Disturbance: A Conceptual Tool for Horror Game Design

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***Abstract. Introduction**: Horror games use design elements that provoke discomfort, such as fear, stress, and anxiety. **Objective**: This paper proposes Disturbance as a conceptual tool for classifying discomfort-producing design elements in horror games according to frequency, sensory modality, and diegetic status. **Methodology**: The concept is developed through an exploratory qualitative approach, inspired by principles of Grounded Theory. **Results**: Disturbance aligns with previous literature and shows potential as a tool for horror game design analysis.*
***Keywords** Horror Games, Game Design, Disturbance*

1. Introduction

Horror games constitute a very broad genre, including games such as *Layers of Fear (2016)* and *POOLS*, in which the player traverses gloomy environments without any kind of direct conflict; games such as *Amnesia: The Dark Descent* and *Outlast*, in which the player is confronted by enemies but has no means of defense; or games such as those in the *Resident Evil* and *The Evil Within* franchises, in which the player has access to weapons and other resources to fight the threats encountered. However, despite the different horror subgenres, these types of games share a common characteristic: they aim to evoke fear, scare the player, or provoke uncomfortable emotions. According to [Ekman 2003], fear is one of the five basic emotions and can range from a low-intensity "trepidation" to "terror", its most intense form, passing through anxiety, panic, and other forms. [Schell 2008] defined his first lens of game design as the **Lens of Essential Experience**, based on the experience the designer wants the player to have and on what is essential for the game to capture it. In the category of horror games, it is fundamental that the player's experience involves such sensations.

[Pires et al. 2018] state that video games are paradoxical because they employ attempts to frustrate the player's efforts, despite promoting fun and entertainment. This paradox becomes very evident in horror games, which use these uncomfortable sensations as the foundation of their structure, although they are still a form of entertainment. This raises the question: what leads someone to play this type of game?

There are several attempted answers. [Juul 2013] reminds us that Aristotle had already discussed catharsis, arguing that we accept experiencing uncomfortable emotions in fiction so that they may later be eliminated. [Ekman 2003] also reinforces the idea that some people enjoy feeling fear, discussing the popularity of books and films, and reporting that he observed pleasure, among other emotions, on the faces of horror film viewers, citing the argument that they know they are not truly in danger and will not be harmed.

Still seeking an explanation for this reason, [Ntokos 2018] divides horror game players into two groups. The first group consists of those who play for immersion, emotion, and adrenaline, corresponding to the idea of "recreational terror" [Pinedo 1997], which allows the player to experience a threat and undergo tension and fear in a safe environment. The second group consists of those who play horror games for the social aspect, to impress other people by "playing without getting scared".

Considering the objective of horror games in causing such sensations in the player, it follows that the way these games are designed primarily targets the first group, which seeks tension and the simulation of danger. Therefore, it is fundamental to understand how certain mechanics can provoke such sensations in the player [Ntokos 2018].

This work seeks to analyze, through a qualitative method, based on adapted Grounded Theory (GT), which mechanics and design tools present in horror games are intended to cause this discomfort in the player, in order to find patterns and better understand the ways in which the game can cause it.

In the following sections, we present the methodology used; the results obtained and the theory created; an analysis of the relationship with related methods, which in the GT method occurs after the creation of the theory; and, finally, the conclusion.

2. Methodology

This work adopts an exploratory qualitative approach, inspired by principles of GT, with the objective of constructing a conceptual tool to analyze design elements that provoke discomfort, tension, or fear in horror games. The choice of a qualitative approach is justified because the objective of the study is not to measure the emotional intensity produced by each game, but to identify recurring design patterns and formulate analytical categories capable of describing them. In this sense, the study approaches GT by starting from the observation of concrete cases and the comparison between occurrences, but it does not intend to claim a fully stabilized substantive theory in the classical terms of the method [Glaser e Strauss 1967, Stol et al. 2016]. The expected result is a first conceptual formulation, open to later refinements through new analysis, independent coding, and validation with experts.

