

**Virtual Reality (VR) Horror Gameplay –
Exploring Emotional Experiences and
Dreaming Occurrences Affected by VR
*Resident Evil 7***

by

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Abstract

The fusion of virtual reality (VR) and interactive gaming has elevated horror games like *Resident Evil 7* to unprecedented immersion and presence, generating more intense mediated experiences among individuals. Recent studies have investigated the effects of VR gameplay on individuals' cognition and user experiences, notably focusing on generated emotions and physiological responses. This study sought to explore individuals' dreams affected by recurring VR horror gameplay and expand on the emotions explored by previous research. Employing a phenomenological approach, descriptive data was collected through data collection methods of semi-structured interviews and dream journals as participants engaged in successive gameplay and noted down their dreams throughout a month. Thematic analysis was conducted to identify codes and develop themes concerning the research phenomena. Data analysis indicates two themes emerged about gameplay experiences and two about dreaming occurrences and recognition. Aligning with previous work, findings unveiled that VR interactions with game components significantly contributed to the overall sense of immersion, intensifying the horror effects. And, participants expressed an increased sense of immersion as gameplay progressed. In addition, participants recounted their elicited emotional responses like fear and anxiety. Expanding upon previous studies examining the connection between video games and dreaming, this study revealed that participants' dreams mirrored game-related content. Moreover, findings also highlighted that participants' dream emotions echoed elicited VR game emotions. In discussions about dreaming, participants also conveyed a heightened awareness and meticulous retrospection throughout. These findings contribute to our understanding of how interactive media affects individuals, particularly highlighting the interconnected realms between our waking and dreaming lives.

Keywords: virtual reality; horror games; Resident Evil 7; emotions; dreaming; dream journal; interactive technology; qualitative research

Dedication

To all those who have lent their support in any capacity, I am sincerely grateful.

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Chapter 1

Introduction

“It was just a dream.” – many of us have thought of this phrase waking up from terrifying nightmares, and we often speculate upon what causes them to occur. Our dreams are usually fragmented and arbitrary but consist of aspects from our waking experiences. Among multiple theories, the Continuity Hypothesis is a prevalent dream theory that discusses our dreams as extensions of our waking experiences [14, 15]. As technology has become an integral part of our waking lives in recent times, we regularly consume a vast amount of media. Researchers have only recently begun to explore its impact on individuals’ experiences, focusing particularly on conscious responses and user experiences as technology evolves. To illustrate this further, VR technology has been dominating the interactive technology market because of its wide commercialization in the video game industry [41]. For instance, VR technology has brought horror video games to the highest level of immersion and presence, generating more arousing mediated experiences [33]. Consequently, recent laboratory experiments have delved into the impacts of VR horror games on individuals, particularly cognition and physiological responses. It commonly showed that VR horror gameplay resulted in individuals’ more intense psychological and physiological responses. To elaborate, they experienced a stronger sense of presence, stronger subjective feelings of fear, fright, and horror, increased perceived anxiety, and just an overall stronger emotional intensity [42, 31, 64, 43]. Nevertheless, delving into the association between VR horror games and dreams remains challenging. Building upon the Continuity Hypothesis, it remains uncertain whether our dreams mirror the media content we consume. While limited research has explored the connections between standard video games and dreams, existing studies have unveiled positive correlations between video games and phenomena like lucid dreaming, as well as the incorporation of video game elements into dreams [17, 21, 57]. However, a notable gap exists in research concerning the effects of VR horror games on dreaming. There is an ongoing necessity to explore some of the impacts of immersive technology on dreaming patterns and behaviors, especially as our interactions with such technology continue to escalate. Moreover, these studies predominately employed quantitative approaches to examine the impacts and experiences of VR and video games, overlooking qualitative approaches.

Existing work has demonstrated some of the effects of emerging technologies on individuals' conscious responses and sleeping activities. Notably, some of the previous studies presented findings on how VR horror games affect individuals' psychological and physiological responses, encompassing immediate reactions, emotional responses, user experiences, and coping strategies. This genre of literature has also conducted comparative studies, illustrating the profound impact of VR immersion on conscious responses as opposed to non-VR mediums like television or console games. However, these explorations often focused on immediate psychological responses, lacking the depth provided by longitudinal approaches that examine potential enduring effects. Another layer of literature involves studies probing into the correlation between video games and dreaming, specifically emphasizing lucid dreaming. Yet, a noticeable gap exists in the exploration of the effects of VR horror games on dreaming, with no apparent literature addressing this domain. Moreover, these studies mostly employed quantitative approaches to examine the generated effects and experiences in individuals, inadvertently overlooking alternative approaches. Quantitative measures and statistical analyses, while valuable, often fall short of capturing the descriptive, intricate, and nuanced nature of individual experiences, particularly in realms like emotions and dreams. Hence, there emerges an identifiable opportunity to incorporate a qualitative approach to address this gap in existing literature. To explore these identifiable opportunities, I formulated open-ended research questions aimed at exploring individuals' subjective experiences and identifying emerging patterns.

- **RQ1:** What are the emotional experiences of adults when playing a VR horror game?
- **RQ2:** How does immersive horror gameplay affect the dreaming experiences among adults over an extended period?

Chapter 2

Study Summary

To address these research questions, I have conducted a qualitative study using a phenomenological approach to explore the emotional and dreaming experiences affected by recurring VR horror gameplay. Employing data collection methods such as interviews and dream journaling, participants consistently reported their emotional responses to VR horror gameplay and their dreaming occurrences across four consecutive weeks. Following a systematic process of thematic analysis, collected data underwent coding and was subsequently synthesized into themes that revealed emergent patterns. Two findings were associated with participants' elicited experiences during VR horror gameplay, while the remaining two pertained to the occurrences within participants' dreams.

These findings offer substantial contributions to existing research on multiple fronts. Firstly, they expand upon the literature investigating the impact of VR horror games on individuals' consciousness. My results highlight a sustained elevation in participants' immersion levels throughout successive VR gameplay, with heightened immersion intensifying the horror effects. In alignment with and an extension of previous research, this phenomenological approach reveals participants' descriptions of emotions closely resembling those induced by consistent, recurring VR horror gameplay. Moreover, this work establishes a significant link between dreaming and VR horror gameplay, which has not been thoroughly explored thus far. While limited research has indicated a positive correlation between video gaming and the incorporation of game content into dreams, along with lucid dreaming [57], this study builds upon these inquisitions and provides additional expansion. It extends previous observations of video gamers' dream content, showcasing easily recognizable references to games [21]. Additionally, the research brings to light that participants experienced dream emotions mirroring the emotions elicited during gameplay, further emphasizing the interconnected realms between waking and dreaming experiences.

Chapter 3

Related Work

3.1 Virtual Reality and Immersive Horror Games

VR is an application that allows users to navigate and interact in real-time with a three-dimensional computer-generated environment [10]. Recent approaches have been proposing that VR is beginning to be considered more as a human experience, underlining how the essence of VR is the inclusive relationship between users and the computer-generated virtual environment [53]. Although technologies can immerse users in a virtual environment to different degrees, head-mounted displays like Oculus Rift¹ are considered the unquestionable leading display of immersive VR [7]. Following that, an extreme variety of video games have been released into the market for several commercial VR systems like the Sony PlayStation VR². In 2017, the release of *Resident Evil 7* on PlayStation VR was a critically acclaimed success, and VR technology certainly also brings to the forefront the assumption that better game mechanics involve greater realism [46]. As discussed, VR technology has been dominating the market of interactive technology due to its wide commercialization in the video game and entertainment industries. The horror, first-person shooter (FPS), and survival genres were the most anticipated [41]. Among the most successful VR video games, horror games constitute one of the most played genres [42]. VR technology has brought horror video games to the highest level of immersion and presence, generating more arousing mediated experiences [33].

Presence is the theoretical mediator of human engagement within virtual environments [48]. Previous studies defined and characterized presence as the subjective experience of being in a virtual environment, even when one is physically situated in another [65]. It is the extent to which individuals experience the virtual environment as opposed to the physical environment in which the virtual environment occurs when they are immersed in it. Therefore, presence is central to distinguishing between video gameplay in an immersive

¹<https://www.oculus.com/rift-s>

²<https://www.playstation.com/en-ca/ps-vr>

environment and a non-immersive environment [48]. Studies demonstrated that when players engaged with more immersive technology, they experienced a stronger sense of presence than when players engaged in less immersive technology [48]. In VR, the interaction blurs the boundary between the game and the physical environment, disrupting the traditional separation between them. Unlike non-immersive gaming where players observe a screen from a distance, players perceive themselves as directly interacting with the virtual game environment due to the seamless integration of their 360° view. The visual perspective mimics real life closely, responding to players' head movements. For instance, the feeling of threats and danger intensifies when a non-player character (NPC) approaches the virtual space. Fear and fright in a game scenario arise when it's perceived as hazardous. Considering this, the high level of immersion and emotional engagement VR strives for, as discussed by Bernard Perron, is effective in creating a frightening experience in horror games like *Resident Evil 7* [46].

In standard video games, players actively decide their engagement, which usually leads to different outcomes and resolutions of the threats based on their previous behaviors and decisions [32]. Unlike traditional media, VR horror games require players to actively decide their reactions to threats and manage to survive as protagonists [32]. In a VR game, players not only actively decide to engage in game content but also directly encounter threats as if they are confronting them in the real environment [59]. As mentioned, VR allows players to view the virtual world through head-tracking goggles covering their entire visual field so that players are fully immersed in the simulated environment. Using controllers, players utilize any game objects to engage and survive [32]. In addition, advanced VR engines allow players to freely move around in an enclosed space so that they can interact with characters and objects as if they were performing actions in the real environment. With VR, ordinary game experiences translate into more immersive ones. For instance, darkness indicates that players experience total darkness. When threatening characters approach the protagonist, a VR environment places players within an immersed space and provides them with a great degree of freedom to engage with threatening situations [30].

