the levels based on the collection pattern as discussed by (El-Nasr and Milam, 2010) and would base their navigational decisions on collecting batteries in order to avoid the darkness as well as keys in order to further progress through the levels. Participants would also strategically navigate around the monster in the second half of the level and base their movement on the path of the enemy, exactly as stated by El-Nasr and Milam (2010) about the pursue AI-pattern.

Further, this research study shows that designing a horror game based on proven horror game design theories, as well as combining them with level design patterns and theories of navigation and appearance, will result in an overall frightening horror experience. Designers should take this into consideration in the future in order to design games that successfully manage to scare the player base. Auditory hallucinations proved the most successful at scaring the players, however, it is noted that a pair of headphones might be of high importance in relation to audio in general in horror games. Participants were further frightened by darkness and would often comment on its contribution to the general atmosphere. However, when participants ran out of battery for an extended amount of time, it resulted in them becoming frustrated, ruining the immersion for them. Participants would further be scared by the monster, and saw it as the pinnacle of the horror build up that was slowly taking place when playing. Participants would often reference horror build up, as presented in the level of fear tool by Ntokos (2017). Therefore, it is further concluded that building up the horror experience based on this model, and implementing the discussed horror theories in combination with level design patterns, designers can successfully manage to scare players looking for a truly frightening horror game experience.

Future research should focus on further studying the impact that level design might have on the horror experience by creating levels that only focus on one specific horror event to specifically understand its effect. Future research should further aim to understand how different audio sources might affect the general horror atmosphere and immersion in order to get a complete understanding of its impact on the horror experience.

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Appendices

Interview Template

The questions will be asked at times when players are introduced to theories of level design and fear and immersion. This includes all the horror elements presented in the literature review.

Warm Up questions:
How often do you play games?
Do you often play horror games?
Do you like horror games?

Interview questions:

(When the player was first introduced to the game's mechanic) (flashlight, doors, batteries, boxes)
What was your impression here?

(When the player is hindered by something in the game, especially the flashlight runs out of battery or a door that blocks the player's path)
What did you feel here?

(When the player responds specifically to someone in the environment. Such as blood effects or props that are deployed in the level. Can also include when the player finds a key to advance to the next part of the game.)
Why did you react that way?

(When the player has several opportunities to go different paths)
Why did you choose to go that way?

(When players pass or advance in part of the level)
What impression did you get from this part of the level?

(When the player responds to horror elements. These include: Auditory hallucinations, flashing and related lights, dynamic music. Set to scripted events in the game and when the player sees the monster in the game)
What feelings did you get here?

Closing questions

Open Level (Level 1)
What influenced your decisions as you walked between different parts of the level?
What motivated you to keep making progress on the level?
What were your general impressions of the level as a whole?

Linear Level (Level 2)
What motivated you to keep making progress on the level?
What were your general impressions of the level as a whole?