The analyzed corpus was composed of digital horror games selected for their relevance to different forms of producing fear, tension, vulnerability, eeriness, repulsion, and anticipation. Games were included with an emphasis on pursuit, exploration, perceptual limitation, survival, atmosphere, scarce resources, psychological horror, and audiovisual threats. The selection sought to contemplate internal variations of the genre, including games in which the player has few means of defense, games in which the player can fight enemies, games based on atmosphere, and games in which the threat is partially unpredictable. Table 1 presents the titles considered in the analysis and distinguishes the games effectively played from those observed through videos or gameplay broadcasts. This distinction is methodologically important since direct gameplay experience allows the observation of decision-making, interactive pressure, and player control, whereas video observation allows the identification of formal design elements but with less access to the situated experience of interaction.

The basic unit of analysis was the design element capable of provoking or intensifying discomfort in the player. Both formally implemented mechanics, such as

Table 1. Games analyzed. Games in red (and with the NP mark) were not played, only watched.

Amnesia: A Machine for Pigs	Resident Evil 3 (2020)
Amnesia: Rebirth	Resident Evil 7
Amnesia: The Bunker	The Evil Within
Amnesia: The Dark Descent	The Evil Within 2
Layers of Fear (2016)	Tormented Souls
MiSide	Tormented Souls 2
Outlast	Alien: Isolation (NP)
Outlast 2	Escape the Backrooms (NP)
Poppy Playtime (Chapters 1-5)	Little Nightmares 2 (NP)
R.E.P.O.	POOLS (NP)
Resident Evil 2 (2019)	Resident Evil Village: Shadows of Rose (NP)

pursuit, resource limitation, enemy movement, and punishments for exposure to danger, as well as audiovisual and spatial resources, such as darkness, approaching sounds, dynamic soundtracks, bodies, abandoned environments, visual distortions, and sudden changes in the scenario, were considered design elements. Each occurrence was analyzed based on the guiding question: "in what way can this element disturb the player?". This question allowed the analysis to shift from a merely thematic description of horror to a functional description of the role played by the element within the game experience.

The analytical procedure followed four stages. First, occurrences of mechanics, events, audiovisual resources, and game situations associated with uncomfortable feelings such as fear, anxiety, apprehensiveness, tension, vulnerability, or repulsion were recorded based on direct gameplay and observation of recurring patterns. Second, each occurrence was briefly described, identifying effects such as anticipation, loss of autonomy, or indications of nearby threats. The third stage employed constant comparison to distinguish similarities and differences between elements of the same experiential type [Adolph et al. 2012, Hook 2015]. Finally, categories were refined to formulate the central concept of Disturbance and its analytical dimensions. Table 2 provides examples of the elements analyzed across the selected games.

Table 2. Examples of analyzed elements and their coding.

Game	Element	Description	Effect	Initial Coding	Final Coding	Dimensions
Tormented Souls	Darkness	Player cannot fight while holding the lighter; Staying in the dark results in game over.	Vulnerability, anticipation, fear	Fear of the dark	Vulnerability; Disturbing Environment	Constant, Visual, Diegetic
Amnesia: The Bunker	The Stalker	Beast roaming the bunker.	Anxiety, fear, fight-or-flight	Persistent (roaming) and immediate (hunting) threat	Contextual threat	Contextual, Audiovisual, Diegetic
Poppy Playtime	Weeping Angels	Miss Delight moves toward player when their back is turned.	Anxiety, tension	Monster	Immediate Threat	Eventual, Audiovisual, Diegetic
Resident Evil 2 (2019)	Gore	Zombie dismemberment; Protagonist death animations.	Repulsion, vulnerability	Repulsion	Repulsion / Disgust	Eventual, Visual, Diegetic
Outlast	Diegetic Sounds	Sound of Chris Walker's chains as he walks.	Fear, tension	Threat indication (sound)	Acoustic Threat Signaling	Eventual, Auditory, Diegetic
Amnesia: The Dark Descent	Non-diegetic Sounds	Chase music indicates the player has been detected.	Fear, tension, fight-or-flight	Chase soundtrack	Psychological Conditioning	Eventual, Auditory, Non-diegetic