In a VR game, the place illusion (PI) mechanism allows players to perceive themselves situated in the game allowing them to perceive the virtual environment as reality. The plausibility illusion (PSI) mechanism allows players to personally confront immediate threats and appearances such as being surrounded and attacked by disfigured characters. For example, individuals respond to zombies as if they were real even though they are not. Therefore, several distinctive elements in VR horror games would induce players' fear. Examples include zombies approaching players (PSI), zombies appearing suddenly behind players (PSI), or hearing the directional footsteps of zombies walking (PI) [59, 30]. According to traditional cognitive media theory, VR gamers feel a greater sense of realism and immersion when their ability to imagine and simulate experiences is engaged by the content [12, 26]. This immersion isn't solely dependent on the realism of the content itself but is influenced by the level

of intricate detail and sensory richness in VR experiences [4]. Specific elements in VR games, such as highly realistic graphics, lifelike character animations, layered and textured sound design, and the overall audiovisual presentation, collectively enhance the player’s mental simulation, making the experience more vivid [5]. As discussed, playing a VR horror game causes perceptual threats to be perceived closely mirror reality compared to non-immersive experiences [44, 31]. If players feel present, their sensory channels primarily perceive input generated by VR horror games, reinforcing the notion that incoming stimulated game content is coherent and believable, making it harder to consciously control their emotional and physiological responses [53]. Existing work has shown that feelings of presence or immersion intensify the existing effects of video games [30]. Specifically, survival horror games elicit emotions such as fear, suspense, and anxiety through players’ sense of presence. More than from the mere perception of being located in a terrifying virtual environment or PI, players’ sense of fear came from the perception of virtual activities happening to them or PSI [32]. Thus, VR provides a strong sense of spatial presence in a terrifyingly virtual environment, simultaneously heightening the sense that potential threats are surrounding the players in reality, thereby increasing feelings of fear and anxiety. Vicariously surviving these terrifying experiences also increases exhibited enjoyment afterward [36].

3.2 The Survival Horror Genre

Among many game genres, the survival horror genre often dominates the game market and provides the most entertaining form of horror gameplay. It’s composed of captivating elements that no other genre does. Perron describes the survival horror game genre components in detail from a videoludic perspective, noting that action-adventure games within it craft unique plots rooted in a shared horror theme [46]. These narratives unfold through cut scenes and are complemented by written or audio elements. Furthermore, visual modulations, such as the simulation of hallucinations or character exhaustion, footsteps, dripping water, or flicking electrical devices complement moments of suspense [47]. While survival is the principal issue of most video games, the survival horror genre is emphasized by the vulnerability of the protagonist, who, without weapons and a supply of ammunition, has to confront or escape from dangers while escaping labyrinthine spaces, gathering various items, solving puzzles and overcoming challenging obstacles [46]. Perron also discusses that survival horror is notorious for its clumsy controls, which make the game even more difficult — both for combat and movement through the fictional environment. And from a horror perspective, the genre is defined by the use of horror film tropes. It creates an eerie atmosphere in dark and/or claustrophobic spaces [46]. Among existing games, the *Resident Evil* and *Silent Hill* series have been recognized as twin pillars of the survival horror genre [55]. One study surveyed university students to recall particularly frightening video games – among 53 game titles, the *Resident Evil* series was at the top of the list [36].

As a subgenre of action-adventure games, the survival horror genre manages to counterbalance action and exploration components while including diverse puzzle elements [55]. Essentially, players experience anticipatory, in-game, and lingering fright as they directly control their character while immersed in a highly suspenseful narrative. The main protagonist would be confronted with horrific events and threatening situations while being extremely vulnerable. The genre utilizes players' constant alertness to imminent death as a primary fear tactic [36, 45]. It's inextricably linked to players' experiences in terrifying worlds and the resulting feeling of powerlessness and entrapment while evoking distinctive sensations in dark, gloomy environments. Often, survival horror games typically cast the player in a vulnerable position [35]. Combined with other fear mechanics, survival horror games were found to evoke stronger fear responses than any other game genre [36, 45].

3.2.1 *Resident Evil 7: Biohazard*

When the *Resident Evil* series debuted in 1996, its slow-paced, exploration-heavy take on zombies was so influential that it spurred the new game genre of survival horror [63]. Released by Capcom³ in 2016, *Resident Evil 7* has reached a new horizon with its design and gameplay experience. As *The Verge* magazine puts it:

“The game’s measured pace and focus on exploration hearken back to the original *Resident Evil*, but a new first-person perspective and stunningly detailed visuals make for one of the most vicious and powerful horror experiences ever created. It’s a complex mystery that balances terror, action, and exploration almost seamlessly [63].”

As of the end of 2022, it is estimated that it has accumulated over 11 million players in total [11]. To elaborate on the game content, Perron described the cinematic plot and gameplay elements evoking compelling horror experiences – the player spends the whole game trying to escape a “house of horrors” inspired by the films *Evil Dead*, *The Texas Chainsaw Massacre*, and *The Hills Have Eyes* [46]. Players play as the protagonist, Ethan, who journeys to Louisiana after receiving a message from his presumed-dead wife, Mia. The game’s emphasis is on exploration to get keys and crests to progress to new locations in a grotesque, dark mansion. Rooms are filled with piles of rotting garbage, and the remains of putrid meals are scattered around the mansion [63]. Vintage VHS tapes give a glimpse into what happened via flashbacks in the shoes of different characters. Ethan is guided through his adventure and faces the possessed characters of the mansion. There are no stereotypical zombies, but monsters made of black mold and coming out of walls, floors, and ceilings [46]. Almost every encounter with the antagonizing characters feels brutal and violent [63]. In 2017, it became one of the first blockbuster games playable entirely in VR. With its first-person perspective, stunningly detailed visuals, and a renewed focus on straight-up horror, it is the most immersive one of the series yet [62]. As of October 2022, approximately more

³<https://www.capcomusa.com>

than 1 million global users have played the game in VR, which is 10% of all players [11]. The VR gameplay attempts to maximize its game environment illusions, encompassing the player’s visual field, excluding as much of the outside world as possible, and focusing the player’s senses almost exclusively on the survival horror world [55].

3.3 Emotional Effects of VR Horror Gameplay

Conceptual Framework Behind Horror Game Effects

Scholar Bernard Perron’s extensive investigation of horror video games provides insights into gameplay’s effects on human emotions and behaviors. In the book “Video Games and the Mind: Essays on Cognition, Affect, and Emotion” by Perron and Schröter, it’s discussed that gaming can provide intense emotional experiences that influence information processing. Therefore, game research can indicate the operation and consequences of human emotional and cognitive activities [47]. Modern exploration allows for quantifying the gameplay impact and design aspects on user experience and enhances understanding of video games as emotionally complex entertainment. Perron discusses that physiological and behavioral changes are manifested through changes in the game experience. The horror game genre leverages intense, punctuated suspense to elicit players’ strong emotional responses [47]. Fear, frustration, tension, grief, anger, relief, and joy can all feature prominently in the complex gameplay and narrative experiences deriving from the horror concept. To name a couple of examples, players experience anxiety and suspense in anticipation of tribulation, fear in the struggle to escape threats, terror in the face of an imminent and often dreadful fate, and relief and joy in the temporary perpetuation of survival [47]. In his investigation, Perron breaks down the emotion of fear induced by survival horror games – they are intentional and object-oriented [47]. Emotions are functional in the way they regulate the interaction between the player and the game environment. They emerge in reaction to a situation and significant positive or negative changes. They’re triggered by events that are important to an individual’s goals, motivations, and worries. Individuals possess a persistent inclination toward these specific emotional states [46]. Therefore, fear is always directed toward threats in the horror game genre. Most of the time, individuals appraise scary situations when negative changes in the environment put their safety at risk. Therefore, the primary action tendency is to disrupt the relationship between the environment and terminate involuntary psychological and physical arousals [46].

Laboratory Studies and Findings

Research findings revealed how VR horror gameplay affected individuals’ conscious and psychological responses, such as emotional reactions, user experience, and psychological after-effects. Selected literature has also conducted comparative studies to emphasize how VR immersiveness can effectively contribute to individuals’ conscious responses compared

to non-VR technology. Key patterns emerged in the literature that demonstrated findings on how VR horror gameplay affects individuals' consciousness. The findings commonly showed that VR horror gameplay resulted in individuals' more intense psychological and physiological responses. To elaborate, individuals who played VR horror games experienced a stronger sense of presence and reality, stronger subjective feelings of fear, fright, and horror, increased perceived anxiety, and just an overall stronger emotional intensity.