Finally, the resulting categories were confronted with related works on horror games, vision, audio, agency, anxiety, the body, and emotional experience. This stage did not aim to statistically validate the tool, but to verify whether the proposed dimensions

were compatible with discussions already existing in the literature and whether they offered an additional conceptual organization. Thus, the methodology used should be understood as a first stage of theoretical and analytical construction. Its main limitations are the absence of multiple coders, the presence of games observed indirectly through video, the lack of evaluation with players or experts, and the fact that the corpus privileges horror games in a three-dimensional perspective. These limitations indicate that the Disturbance tool should still be treated as an initial proposal to be refined in future studies through comparative applications, inter-rater validation, and analysis of other formats of horror games.

3. Results

When analyzing the common elements and mechanics in these games, the first classification found shows how they disturb the player in relation to the dimensions of (1) frequency, (2) sensory modality, and (3) diegesis. Figure 1 presents the overall structure of the Disturbance model, while Table 3 provides an overall view of the model.

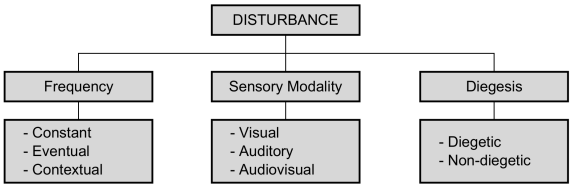


Figure 1. Disturbance dimensions.

Table 3. Synthesis of Disturbance

Dimension	Category	Definition	Analytical question	Examples
Frequency	Constant disturbance	A design element that produces continuous or recurring discomfort during an extended section of the game.	Does the element keep the player apprehensive even when no immediate threat is present?	Darkness, hostile atmosphere, disturbing narrative premise, scarce resources.
Frequency	Eventual disturbance	A design element that appears in a momentary situation and temporarily concentrates the player's attention on an immediate threat or shock.	Does the element interrupt the current state of play and demand an immediate reaction?	Jumpscares, enemy encounters, pursuits, sudden scenario changes.
Frequency	Contextual disturbance	A design element whose disturbing function changes according to the state of the game, becoming constant in some moments and eventual in others.	Does the same element disturb the player differently depending on its current behavior or position in the game system?	Hunters such as Mr. X, the Xenomorph, or the Beast in *Amnesia: The Bunker*.
Sensory modality	Visual disturbance	A disturbance produced mainly through what the player sees or cannot see.	Is the discomfort primarily caused by visual exposure, visual limitation, or visual uncertainty?	Darkness, gore, grotesque bodies, abandoned environments, liminal spaces, visual distortions.
Sensory modality	Auditory disturbance	A disturbance produced mainly through sound, including sounds whose source may be outside the player's field of view.	Is the discomfort primarily caused by sound cues, sound intensity, rhythm, or auditory anticipation?	Footsteps, monster sounds, heartbeat sounds, stingers, dynamic pursuit music.
Sensory modality	Audiovisual disturbance	A disturbance produced by the combined effect of visual and auditory stimuli.	Does the disturbing effect depend on the simultaneous articulation of image and sound?	Jumpscares, sudden apparitions with loud sounds, abrupt environmental changes with sound effects.
Diegesis	Diegetic disturbance	A disturbance whose source belongs to the fictional world of the game.	Can the disturbing element be perceived as part of the game world by the character or by entities within that world?	Monster sounds, character breathing, sanity effects, hallucinations, in-world visual distortions.
Diegesis	Non-diegetic disturbance	A disturbance whose source does not belong to the fictional world, but is used to affect the player's emotional response.	Is the element directed primarily at the player rather than existing as part of the fictional world?	Tension soundtrack, non-diegetic stingers, interface effects, musical escalation.

The concept of disturbance aims to analyze how different design elements affect the player's emotional experience, provoking states of discomfort, tension, or fear throughout the interaction with the game. The following subsections elaborate on their meanings and show some examples present in the games analyzed.

3.1. Frequency

The **frequency** dimension analyzes how the game makes the player remain apprehensive and how it provokes a more intense fear through immediate threats. The types of disturbance in this dimension can be qualified as: constant, eventual, and contextual. Figure 2 illustrates how constant, eventual, and contextual disturbances differ in their temporal behavior during gameplay.

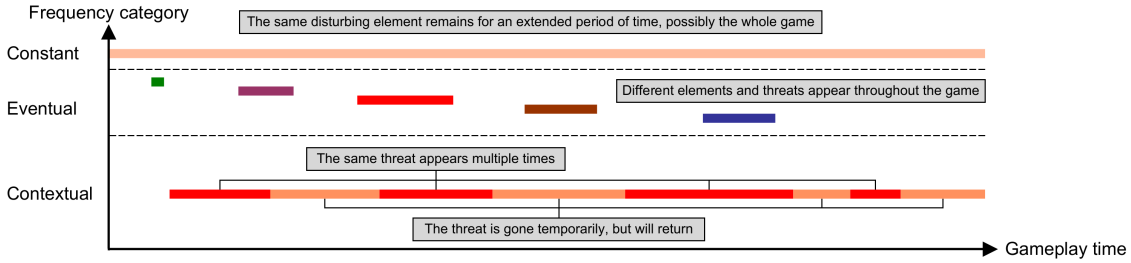


Figure 2. Temporal behavior of constant, eventual, and contextual disturbances. Different colors represent different disturbing elements or threats, while repeated segments of the same color indicate recurring occurrences of the same element.

Constant disturbance indicates that a mechanic or design tool causes constant discomfort or tension in the player, either throughout the game or during a specific section. They have the purpose of leaving the player nervous, attentive to dangers of which they are aware, or apprehensive, in expectation of dangers that may be yet to come.

According to Ekman, "anticipating the threat of harm can also monopolize our consciousness for long periods of time, or such feelings may be episodic, returning from time to time, interrupting our thoughts when we are dealing with other matters..." [Ekman 2003]. We can draw a parallel between this statement and the purpose of constant disturbance, which seeks to "take over the player's mind", provoking fear and apprehension during their experience with the game, while waiting for some threat that may occur.

Narrative premises can also operate as constant disturbances when they establish a persistent background of threat, vulnerability, or psychological unease that frames the player's interpretation of later events. In *Amnesia: The Dark Descent*, for example, the protagonist traverses a gloomy castle and dungeons where monsters live.

Another example is the use of darkness with the purpose of making the environment more frightening, provoking a fear of the dark or the unknown in the player. When walking in a dark environment, the player feels vulnerable, since they have difficulty or may even be unable to see what is around them. Darkness is very common in horror games and, often, permeates the entire design of the environment.

Eventual disturbance, in short, refers to elements that "appear and then go away". In other words, the player will encounter them in parts of the game and will have to get through them, possibly encountering them again or not.

Eventual disturbances, especially those that produce fear, concentrate the player's attention on an immediate threat or shock, producing a temporary state of urgency until the player escapes, neutralizes the threat, or realizes that there is no continuing danger.

Jumpscares are typical eventual disturbances: they interrupt the current state of play through a sudden audiovisual stimulus and usually lose force once the player realizes that the immediate event has passed.

An additional mechanic associated with some enemies is known as *Weeping Angels*, in reference to the fictional race of the same name from the television program *Doctor Who*. In it, enemies move only when they are outside the player's field of view. Because the player knows the enemy is moving without being able to see it, this mechanic intensifies anticipation while also illustrating the visual modality discussed later.



Figure 3. Enemies present in the games *Resident Evil Village: Shadows of Rose*, *MiSide*, and *Poppy Playtime*, which move when they are outside the player's field of view.