Pallavicini and collaborators explored VR horror survival games and the participants' psychological effects of fright and anxiety [42]. The study aimed to compare *Resident Evil 7* experienced through VR as opposed to a non-immersive display and explore differences in the usability and players' emotional activation. By sampling 26 young adults, the study divided the participants into playing in VR or a non-immersive console system. The usability and emotional impacts were assessed through self-report questionnaires and physiological indexes. Study results indicated that participants showed increased perceived anxiety, increased perceived sense of happiness, and a greater sense of presence all after VR gameplay [42]. A similar study was conducted comparing participants' responses to *Resident Evil 7* in a VR environment and on a non-immersive display. To elicit multiple perspectives on participants' experiences, the study employed self-reported questionnaires and semi-structured interviews. Study results demonstrated participants reported a significantly higher presence, and that the violence received and enacted felt more realistic in VR mode [64]. Another study conducted by Pallavicini and others assessed VR gaming's user experience compared to non-immersive video games among players. The study measured and assessed usability, emotional response, and the reported sense of presence. A within-subjects design was used to compare the usability, emotional response, and perceived sense of presence in the two experimental conditions: VR immersive condition and desktop or non-immersive condition. The results showed that no statistical difference emerged between the immersive and the non-immersive conditions regarding usability. The perceived sense of presence was higher in the VR condition than in the non-immersive condition, and immersive display modality was associated with higher emotional responses [43]. In another study, Lemmens and colleagues analyzed data that showed that playing games in VR resulted in a stronger sense of presence, lower heart rate variability, and a stronger subjective sense of fear. This study demonstrated that VR games affected feelings of presence and players' intensified physiological and emotional states [31]. Bender and Sung conducted a psychological analysis consisting of participants' affective emotional responses such as fear, arousal, and enjoyment, and their relations with VR immersion levels. This study examined the user experience of a VR game employing psychophysiological measures and examined users' affective experience and whether such affective experience relates to users' experience of enjoyment. Employing a one-way within-subject design, 63 participants were randomly presented with five gameplay conditions while psychophysiological equipment was used to measure participants' responses. Results showed that the intensity of users' affective responses differs based

on the different gameplay modes that were selected as a natural manipulation of immersion levels. Ultimately, the findings showed that immersion is an antecedent of affective responses such as fear, arousal, and enjoyment, demonstrating the marketing implications of immersion and affective responses of VR games [6]. Lin investigated players' fright reactions and coping strategies in an immersive VR horror game. The goal of this study was to explore how participants responded to fear elements with coping strategies and recorded their immediate and next-day fright responses. Using a mixed-methods approach, this study recruited 145 university students who were willing to play a VR horror game. The research applied methods of multiple questionnaires and surveys to determine their fright reactions. Female participants, low-sensation seekers, and high-neuroticism participants reported a higher degree of fear from playing a VR survival horror game. The study identified place illusion (PI) and plausibility illusion (PSI) elements that caused fright experiences and revealed only a few participants experienced next-day cognitive fright [32].

3.4 Video Games and Dreams

Previous research has examined the impacts of video games on sleeping activities, mostly focusing on adolescents. King and researchers investigated the short-term impact of adolescents' prolonged exposure to violent video gaming on sleep. Results provided evidence that prolonged video gaming may cause clinically significant disruption to adolescent sleep, even when sleep after video gaming is initiated at a normal bedtime [29]. In a similar study, Altintas and others aimed to explore sleep quality among frequent video game players. Statistical analyses were performed consisting of descriptive and hierarchical cluster analyses measuring participants' sleep quality, mental health, physical health, and gameplay behaviors. The results indicated that sleep quality was positively associated with mental health and negatively associated with gameplay intensity [2]. Among the researchers who investigated the relationship between dreams and video games, Jayne Gackenbach is a dream researcher whose focus is lucid dreaming [18]. Gackenbach investigated the relationship between video gameplay and threat simulation dreams, lucid dreaming, dream content, and dream bizarreness [18]. Multiple studies have indicated that frequent video gameplay has prominent effects on dreaming and consciousness development. Gackenbach's earlier research explored the implications of video games on lucid dreaming and consciousness development. The goal was to examine consciousness development indices, particularly lucid dreaming, as a function of video gameplay. Data analyses were conducted on reported dream variables, waking variables, and mystical and absorption variables from participants. Results showed that frequent video game players were more likely to report lucid dreams, observer dreams, and dream control [17]. Building on this, Sestir and colleagues aimed to identify connections between specific video game genres and lucid dreaming, as well as gameplay and engagement, and game content incorporation and dreams. Through data analysis, findings

demonstrated that physically interactive games were positively correlated with lucid and lucid/control dream frequency. Overall gameplay was not associated with the frequency of lucid and lucid/control dreams but was positively correlated with the incorporation of game content into dreams, which in turn was positively correlated with lucid and lucid/control dream frequency [57].

Similar research explored the relationship between video games and their effects on dreams and dream content that were affected. This study investigated the effects of video games on college students' dreams concerning Revonsuo's evolutionary theories on dreams, which postulate that themes concerned with ancestral and survival threats should be prevalent in dreams [50]. Known as the threat simulation theory of dreaming, Revonsuo proposed that dream consciousness is essentially a human biological defense mechanism, evolutionarily selected for its capacity to repeatedly simulate threatening events. Revonsuo discussed that empirical evidence from normative dream content, children's dreams, recurrent dreams, nightmares, and the dreams of hunter-gatherers indicates that our dream-production mechanisms are specialized in the simulation of threatening events [50]. Based on the gathered data, the standard dream content analysis system was used to analyze these dreams as was another content analysis focused on lucid dreaming. The results demonstrated that video gamers' dream content included easily recognized references to games. Although gamers evidenced more self-negativity in these dreams, other indications of positive emotional environments were present. Ultimately, the results indicated that dreams regulate the intense experiences of gaming experiences [21].

Diving deeper into the dream content, Gackenbach and Kuruvilla's research explored the relationship between video gameplay and its effect on threat simulation dreams. This research aimed to examine the hypothesis that high-end gamers would experience fewer threat simulation dreams because of frequent threat resolution rehearsal during gameplay. In the study, subjects were asked to fill out surveys regarding their gaming history, media use, and dream experiences. The findings ultimately supported the main hypothesis. Results indicated that individuals with a history of frequent gameplay experienced fewer threat severity variables in their dreams [19]. And, an additional study conducted by Gackenbach and colleagues focused on evaluating whether frequent video game play results in higher levels of dream bizarreness. As a result, high-end gamers' dreams were coded as containing more incongruent and vague elements than those of low-end gamers based on dream content analysis developed by Revonsuo and Salmivalli [20, 51].

Chapter 4

Methodology

4.1 Phenomenological Approach

Essentially, I employed a phenomenological approach aiming to generate new experiences among participants and collect data that are in-depth, nuanced, and descriptive. Specifically, semi-structured interviews and dream journals provided insights into participants' subjective emotional and dreaming experiences affected by recurring VR horror gameplay. To justify this methodological choice, I adopted qualitative approaches of phenomenology and micro-phenomenology. Phenomenology describes the shared experiences of individuals and reduces them with a phenomenon to descriptions. It heavily emphasizes the "what" and "how" that the individuals have experienced the particular phenomenon [38]. In this research, the objective is to describe the shared phenomena of emotional and dreaming experiences affected by recurring VR horror gameplay. The research questions are open-ended process questions that focus on the essence of experience. In contrast to phenomenology, I aimed to explore newly generated experiences rather than focusing on individuals who have been playing the game independently. The intention was to maintain control when measuring these generated, unexplored participant experiences. Thus, while rooted in phenomenology, this methodology adapts to a phenomenological approach. Essentially, this approach was intended to delve into the essence of the unexplored, shared VR horror game experiences.

Focusing on generating new experiences and aiming to develop an essence of the shared phenomena, the systematic process of this approach consisted of the key characteristics of phenomenology. Central to this methodology was using interviews as the primary method for data collection and the development of themes through thematic analysis. In this study, my particular interests lay in the participants' subjectively generated emotional and dreaming experiences. For instance, a phenomenological study delved into how individuals experience emotions in dreams [16]. It attempted to show that phenomenology-based approaches are prominent for investigating dreaming experiences, allowing for richer descriptions and a deeper understanding of the phenomenon [16]. Moreover, different methods to measure

Participant	Gender	Age	Background
P1	Man	24	Graduate student
P2	Man	23	MBA Student
P3	Man	30	Graduate student
P4	Woman	24	Graduate student
P5	Man	27	Graduate student

Table 4.1: General characteristics of participants.

emotions in dreams (e.g., self-rating using emotion rating scales in comparison with external ratings using content analysis of narrative dream reports) can lead to very different results concerning the affective content of dreams [58]. Also, previous studies have explored the effects of video games predominantly through quantitative methods and statistical analyses, lacking alternative approaches. Hence, the design and approach in this study are meant to investigate participants’ subjectively generated experiences, diverging from placing measured data into pre-existing categories. This approach not only encourages other studies to adopt qualitative approaches for more nuanced responses but also complements future statistical data, fostering a deeper understanding of the phenomena.

4.2 Participants

Seven participants were initially recruited via word-of-mouth and Discord¹, but two withdrew after experiencing severe motion sickness. Five individuals ultimately participated, see Table 4.1 for their characteristics. Through filling out an online survey, four identified as male and one as female. Three participants described playing games regularly on mobile and desktop devices, and most participants have played at least one VR game but not at all often. Even though most have heard of the media franchise series *Resident Evil*, none have ever played *Resident Evil 7* or were aware of its VR release. Only one participant revealed having done dream journaling in the past. All participants reported no motor control issues or health concerns such as migraines, epilepsy, multiple sclerosis, or chronic pain.