Pursuits are also a form of eventual disturbance. In them, the player is spotted by some kind of enemy that they are unable to face, either temporarily or permanently. At this moment, the player feels fear for having been seen by the monster and must find a way to escape or try to lose the enemy. Following Ekman's statement, it is difficult for the player to feel or think about anything else at the moment, because their focus is taken over by the immediate danger.

In general, eventual disturbances cause more intense levels of anxiety, fear, and stress in the player, requiring them to take action (which may demand speed, so as not to be caught by the enemies) and usually being more spaced out from one another.

Contextual disturbance means that a mechanic or design element can disturb the player in a constant or eventual way, depending on the context in which it is used.

Some games have a specific type of enemy, referred to in this work as *hunter*, which, instead of staying in a specific place and waiting for the player to appear or be detected in order to move toward them, remains actively wandering through different places on the map in search of the player. During part of the game, they represent a constant threat that the player must always consider while moving through the map. After a certain event happens, it becomes an eventual threat that needs to be resolved. Figure 4 shows some examples of this mechanic: in *Amnesia: The Bunker* and *Alien: Isolation*, the player is pursued by a monster and a Xenomorph, respectively, that wander through the walls and ventilation ducts of the environment in which the player finds themselves, being able to come out at any moment to look for them; while in *Resident Evil 2 (2019)*, *Mr. X* wanders through the Raccoon City Police Department, being able to encounter the player at any moment.

3.2. Sensory modality

In this dimension, the sense stimulated by the disturbance is taken into account. The modalities found during this analysis were (1) visual, (2) audio, and (3) audiovisual.



Figure 4. The Xenomorph from *Alien: Isolation*, *Mr. X* from *Resident Evil 2 (2019)*, and the Beast from *Amnesia: The Bunker* are examples of the Hunter mechanic.

Visual disturbances use visual elements to disturb the player. This can be evoked by grotesque visuals, such as the monsters and scenarios present in several games, including *Amnesia: The Dark Descent*, *The Evil Within*, *R.E.P.O*, and *Resident Evil 7*. The use of darkness is also a form of visual disturbance, since the player feels vulnerable when losing control over what is around them, precisely because they cannot see their surroundings.

Gore, present in *Resident Evil 2*, *Outlast*, *Tormented Souls*, and many other games, also serves as a visual disturbance, through the explicit use of graphic violence, dismemberment, and anatomical detail that intensify the sensation of discomfort. Such extreme violence evokes sensations of repulsion in the player, especially in games with more realistic graphics, serving as a reminder of the fragility of the human body. In addition, this exposure can generate a strong identification with the protagonist's suffering, making the player project the character's vulnerability onto themselves.

Empty or abandoned environments also serve as a visual way to disturb the player, evoking feelings of loneliness, abandonment, or the sense that "I should not be here". Games such as *Poppy Playtime*, *POOLS*, and *Escape the Backrooms* are examples of this aesthetic, illustrated in Figure 5, where the setting becomes a source of anxiety due to the absence of life. The last two, in particular, are focused on environments called liminal spaces, which are described as real or artificial spaces of an ephemeral nature that evoke sensations of isolation and strangeness, making them frightening or unsettling [De Andrade et al. 2025, Diel e Lewis 2022].



Figure 5. *Poppy Playtime*, *POOLS*, and *Escape the Backrooms* have settings that evoke sensations of abandonment and loneliness. *POOLS* and *Escape the Backrooms* are examples of liminal horror games.

Auditory disturbances use sound stimuli to provoke discomfort, tension, or fear in the player. Unlike visual disturbances, audio acts even outside the player's field of view, which makes it effective for generating anticipation and anxiety, such as the roar of a monster in *Amnesia: The Dark Descent*, the sound of the Beast from *Amnesia: The Bunker* moving through the walls of the bunker, and the footsteps of *Mr. X* approaching

in *Resident Evil 2 (2019)*. Heartbeat sounds, present in *Amnesia: The Dark Descent*, *Amnesia: Rebirth*, and *Amnesia: The Bunker*, are also a resource for intensifying tension, by indicating the protagonist's state of fear, increasing the player's immersion. Abrupt sounds, such as stingers used in jumpscares and changes in the scenario in *Layers of Fear (2016)* and *The Evil Within*, are another tool for inducing a state of immediate alertness in the player.

One of the main resources is the use of dynamic soundtracks associated with pursuit states. In games such as *Amnesia: The Dark Descent* and *Outlast*, the music changes abruptly when the player is detected by an enemy, beginning to present accelerated rhythms and greater intensity. This transition signals a situation of immediate danger, inducing quick responses and increasing psychological pressure. This dynamic also conditions the player, causing them to associate the soundtrack directly with the need to flee, reinforcing the sensation of urgency and vulnerability.

The same can be said regarding games such as *Tormented Souls*, *The Evil Within 2*, and *Resident Evil 7*, where the change also signals that the player has been detected by an enemy. The difference is that, in these games, the player has means to defend themselves and face the threats, altering the interpretation of the sound stimulus. Instead of exclusively indicating the need to flee, the intensification of the soundtrack comes to represent a state of imminent confrontation, in which the player must decide between fleeing or facing the enemy. Thus, the psychological pressure induced by audio is maintained, but linked to the possibility that the player may choose between fleeing or facing the threat.

Audiovisual disturbances refer to disturbances that elicit some fear or discomfort in the player through both sound and visual stimuli. Jumpscares fit into this type, given that they are often characterized not only by the sudden visual element, but also by some disconcerting sound — and often a loud one —, such as a scream or some sound effect.

3.3. Diegetic

This dimension considers whether the disturbance is something that only affects the player (non-diegetic) or whether it is part of the game world (diegetic). **Non-diegetic disturbances** correspond to elements that have no origin in the fictional world, such as tension soundtracks, abrupt stingers, and sound effects used exclusively to manipulate the player's emotional response.

Diegetic disturbances, on the other hand, are those whose source is inserted into the game world itself, such as sounds emitted by monsters in *Amnesia: The Dark Descent* and the sound of Chris Walker's chains as he moves in *Outlast*. Other forms of diegetic disturbance include: physiological indicators, such as heartbeats (*Amnesia: The Dark Descent*, *Amnesia: Rebirth*, *Amnesia: The Bunker*), signs of sanity loss (*Amnesia: The Dark Descent*, *Escape the Backrooms*), panting sounds (*Outlast*, *Amnesia: The Dark Descent*); visual distortions, such as blurred vision when facing the Beast in *Amnesia: The Bunker*; hallucinations (*Amnesia: The Dark Descent* and *Layers of Fear*); and changes in the scenario in *Layers of Fear (2016)* that indicate the decline of the protagonist's mental health.

Non-diegetic disturbances have the purpose of provoking instantaneous responses in the player and indicating clear signs of immediate danger, through abrupt sounds

or changes in the soundtrack, for example. On the other hand, diegetic disturbances contribute to immersion, making the player feel in the place of the character within the fictional world.

4. Related Works

After the initial construction of the categories, related works were examined to position the proposed tool in relation to existing discussions on vision, sound, agency, anxiety, and embodied horror in games. To find these works, the Scopus search engine was used with the string:

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( GAME OR VIDEOGAME OR VIDEOGAMES )
AND HORROR AND ( MECHANICS OR DESIGN OR EMOTION OR ANXIETY )
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[Haahr 2018] conducted a comparative analysis of 10 games in the *survival horror* genre and how they use vision as elements of the story and mechanics, especially in relation to how games attempt to affect the player emotionally. The article raises the convention of the weak and defenseless protagonist present in the psychological horror genre and how some games use the modification of vision as one of the crucial elements of the story and mechanics. Haahr cites five distinct mechanics and how each one affects vision, followed by an analysis of how games use these mechanics not only for player interaction but also as elements of the narrative.