4.3 Study Design

Participants were then informed of the research commitment and expectation: the study spans approximately four consecutive weeks, involving various data-collecting methods. Upon receiving the signed consent forms, participants were given an anonymous survey inquiring about their demographics and VR gameplay experiences. Participants were labeled P1 to P5 to protect their anonymity. Participants were then asked to input their

¹<https://discord.com>

availability on LettuceMeet², and I scheduled the sessions based on the participants' input. The game was installed on a desktop PC, and Oculus Quest 2 was provided to participants during gameplay. Recognizing varied progress in each gameplay session, the game allowed participants to save their advancements as timestamped files, enabling participants to resume their saved progress. If participants experienced any discomfort or motion sickness during the gameplay, they were encouraged to pause and take a short break. Each gameplay spanned approximately 30 minutes, followed by a 10-minute semi-structured interview probing into their VR gameplay experiences. Each participant was in one or two gameplay sessions per week and six to eight for the whole study duration. Once participants had started the gameplay sessions, they were asked to write down their dreams following a journal prompt. Dream interviews were conducted as participants progressed through the study, exploring their dreaming occurrences. Ultimately, final interviews were conducted with each participant, inquiring about their subjective experiences.

4.4 Data Collection

Each participant engaged in VR gameplay sessions that each ranged approximately 30 minutes, followed by an interview inquiring about their gameplay experiences. I used a semi-structured interview protocol, see Appendix C.1. They were written to guide the participants to reflect on their experiences rather than a strict script. The VR gameplay interview protocol was designed to inquire about participants' game experience, emotional effects, immersion, physical sensations, etc. The interview questions remained the same throughout, but certain aspects of participants' evaluations shifted as the gameplay progressed. Once participants had started the gameplay, they were asked to dream journal guided by a prompt. Because dream journaling entirely depended on participants' self-documentation, detailed journaling was highly encouraged for data collection. I designed a dream journal prompt to elicit participants' in-depth and nuanced dreaming occurrences, see Appendix D. Categories of entry date, dream content, dream emotions, awake response, and coping strategies were included. As participants progressed, a one-on-one dream interview was conducted inquiring about their dreams and dream journaling experiences, see Appendix C.2. Each dream interview lasted about 10 minutes. Similarly, the dream interview protocol was designed to elicit participants' detailed dreaming experiences and introspection. Participants described their experiences which consisted of recurring dream themes, significant dream emotions, connections to gameplay, and dream changes. Along with dream journaling, dream interviews were an additional source of descriptive dream data that provided more nuance. Final interviews were then conducted with each participant lasting around 20 minutes. We gathered a general sense of participants' gameplay and dreaming experiences from the recurring

²<https://lettucemeet.com>

interviews and dream journal entries. The final interview protocol was written to encourage participants to deliberate on their gameplay and dreaming experiences, see Appendix C.3. It is meant to guide participants in reflecting on their experiences rather than a strict script. Finally, participants elaborated extensively on their VR gameplay experiences and unveiled interesting and emerging dream patterns throughout this study period.

All participant interviews were conducted one-on-one and audio-recorded on a computer. The audio recordings were labeled according to participant numbers (i.e. P1) and interview types (i.e. P1-Final). Then, the audio recordings were transcribed via the otter.ai³ service followed by manual corrections to ensure accuracy. Participants documented their dreams anonymously on an online whiteboard software, FigJam⁴. Ultimately, constructing these data sources was intended to elicit rich, nuanced, and descriptive participant data to explore the emerging patterns regarding the research phenomena.

³<https://otter.ai>

⁴<https://www.figma.com/figjam>

Chapter 5

Qualitative Data Analysis

Following Braun & Clarke’s thematic analysis approach [8, 9], a method for identifying, analyzing, and reporting patterns or themes, data was systematically analyzed via the [Airtable](https://airtable.com)¹ service. Thematic analysis is considered a foundational qualitative method. It summarizes key features of a data set offering a ‘thick description’, highlights similarities and differences across data, and generates unanticipated insights [8]. My analysis precisely involved searching for themes concerning the research questions across the whole data set. This process underwent phases of data analysis to develop themes, which captured the important matters concerning the research questions and represented some patterned responses within the data set [8]. Rather than a linear process, I applied a more recursive approach where I repeatedly moved back and forth across the entire data set.

Codes and Code Clusters

The thematic analysis started with gathering all raw data from semi-structured interviews and dream journal entries. To further familiarize myself with the data, I wrote participant-specific memos as I engaged in active reading – identifying potential patterns before data coding. The audio recordings from interviews were then exported and transcribed via otter.ai followed by manual corrections to ensure accuracy. In this process, potential patterns began to emerge and formulate. To generate initial codes, I systematically extracted codes from the entire data set and identified significant aspects regarding the research phenomenon. Specifically, I extracted codes that may address the research questions or contribute to emerging patterns by closely reading through all the data. Then, I manually entered the extracted codes into a table as individual entries and added their relevant labels, see [Table 5.1](#) as an example. As I coded through the data, a common practice occurred where I considered whether an existing code applies or to develop a new code. More than a thousand initial codes were then generated that I thought were relevant. Using an inductive analysis approach, higher-level code clusters were then generated from initial descriptive codes. Each

¹<https://airtable.com>

higher-level code cluster contained some initial codes resulting in code clusters relevant to participants' gameplay or dreaming experiences.

Codes	Code Clusters	Themes	Participants
Reflective of dreams throughout	Dream Contemplation	Dream Retrospection	P4-Final

Table 5.1: Example of an extracted code, its associated code cluster, theme, and participant label.

Themes

Once the code clusters that contained identifiable codes were collated, I began to search for themes and potential patterns. This phase re-focused the analysis on the broader level of themes, rather than codes or code clusters that are more specific. Essentially, I sorted the code clusters that contained initial descriptive codes into potential themes and collated the relevant coded data extracts within the identified themes [8]. Visual representations of these tables contributed to sorting code clusters and examining the relationships between code clusters and themes. During this phase of theme searching, most code clusters contributed to forming candidate themes, see Table 5.2. Devised candidate themes were undergone and involved in two levels of review and refinement before theme definition. Level one involved reviewing coded data extracts and code clusters from candidate themes. Level two involved considering the validity of individual themes concerning the entire data set [8]. With further refinement, candidate themes transformed into themes containing code clusters that showed a clear narrative. After further definition, four themes and two sub-themes were established to tell a coherent story. Each theme captured an aspect concerning the research phenomenon, and sub-themes provided specifics within themes. The finalized findings and the emerging patterns are presented below.

Code Clusters	Themes
Game Design	Gameplay, Horror Effects, and Immersion
VR Interactions	Gameplay, Horror Effects, and Immersion
Immersion and Presence	Gameplay, Horror Effects, and Immersion
Game Emotions	VR Horror Gameplay Experiences
Physical Sensations	VR Horror Gameplay Experiences
Gameplay Adaptation	VR Horror Gameplay Experiences
Connection to Protagonist	VR Horror Gameplay Experiences
Gameplay Impressions	VR Horror Gameplay Experiences
Dream Emotions	Dreaming Experiences
Dreaming of Game Settings and Scenarios	Dreaming Experiences
Dreaming of Combats and Character Interactions	Dreaming Experiences
Dreaming of Video Games	Dreaming Experiences
Dream Journal	Dream Retrospection
Dream Identification	Dream Retrospection
Dream Contemplation	Dream Retrospection

Table 5.2: Finalized code clusters and associated themes derived from initial codes.

Chapter 6

Findings

From the thematic analysis, I identified four themes and two sub-themes. The first two main themes pertain to elicited participants' VR horror game experiences, and the other two main themes pertain to participants' dreaming occurrences and recognition.

6.1 Gameplay, Horror Effects, and Immersion

Game Design

Video game components were prominent factors that affected participants' immersive experiences. Specifically, the visual output of graphics and auditory output of sound effects contributed significantly to immersion and horror effects, which universally affected participants' responses and user experiences [1]. Participants categorically described their perceptions of graphics and audio after each gameplay. P1 recalled the game's visuals and environmental design as memorable, disgusting, and terrifying. After exploring the basement environment of the game, P1 frequently conveyed that the environment was creepy and eerie throughout. P3 recalled specific graphics of shadows and lightning are terrifying and immersive:

“The game plays a lot with shadows, and I think that's super scary, for sure. Because you're never really sure, like if something's gonna pop up or not.”

In another instance, P3 described shadows and lightning in detail:

“And I think there are lots of elements in that video that really freaked me out. . . I think lightning in the video is super important because you can see the mum walking around, and then the light kind of gives you a hint, but it's like a super scary hint. And also her shadows and also like when the two times that the lights go off, definitely are super, super freaky and scary.”

P2 described the visuals of blood and limb-cutting to be scary and disgusting. Participants also considered the game audio to be extremely effective. P4 conveyed that the game's ambient sounds added to immersion and heightened the horror effects. It was noted that the characters' horrifying screams added to the feeling of presence. It was convincing enough

for P4 to feel like actually present in the game. P3 categorically described the game audio as the scariest and described a terrifying balcony environment:

“I think one of the memorable and horrifying moments is when you go out in the balcony of the house, that balcony is scary as ****. It’s really, really scary. Like, with the sounds happening and like all of the darkness and you can see you know, like the lights, while you hear the dad inside. It’s like, I definitely never feel very, like happy to be there.”

Notably, P1 expressed that constant ambient and creaking noises were intense and made P1 particularly ultra-focus on the environment. Similarly, P2 discussed the intricate game elements of rain, knocking sounds, and dim lights that captured their maximum attention. Across the board, participants indicated that the syncing of game audio and designated sequences was extremely intense and immersive. Lastly, participants discussed that the graphics and audio were incredibly diverse in format, and therefore massively added to the presence feeling.

VR Interactions

Participants also discussed that VR’s mechanics and interactions added to the overall immersion and intensified the perceived horror effects. P1 expressed that more tangible game interactions and VR controllers’ haptic feedback significantly added to the immersion. P1 described their experience with an action-packed scene:

“...the game also has like, haptic feedback on the controllers. So the moment something happens like that, it vibrates, both of them. And that also helps (immersion) a lot. Because I feel like, so when she (Mia) attacks you, every time she stabs there’s a vibration that comes each time. So that’s pretty cool. I can feel like, it’s actually touching me, instead of just not feeling anything.”

P1 also mentioned that shooting-based interactions further enhanced immersion and engagement:

“I did feel pretty immersed this time. So I think as I mentioned, I also found ways to enhance my performance in terms of gameplay. So I started doing things that would benefit me. I mean, there’s something which I’ve done in VR games before, but like, just to improve my aim. I started doing things which are like, like resting it on my other arm. So my aim is steady, all of those things added to my immersion. Like, I felt like I actually had use of more of my body.”

The progressive plot and increased interactions resulted in P1’s full immersion in the final gameplay. P1 described their gameplay experience in detail which consisted of “more incentive towards collecting bullets”, constantly looking for items, and being fixated on everything in the virtual environment while restlessly rotating in the physical space for better shooting aims. P1 remarked on the game’s interactivity compared to standard video games:

“... a lot of the functions did rely too much on like, my actual motion, like being able to block or reaching out to pick up something, as opposed to like, how in video games, you would just go to the closest point and then click a button. So I felt like I was like, the whole thing of reaching out, ducking, and crouching and like covering or like escaping from enemies, all of that added to like my overall immersion.”

P5 expressed that the incorporation of VR gestures like blocking enemies by holding Touch Controllers resulting in movements synchronized with in-game actions also added to the overall immersion. For instance, all participants uncontrollably moved back in the physical setting to draw distance when aiming and defeating enemies because of high immersion.

Immersion and Presence

All participants conveyed that immersion intensified perceived horror effects. P1 reflected on the overall immersive horror experience and expressed that playing in VR caused more substantial horror effects:

“VR definitely made the horror elements more because just looking around panning and all like, taking care of like my character. There was a lot more like, actual physical movement required from my end... So along with, like, the way the interactions worked, they all were tied to my physical movements. And so that that whole thing definitely made me more immersed and that, in turn, like made the horror effects much stronger. So any jump scare that would happen because it’s hard to look away because it’s like my whole viewpoint.”

P3 discussed that they perceived fewer horror effects when they were less immersed or experiencing cut scenes that were “nonsensical”, which led to less immersion. When reflecting, P3 recalled further incidents of immersion intensifying horror effects:

“Definitely, at some moments, it really, really intensifies the situations, especially because like I think sometimes you do get lost and you kind of remember that, or you don’t remember that during the game. So there are moments where I could feel myself becoming panicked. Like I remember the first time that I walked out of the hallway where there’s like, like the night happening and the mom is outside, and you kind of see the mom yelling and then you were like in that horrible, horrible-looking hallway. I wasn’t even thinking that I was in the game. I was just super downright scared.”

When reflecting, P4 and P5 categorically described that being in an immersive environment intensified the horror effects. As P4 described:

“your whole view is that, then something else is like the sound effects also. Because you’re like fully hearing it, you’re blocking out everything, basically. So it’s just as if you’re trying to convince yourself that you’re there. And at some point, it really becomes that after like, playing it for a while.”

Finally, participants expressed an increased level of immersion as gameplay progressed. P2 described their experiences of in-depth immersion when equipped with the Oculus head-

set. As immersion drastically increased with each gameplay, P1 felt “fully in the game” during the final gameplay. P2 “lost track of being in the virtual environment” by the third gameplay and felt the highest level of immersion expressing being completely unaware of their actions in the non-virtual environment during the final game. Similarly, P3 perceived increased immersion throughout and had “no awareness of the physical environment” as the game progressed. They conveyed that the VR gameplay became more immersive and interactive over time. Finally, P5 also expressed that immersion significantly increased as the plot progressed from initial low immersion to incorporating more game interactions. Participants conveyed their motion sickness and coping strategies via semi-structured interviews. P3 expressed experiencing motion sickness during initial gameplay from character movements and environmental design describing it as “I did feel dizzy”. With progressive gameplay and increased immersion, P3 expressed decreased motion sickness describing it as:

“I just didn’t even care about like getting dizzy or not. I was just kind of like in survival mode, that was super fun.”

When reflecting on the gameplay experience, P3 drew a comparison between initial and further gameplay describing the initial gameplay as motion sickness-inducing but experiencing none during the latter. P4 also expressed experiencing motion sickness with initial gameplay but was able to cope and ignore the uncomfortableness with progressive gameplay. Similarly, P5 has undergone motion sickness during initial gameplay then expressed that it “faded away” with game progression.

6.2 VR Horror Gameplay Experiences

Physical Sensations

Across the board, participants experienced physical sensations in response to the immersive gameplay. Intense horror effects and high immersion affected participants to uncontrollably react in ways of sweating, increased heart rate, pounding heart, being startled, chills, and sometimes shaking. Particularly, moments of intense combats, character interactions, unexpected incidents, and anticipation affected participants to exhibit physical sensations. To name a few, P5 experienced sweating and flinching then later adrenaline rush in response to immersive combats against terrorizing antagonists. P4 regularly experienced increased heart rates, startling, sweating, and shaking with each gameplay. Additionally, P4 described feeling synchronized to in-game audio:

“... I did feel like an increase in heart rate, especially because the audio of the game, it had heartbeats as part of the game. So, like, somehow I felt like I was also becoming more synchronized with that.”

Repeatedly, P2 acknowledged constant shivering and noticed their palms sweated as the game audio got increasingly intense. When encountering terrifying characters or interac-

tive sequences, P2 and P4 were often startled and screamed uncontrollably. Frequently, P1 experienced hyperventilating and sweating during and after each gameplay. Moreover, P1 and P3 were often startled and completely froze when unexpected incidents happened, even when anticipating them. And, P2 described experiencing noticeable high body temperature and adrenaline rush because of game intensity and increased immersion.

Gameplay Adaptation

Initially, participants described the game to be somewhat difficult, especially the game controls. Over time, participants demonstrated that adaptation to the game and its mechanics was a prominent contributor to their experiences. For P1, the gradual adaptation of game controls was significant. In the beginning, P1 put sufficient effort into figuring out the controls, especially during intense combats against devilish characters. Gradually, P1 expressed that adapting to interactions added to the overall immersive experience. P1 eventually described how their adaptation contributed to a positive gameplay experience:

“I think I’m completely immersed into the gameplay, I have like a very good understanding of just overall, the environment, controls, and everything. So I’m not really struggling with anything. So that helped me progress more efficiently to the whole experience.”

Also, P2 demonstrated their constant strategizing during initial combats but was able adequately to use weapons later in the progress. More importantly, there was a gradual adaptation to very stressful moments as P2 became more fluent with in-game controls. P3, P4, and P5 described initially dealing with difficult controls and technical aspects of the game but eventually adapted. And, P4’s game adaptation even made them feel hopeful during intense sequences which added to their overall immersion.

Connection to Protagonist

When reflecting, participants expressed an overall connection to the game protagonist, “Ethan”. P1 repeatedly conveyed feeling more “connected to the protagonist than anyone else” and “more concerned with the protagonist”. Moreover, P1 conveyed that worrying for the protagonist was largely due to the immersive gameplay being from a first-person perspective. As the plot progressed, participants became gradually invested in the protagonist’s adventures and well-being. P3 and P4 felt almost no attachment to any characters during initial gameplay but became gradually concerned for the protagonist later on. P4 gradually invested in saving the protagonist from the horrific environment and frightening characters as the game progressed.

Gameplay Impressions

Lastly, the game had lasting and memorable impressions among participants. Participants across the board expressed an appreciation and a surprisingly positive experience during

final reflections. P1 discussed that it was an “overall very memorable experience” and the experience “really stuck” with them. Furthermore, P1 showed a vast appreciation for the game. As P1 put it:

“I think it was one of the most standout video game experiences I’ve had. It’s also probably because I’ve not played as many VR games. So it definitely had a very personal connection to it.”

P2 was also fully invested in the game. With lasting impressions like wanting to finish the entire game, clearly remembering the characters, and feeling paranoia thinking about the horror gameplay. P2 discussed that it was a very distinctive VR gameplay experience. Overall, P5 thought that it was an exceptionally designed game with outstanding horror effects. P5 reflected that the antagonist of the game was very memorable and terrifying, which left a lasting impression. Besides feeling fearful, anxious, and excited during gameplay, P3 mentioned that it was a “surprisingly fun gameplay experience,” and playing in VR was quite enjoyable. After all, P4 and P5 commented that the gameplay experience gradually became generally positive and enjoyable.

6.2.1 Gameplay Emotions

All participants recounted their emotional responses via semi-structured interviews. With progressive gameplay, participants expressed a range of emotions but some remained the most commonly exhibited throughout. And, participants underwent interchangeable emotional experiences with plot progression. Participants described feeling one type of emotion or mixed emotions under various game settings or character interactions. Table 6.1 demonstrates the most reported gameplay emotions among all participants. Fear, anxiety, excitement, and stress were the most reported emotions from recurring VR horror gameplay.

Gameplay Emotions	Count
Fear	49
Anxiety	24
Excitement	19
Stress	18
Anticipation	17
Focus	14
Reluctance	13
Pugnacity/Interestedness/Calmness	12
Survival-oriented	10

Table 6.1: Dominant VR horror gameplay emotions across all participants.