Haahr argues that the lack of proper vision emphasizes the character's vulnerability to invisible threats and evokes primordial fears as the player does not know what lurks in the dark, but it will certainly be unpleasant. [Dudek 2021] also says that the use of mist and darkness as elements that provoke anxiety is common in horror games, since fear of the dark is a human evolutionary disposition.

When discussing *Slender: The Eight Pages*, Dudek also mentions how it is more frightening to be haunted by a single enemy with a unique focus, rather than having several enemies chasing the player, citing *Outlast*, *Alien: Isolation*, and *Resident Evil 2 (2019)*, allowing a parallel to be drawn with the concept of the hunter mechanic.

[Habel e Kooyman 2014] propose the notion of agency mechanics in survival horror, emphasizing how game design can grant or remove autonomy, control, and movement from the player. Their discussion of restricted spaces, such as ventilation shafts in *Dead Space*, supports the idea that disturbance is not limited to frightening images or sounds, but also emerges from the reduction of agency and the player's sense of vulnerability.

[Graja et al. 2021] analyzed the physiological effects caused in the body by the visual and sound orchestration of the game *PTVR*, an adaptation of the *P.T.* demo to measure tension and stress. The authors explored the manipulation of three different environmental effects: lighting, audio, and "actions" (which are the "physical" objects that appear or move in the virtual environment) in seven distinct scenarios. The authors observed that audio tends to have the greatest impact among the observed effects, resulting in more intense physiological reactions, making sound events the most effective for stimulating stress, anxiety, and tension.

The authors point to the *Silent Hill* series as an example of how environmental design is structured to maintain the player in a perpetual state of alert. According to

them, the lack of vision brings a more subtle fear, defined as terror, which reinforces the idea of darkness as a way of disturbing the player. They also discuss the disturbing, unpredictable, and arrhythmic sounds present in these games, which demand constant attention from the player, making the soundscape exhausting for the player.

[Hawco 2023] analyzed the ludic impact that horror games can have on the body, and states that the horror genre is more successful in video games since these require the player's physical interaction, causing an affective relationship between the body and the horror experience.

The idea that darkness and sound disturb the player is also reinforced by Hawco, who argues that horror games rely on atmosphere to prepare the player for panic, emphasizing lighting, sound, and environmental aesthetics as key elements. According to her, darkness creates suspense and anticipation, making players more sensitive to scares, while sound effects further reinforce this anticipation, as exemplified by *Alien: Isolation*, in which sound cues indicate that danger is approaching.

5. Conclusion

This paper proposed *Disturbance* as an initial conceptual tool for analyzing how horror video games produce discomfort, tension, and fear through design. Rather than treating horror as a single emotional effect, the tool organizes disturbing elements according to three complementary dimensions: frequency, sensory modality, and diegetic status. This structure helps distinguish, for example, between a constant oppressive atmosphere, an eventual jumpscare, and a contextual threat whose function changes according to the game state.

The analysis suggests that horror design operates through the articulation of persistent anticipation, punctual threat, perceptual limitation, audiovisual orchestration, and the relation between what belongs to the fictional world and what directly targets the player. In this sense, *Disturbance* contributes a vocabulary for comparing horror games and for discussing design choices that are often described only impressionistically.

As an exploratory proposal, the tool should still be treated as provisional. The study is limited by the absence of multiple coders, the use of some games observed indirectly through video, and the lack of validation with players or specialists. Future work should refine the categories through comparative applications, inter-rater analysis, expert review, and the study of horror formats beyond three-dimensional games, such as side-scrollers, point-and-click games, and visual novels.

Additionally, empirical validation through playtesting sessions involving players and domain experts could provide further evidence for the proposed categorization. Such studies may combine subjective measures, including questionnaires and interviews, with physiological data collected using electrocardiogram (ECG) and electroencephalogram (EEG) devices, enabling a deeper investigation of the relationship between the proposed disturbance categories and players' emotional and cognitive responses.

Acknowledgments

This work was supported by the National Council for Scientific and Technological Development (CNPq, Brazil). ChatGPT was used to assist in finding relevant articles for the theoretical background and manuscript revision.

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