Fear

Participants exhibited substantial feelings of fear and terror among reported emotions. Often, participants also experienced fear mixed with other emotions: stress, anxiety, reluctance,

and shock. Universally, participants uncovered that various types of explorations and interactions induced severe fear. Environment exploration, jump scares, character interactions, and violent combats were the noted factors that induced the most fear among participants. Several participants experienced severe fear when exploring the abandoned, rural estate in the game. Mixing in with immersed physical sensations, participants reacted in ways of trembling and screaming when experiencing severe fear. Additionally, participants visibly demonstrated startle responses when encountering fear-inducing jump scares. P1 described being scared to explore the environment and was “really afraid to open any doors” because of the pressuring unpredictability. To put it in more context, P1 recounted:

“The gameplay, like, it started off just looking like a haunted house, for example. But as I explored different areas and saw different parts of the house that, that enhanced my experience and like, caused more fear very often, especially like when I started going to the basement.”

P1 and P2 also exhibited fear as they concentrated on the settings’ components: rain, dark lightning, sounds of knocking, creaking, and footsteps. Likewise, P3 and P4 were very fearful to explore the game environment. As P3 put it:

“It’s like constant fear of free exploration. You don’t really want to explore freely in the game.”

Participants across the board also experienced great fear of confronting the villains, especially in unanticipated instances. P5 discussed his encounter with the characters:

“When I open the door and ‘Jack’ grabbed me and then sort of hit me away, that was as not expecting, so that really scared me. And when Mia was underneath the tunnel, and everything got dark and then I was I was expecting something. Yeah, but still I got scared, so that was intense.”

P4 and P1 emphasized the sequence of “Jack” noticing, seeking, and then restlessly chasing the protagonist was very fear-inducing. P3 expressed the most fear when a character unexpectedly attacked the protagonist, and P1 felt fear and helplessness of characters possibly overpowering the protagonist. All participants expressed fear and fright after encountering unavoidable jump scares.

Anxiety

Other than fear, participants frequently expressed feeling anxious during gameplay. P1 initially experienced anxiousness in certain moments but the feeling became constant later. Initially, P1 described the mysterious game elements and suspensive exploration caused anxiousness. Then, fight sequences, hiding from antagonizing characters, and “a lot of unexpected actions” were also described as very anxiety-inducing. Specifically, P1 discussed the constant anxiety of worrying whether “Jack”, the main antagonist, would unexpectedly appear from behind. P5 experienced the greatest anxiety during intense chase scenes where “Jack” relentlessly pursued the protagonist. P2 and P3 also described severe levels of

anxiousness during intense combats or chase sequences. Besides being consistently anxious since the initial gameplay, P4 also described feeling extreme anxiety witnessing unexpected events that occurred through plot progression and character interaction.

Excitement

Participants expressed feelings of excitement throughout, predominantly when exploring new spaces and combatting menacing characters. P3 expressed an overall feeling of excitement or enjoyment, especially when battling the main antagonist. Likewise, P2 expressed being “super excited” fighting “Jack” during the garage scene where “Jack” restlessly and violently attacked the protagonist, even after being shot multiple times. Additionally, P2 discussed that increased character interactions and movements added to their overall excitement. Also, P5 described the shooting sequences to be very exciting. P4 expressed that it was “exciting to explore new and different things around” the game. Several participants discussed that the strong desire to defeat “Jack” transformed feelings of continuous fear or stress into excitement. P1 discussed that unraveling the plot and its emerging sequences was as exciting as combats and explorations. And, participants were particularly excited to progress further in the game, wanting to know what happens to the protagonist (themselves) and the story.

Stress

Lastly, participants described feelings of stress on multiple occasions. P2 expressed feeling stressed out when encountering “Jack.” P3, P4, and P5 all expressed experiencing severe stress in intense chase sequences trying to escape from the antagonists. P3 also described a mixture of feeling scared and stressed out. While undergoing consistent gameplay, P3 conveyed experiencing a “constant level of stress” when looking for items, fighting creatures, and trying to defeat the characters. All participants described feelings of constant anticipation of misfortunes and twists of events with an emphasis on jump scares and surprising character encounters, emphasized by P4 and P5. Furthermore, P3 exhibited feeling completely frozen when anticipating “surprising events” or “worst jump scares.” P2 also experienced severe sweating when anticipating unexpected events and was mentally preparing for the worst causing them even more severe stress.

6.3 Dreaming Experiences

Thematic analysis revealed that participants’ dreams heavily reflected gameplay-related content during the study period. Specifically, participants dreamed of settings, objects, combats, and character-based actions closely associated with *Resident Evil 7*. Additionally, participants exhibited dreams of other video game-related content in between.

Dreaming of Game Settings and Scenarios

Participants frequently dreamed of environments, objects, and settings that resembled those in the game. Quite often, participants dreamed of eerie and creepy elements that highly resembled the game environment – night setting, faint lighting, rain, dark musky corridors, disgusting toilets, and more. P5 described some of the dream settings to be “dark and disturbing” with “film-like scenes.” In one dream, P5 depicted an old, fortified, and castle-like school building with corridors that looked like mazes. P4 often dreamed of “very dark and ambient environments” like being “trapped in a closed room with no windows” in a mental asylum or “a mattress in the middle of a house which has gotten wet by rain.” P1 dreamed of an apocalyptic setting consisting of zombies, and the scenes were “scary yet realistic.” This dream was a convincing reflection of the horror genre and the possessed, inhuman characters in the game. In this period, P1 noticed that their dreams often transitioned from “normal” settings to “creepy” ones: sudden shifts to a dark mansion mixed with a “disturbing and stressful turn of events.” These depictions of dream environments incorporated a lot of game environmental elements: castle-like houses, maze-like corridors, closed rooms, claustrophobic spaces, and rainfall. P3’s dream descriptions were often filled with these elements along with a gloomy, eerie, and dark ambiance. Repeatedly, P1 and P3 dreamed of a grand, dark, and eerie mansion. The dream entries vividly described intricate mansion elements: scary and old Japanese architecture, a series of large, dark rooms, constant rain, descending stairs, a wall covered in spider webs, mirrors that distorted reflection, and a massive moving sinkhole. Often, participants explored and ventured into these nightmarish environments. In one dream, P3 opened a cabinet with glass jars and then became possessed after touching them. In another instance, P4 dreamed of “rearranging nostalgic photos on the wall”, which possibly mirrored a game interaction when P4 stared at a character portrait on a corridor wall. Comparably, P1 dreamed of “photo albums of compressed dead dogs”. Objects of photo albums and dog heads were recurrent objects that participants interacted with. More than that, dream entries mirrored disgusting objects that participants discovered during game explorations: rotting fish, mangoes, feces, and chopped hands.

Dreaming of Combats and Character Interactions

Each participant rotated their VR headset to interact with the surroundings as the main protagonist. They used the Quest controllers to collect weapons, ammunition, and medicinal items. Gestures like blocking allowed for reducing damage from attacks, and participants used various weapons and strategic tactics to defeat enemies. Dream journal entries revealed participants’ frequent dreams of intense combats, altercations, and confrontations that mirrored game interactions. P4 discussed and noted dreams of active threats, e.g. a figure carrying an ax trying to attack and P4 being brutally beaten. Likewise, P1 and P5 dreamed of assaults as well as witnessing others and their deaths. P5 dreamed of being a

member of a criminal organization and shooting at hostile individuals in a “Mexican stand-off”¹. P5 witnessed other members being murdered while slowly falling into an unconscious state due to gun wounds. Hence, P5 expressed that they were very conscious of dreaming about deaths, which had never really occurred before the gameplay. P5 also depicted dream themes of “heroism” and “betrayal”. P3 discussed his frequent dreams of blood, combats, and threats in intense action sequences that involved weapons. In one dream, a threatening, “evil” character brutally shoots at P3, and P3 “seized a shotgun and took decisive action” while “knowing a headshot would result in immediate death”. In another dream, P3 embodied a figure to defeat a frightening monster by attempting to destroy its head. In other instances, P3 often confronted and combated distorted, mysterious, and repulsive creatures by undergoing “an extraordinary process.” These depicted action-packed dreams notably mirrored the game sequences – frequent confrontations, battles, and attempts to defeat the enemies with various weapons. Often, participants dreamed of gestures and actions in first-person POV that closely resembled the gameplay. P1 revealed that they navigated their dream worlds similar to in-game navigation tactics like slowly walking through rooms. Also, P1 dreamed of gesturing and blocking with their hands from a first-person perspective. In one instance, a knife is stabbed through their hand, which echoes the scene where the protagonist gets stabbed with a knife going through his hand. Similarly, P3 dreamed of stabbing a woman with a blade but failed and described it as a “sensation akin to the ineffective attacks in gameplay.” Also, P3 often dreamed of searching for specific objects, which may be a reflection of searching for weapons, medicine, and ammunition in the game. P1, P4, and P5 all have dreamed of hiding, remaining silent, and trying to escape on multiple occasions. These dreams may be reflections of the game sequence where the protagonist tries to hide from a horrifying character “Marguerite”.

Dreaming of Video Games

Other than dreaming about *Resident Evil 7* content, participants also journaled dreams of other video game-related. P1 had dreamt of individuals playing violent fighting games. In a later entry, P1 dreamed of “devising a method for a game that could induce fear effects” that “resulted in a self-aware and existential AI developed using GPT” with me, the researcher. In another instance, P1 dreamed of being in a video game as a protagonist that required them to have flying abilities. Often, P1 revealed that they dreamed of being in or playing a video game. P3 revealed that they dreamed of other games other than *Resident Evil 7*. In one instance, P3 dreamed of playing *Age of Empires*² and having multiplayer connection errors. In another instance, they dreamed of “encountering a grotesque version of a character from

¹Merriam-Webster definition: a situation in which no one emerges a clear winner

²<https://www.ageofempires.com>

*The Legend of Zelda*³. One dream depicted P3 having a strong desire to play *The Legend of Zelda* on a Nintendo Switch⁴ but “only to find the game wasn’t functioning properly.” Regardless of struggling in this dream, P3 attempted to play restlessly. In another instance, P5 dreamed of discussing and deciding to play *Call of Duty*⁵ in a classroom and install it on a laptop.

6.3.1 Dream Emotions

All participants revealed their dream emotions through dream journals and interviews. They wrote down and reflected upon a range of dream emotions, with certain ones consistently recurring, see Table 6.2. Stress, anxiety, excitement, and fear emerged as the most frequently reported dream emotions during the period of dream journaling, mirroring those experienced in the recurring gameplay. Besides dream content, this highlights the converging realms of elicited in-game emotions and dream emotions, revealing an overlap between these realms.

Dream Emotions	Count
Stress	17
Anxiety	11
Excitement	11
Fear	11
Uneasiness	8
Sadness	6
Adventurous	5

Table 6.2: Dominant dream emotions across all participants.

Stress

The participants overwhelmingly reported experiencing intense feelings of stress in their dreams. Oftentimes, participants dreamed of discomfiting situations that were stressful and challenging to navigate. P1 reflected on having the “continuous theme of being stressed” among their dreams, causing disturbed sleep and sweating during some nights. Journal entries indicated that P1 experienced stress and sometimes mixed with unease and disturbance. P1 noted in one dream journal entry:

“A vision of Mother Maria and a twin surfaced in my dream. A unique phenomenon had occurred – all currencies worldwide had been replaced. To my surprise, I was the architect of this sudden change, having staged a coup to slowly transition out of the old system. My sleep was unusual and I felt weak, with a sense of things going wrong. A distressing

³<https://zelda.nintendo.com>

⁴<https://www.nintendo.com>

⁵<https://www.callofduty.com>

conversation involving my mother about my partner and my dad's lack of support in our relationship added to my restlessness."

Upon reflection, P3 acknowledged experiencing numerous stressful dreams during this period. Stress was a recurring emotion for P3 in diverse dream scenarios, ranging from bizarre occurrences and angry confrontations to confrontations with devilish creatures and academic conflicts. P3 documented an exceptionally stressful dream:

"We arrived at a fish tank that me and my brother had bought, and as we usually did as kids, we had bought like every single thing for it and then abandoned it. The fish at first seemed to be alive, like lying down on plants but still breathing. But upon closer inspection, I realized they were all being eaten alive by a carnivorous plant."

In another dream, P3 experienced stress from witnessing a family member not following COVID-19's health regulations while being sick. P4 often dreamed of stressful scenarios that involved decision-making and unmanageable conflicts. In one dream, P4 described a stressful dream scenario in detail:

"I was going on a vacation, leaving Vancouver for a month. I have a lot of plants, so I was sitting in my room a few hours before the flight deciding who to leave my plants to take care of, and also what specific instructions to give. Instead of it being an easy process though I was feeling very anxious just deciding who to give my plants to. Leaving them to one friend who knew how to take care of my plants was a good option, but it was uncertain whether she would be in town the whole time that I was on vacation. Leaving them to another friend had the drawback that they had no idea how to take care of plants so I didn't want to risk that person killing my plants. The situation was more stressful because I had little time to decide, and none of my friends were available at the time for me to discuss this with them."

P4 experienced overwhelming stress in their dreams, underscoring that their recurrent dreams of stress served as a significant reflection of their waking experiences of stress.

Fear

Participants consistently expressed feelings of fear in their dreams. P1, for instance, explicitly mentioned experiencing fear and a sense of repulsion in a particular dream, where they wrote:

"The dream presented a scenario where Issac from *Ted Lasso* gave me an iPad after fighting a video game together. There was an apocalyptic setting with zombies everywhere. My friend got very sick and there were scary scenes in the video game, which felt quite realistic. The setting involved slow walking through various rooms, bathroom scenes, and jump scares."

Similarly, P3 also described a terrifying and extreme fear-induced dream:

"When I got to the restaurant, which was more like a series of large, dark rooms, I noticed a strange, dark vibe. It seemed many people were 'duplicated', meaning several

tables had the same character. The place got progressively darker and more gloomy, and I felt as though people were staring at me. At one of the tables sat these tall, intimidating twins and a very frightening-looking doll, similar to *Chucky*. As the doll began to approach me, I knew the only way to avoid harm was to completely ignore it. Yet, I could feel it nearby and, through my peripheral vision, could see the doll creepily walking towards me on its hands and staring at me. . . it made me realize I would have to interact with the people around me. I started making eye contact, and everyone morphed into twisted, horrifying versions of themselves with long faces and exaggerated features. One person in particular, right in front of me, shifted his face into a terrifying mask with a long jaw and creepily shut eyes, similar to the distorted faces from Aphex Twin's music video *Windowlicker*."

P3 recounted a dream involving a violent and confrontational scenario with an armed stranger opening fire at them. P3 detailed this unsettling experience in the entry:

"Fear and concern swelled within me as I felt the impact of the bullets, yet a part of me also felt an odd confidence that I would survive the ordeal. As I tried to gather my breath to make a dash for the house, I abruptly woke up, deeply startled."

Additionally, an entry unveiled P5 experiencing betrayal and being shot following a violent sequence of conflict. P5 acknowledged that it was a "dark and disturbing dream" and consequently "felt scared." Notably, participants often found themselves needing to escape or navigate through terrifying environments in these fear-inducing dreams. P5, for instance, experienced fear when attempting to escape a fortified school building with maze-like corridors after stumbling upon a horrifying secret. Similarly, P4 felt intense fear in a dream where they were trapped in a closed room of a mental asylum. P4 provided a more detailed account of this particular dream:

"I'm constantly crying and screaming but no one hears me, or they choose to ignore it. Other people who go through this procedure seem sad but show nothing on their faces, they all seem very quiet."

Likewise, P3 also revealed dreaming of being "trapped in a house with a dreadful zombie-like entity" in a fear-inducing dream.

Anxiety

In addition to stress and fear, participants disclosed experiencing anxiety in their dreams. P2 described a dream of "falling down an endless loop of dark space" and expressed a sense of anxiety. In a lucid dream, P1 recounted navigating "an environment very similar to the game," leading to heightened anxiety. In another anxiety-inducing dream, P1 wrote in detail:

"My friend was brutally murdered by a child committing multiple homicides. He passes me and I act like I'm asleep. I then try to stop him but get stabbed through my hand in the process. The setting shifted to a dark, random mansion where I got attacked while sleeping."

Throughout the study period, P3 documented several notable anxious dreams. These dreams induced severe anxiety, often featuring distorted, frightening, and mysterious fictional creatures. Among them was a dream where P3 grappled with technical difficulties before a presentation at a prestigious university. In another dream, P3 felt severely anxious over missing an important flight. Similarly, P4 reflected on the persistence of anxious and uneasy emotions in recurring dreams. Often, P4 felt severe anxiety in dream situations involving decision-making, isolation, and frightening environments. The theme of anxiousness in dream emotions was recurrent among participants under various dream circumstances.

Excitement

Finally, participants expressed feelings of excitement via dream journals and interviews. These excitement-laden dreams often portrayed participants as highly engaged and proactive in various activities. For instance, in a dream, P2 navigated a vibrant highway with a friend, exuding thrill and enthusiasm. P3 experienced excitement paired with sentiments of empowerment, confidence, and triumph, particularly in a dream where they confronted distorted monsters to overcome fears. In another dream, P3 felt excited to vigorously perform parkour tricks and skillfully maneuver a football on a school field. Additionally, P4 frequently experienced excitement in nostalgic dreams, such as visiting a village restaurant in their home country and attending their favorite music band’s concert in another dream.

6.4 Dream Retrospection

Dream Journaling

When discussing dreaming experiences, participants communicated a heightened awareness and meticulous retrospection throughout the study. Dream journaling was found to have various effects on dreaming and dream awareness, according to the participants’ nuanced reflections. P1 discussed their gameplay and dream journaling experience:

“I think one thing that I noticed is just the fact that I knew that both of these things were being observed, like my gameplay and the journaling that I’m doing, it’s very often that I would also dream about exactly that, like, both the gameplay, I’ve dreamt of journaling, I’ve dreamt of making a game with you to induce fear with into other people.”

In their case, P1 not only has been dreaming of gameplay-related content but also dream journaling activity itself. P3 noticed that there were generally more vivid and memorable dreams since dream journaling, and it’s also because P3 was “just more aware of writing dreams immediately after waking up.” Moreover, it was revealed that P3 insisted on maintaining a habit of noting down dreams unfailingly. Because of this journaling awareness, their dreams were exceptionally well-documented which contributed to even more memorable dreams occurring, according to P3. Similarly, P5 expressed noticing the connection between their patterns of vivid dreaming and dream journaling. Lastly, P4 discussed that

frequent dreaming and vivid remembrance may also be connected to consistent dream journaling.

Dream Identifying

Upon reflection, participants discussed identifying dream patterns, changes, and recurring themes. P1 discussed recognizing “stronger, more abstract, and more intense dreams” that were also quite disturbing. For P1, there were a lot more nightmares during this period:

“Since I was also paying more attention to my dreams, I felt like I had more nightmares during that whole event. Usually, I don’t have that frequency of it, like it would be once a week maybe once in a while. But I saw like, at least either themes of something nightmarish, or sometimes it would be a very nightmarish setting, but I’m somehow normalized in it. It was interesting seeing that, like I’ve never seen, like zombies and those kinds of events happen, back to back.”

Although no particular themes or changes happened, P2 described noticing dreams of extremely bizarre content. With P3, they identified two leading dream themes – absolute success and extreme stress. Furthermore, P3 recognized and detected that the dream content drastically changed during this period. When comparing, P3 discussed that:

“I would definitely say that I detect a pattern of change between the dreams and the emotions and like, pre and during the (gameplay) sessions and after the sessions now that some of like decisions have indents in some time ago. I have gone back to normal dreams.”

P4 also discussed their emerging dream patterns after recognizing some of the repeating dream content. P4 described them as:

“I have noticed that in the past two months that I’ve been writing down (dreams)... looking back at all of it, I was able to categorize my dreams into just like three types of dreams and everything just falls into those. It’s just like a different plot of the same thing. . . one of them is just like scary, weird dreams, which I think goes back to maybe the game. The other one is loneliness. And the other one is being stressed out about work. So it’s just these three that happen in different stories. Where it’s the same thing on and on. It’s either like if it’s about loneliness, it’s either it’s like, me in my dream feeling like I don’t belong in a group or me like in a group suddenly, like talking about how like I don’t feel, like it’s the same thing over and over. Like the work thing I had like a couple of dreams of like being in class but like different situations, but like, I can feel like I feel insecure about it.”

Dream Contemplating

Participants also disclosed that they had been contemplating their dreams during waking hours in various contexts. P1 has been “paying more attention” to their dreams ever since initial dream journal entries. P3 has been pondering their dreams with mixed emotions:

“Like I definitely have, at moments remembered, parts of the dreams. . . and sometimes with disgusts, and sometimes with happiness. . . I would say that I have been thinking about them and remembering like them throughout the day-to-day basis.”

In P4’s case, not only did they regularly think about their dreams throughout the day, but they also actively reflected on them and came to self-identifying resolutions:

“If I feel stressed out in my life, and I keep seeing that in my dreams, I think about it throughout the day, and like I try to think of like, how I can fix it, or why I’m feeling this way or why it matters to me so much.”

P5 also contemplated whether their dreams have indicated other waking experiences besides the VR horror gameplay. For instance, P5 discussed thinking about whether nightmares indicated bad omen in his waking life. However, all participants discussed that none of the terrorizing dreams had any lasting effects on their waking life, as they did not carry into day-to-day activities or have emotional lasting effects.

Chapter 7

Discussion

7.1 Immersive Gameplay and Intensified Emotions

The findings build upon previous research, demonstrating that VR games and mechanics enhance the horror effects and notably perceived immersion. To elaborate on the findings, participants described that the VR interactions and game components significantly intensified the horror effects contributing to their immersive experiences. Particularly, VR gestures and prevalent interactions in first-person POV all intensified the horror effects and the feeling of presence. And, the visual output of graphics and the auditory output of sound effects contributed to the perceived horror and immersion. Aligning with previous work, these findings expand on the literature that explores and discusses contributing factors of VR horror games and their effects on individuals.

Unlike traditional games, VR horror game requires players to actively decide their reactions to threats and manage to survive as protagonists [32]. In a VR game, players not only actively decide to engage in game content but also directly encounter threats as if they are confronting them in the real environment [59]. Using controllers, players can utilize any game object to engage and survive the threats[10]. In addition, advanced VR engines allow players to freely move around in an enclosed space so that players can interact with characters and objects as if they were performing authentic actions in the real environment. When threatening characters approach the protagonist, a VR environment places players within an immersed space and provides them with the greeted degree of freedom to engage with threatening situations [30]. These attributes align with my findings of participants' immersive experiences when confronted with dangers as if they were in a real environment. Participants invariably used VR gestures like blocking, aiming, shooting, and reaching out when encountering dangers and threatening characters like "Jack". When indestructible dangers approached participants, they immediately reacted in ways of escaping or drawing distance to strategize or ultimately survive the hazard. Participants described that these in-game gestures, movements, and interactions were instantaneous reactions to realistic threats and dangerous situations. More than participating in VR interactions and

movements, my findings also revealed that game components, especially graphics and audio, particularly affected participants' immersive horror experiences. Researchers and authors have examined the distinctive characteristics of the survival horror genre and the compelling horror experiences of *Resident Evil 7*. Traditional cognitive media theory points out that VR game users perceive a greater sense of realism and immersion when their ability to imagine and simulate experiences is engaged by the content [12, 26]. This immersion isn't solely dependent on the realism of the content itself but is influenced by the level of intricate detail and sensory richness in VR experiences [4]. Specific elements in VR games, such as highly realistic graphics, lifelike character animations, layered and textured sound design, and the overall audiovisual presentation, collectively enhance the user's mental simulation, making the experience more vivid [5]. Perron discusses that the survival horror genre comprises compelling game components that no other genre does. Action-adventure narratives rooted in the horror theme unfold through cut scenes and are complemented by written or audio records. And, the genre is defined by the use of all the horror film tropes. It creates an eerie atmosphere in dark and/or claustrophobic spaces [46]. These depicted horror experiences have consistently reminisced among participants throughout the study. Participants conveyed that the gruesome visuals of the environment, objects, and characters were terrifying but exceptionally unforgettable. Specifically, dark lightning and moving shadows were incredibly effective when forming suspenseful moments. And, participants described the syncing of sound effects and corresponding visual sequences to be extremely frightening and immersive. This is also in line with previous survey results that audio and music were important elements that caused fear in video games [36]. With VR, it attempts to maximize the game environment of gruesome graphics, encompassing the participants' visual field, and focusing the player's senses exclusively on the "house of horrors" [46, 55]. Ultimately, these findings exemplified discussions of VR horror game components inducing stimulating horror effects and the most immersion among individuals.

My findings further expand on earlier discoveries, highlighting participants' sustained feelings of fear, anxiety, anticipation, and excitement throughout the successive VR gameplays over the study period. And, participants exhibited consistent physical responses, gradual adaption to the game controls, and lasting impressions. Previous literature demonstrates that individuals experienced a stronger sense of presence, stronger feelings of fear, fright, and horror, increased anxiety, and an overall stronger emotional intensity after playing a VR horror game. Expanding on these related studies, my findings contain participants' nuanced descriptions of experiencing a range of emotions throughout but some remained the most commonly exhibited.

The findings showed that participants exhibited substantial feelings of fear and terror throughout the study period. Often, participants experienced fear mixed with stress, anxiety, reluctance, and shock. And, participants revealed that different modes of game explorations and interactions can all induce severe fear. Without exception, participants felt

fearful and frightened after encountering inescapable jump scares. This exemplifies previous explorations of fear as functional regulating between the individual and the virtual horror environment [46]. It's directed towards threats menacing threats in the horror game environment. These were psychological and behavioral changes as individuals assessed risks. Lemmens and colleagues demonstrated the indirect effects of VR on fear through individuals' sense of presence in the game environment. A stronger subjective sense of fear was exhibited [31]. Lynch and Martins' survey indicated that darkness, disfigured humans, zombies, the unknown, and surprise were the top fright-inducing elements in video games [36]. And, previous studies demonstrated individuals' stronger sense of fear from VR gameplay. These in line with my findings indicating that environmental exploration, jump scares, character interactions, and violent combats were the noted factors that induced the most fear among participants. Furthermore, adding to measuring immediate fear reactions, my findings indicate participants exhibited consistent fear and terror throughout the duration. In addition to fear, thematic analysis showed participants' persistent indication of anxiety and excitement throughout the study period. Pallavicini and colleagues demonstrated that players showed increased perceived anxiety after playing *Resident Evil 7* in VR with self-reported questionnaires and physiological indexes [42]. This aligns with my findings that participants described feeling severely anxious during intense combats and unexpected game occurrences each time. Moreover, previous discussions suggested that higher physiological excitement can occur after resolving frightening threats. Scholars Andrade and Cohen also discussed the capacity of individuals to reinterpret perceived anxiety as excitement by distancing themselves from potential threats [3]. Indeed, Lin and researchers also discovered that highly aroused players who reported intense fear reported high excitement while playing a VR horror game [33]. This also aligns with my findings that participants expressed feeling excited throughout, predominantly while exploring new rooms and fighting menacing characters. It's possible that with progressive gameplay, participants adapted to transform their feelings of fear and anxiety into excitement from coping and constant threat resolution.

Scholars discussed that regardless of whether players respond to acute in-game threats with fear or other responses, the intensity of their emotional experience will likely depend on their sense of presence in the virtual environment [44, 31]. My findings illustrate that participants across the board shared consistently elevated immersion throughout successive VR gameplay, with more significant immersion amplifying the horror effects. This adds descriptive data to the previous research and further exemplifies participants' immersive experiences affected by a VR horror game. Though induced game emotions remained consistent, this finding indicates participants' incremental immersion possibly is an accumulative outcome of consecutive gameplay, elicited responses, and lasting impressions.

With VR, ordinary game elements translate into more immersive experiences. Earlier research has shown that feelings of presence or immersion intensify the existing effects of video games [30]. It was discussed that VR provides a strong sense of spatial presence in

a terrifyingly virtual game environment, simultaneously heightening the sense of potential threats surrounding the players in the physical environment. Some studies have investigated this extensively, especially compared to the non-immersive modality of video gameplay. One finding showed that immersive zombie games evoked significantly higher fear and arousal in comparison to the less immersive gameplay mode, suggesting that immersion serves as an important antecedent of users' affective experience within a VR game. Thus, it was discussed that immersion is a critical precursor of affective responses like fear, arousal, and enjoyment [6]. In a similar study, a stronger sense of spatial presence was exhibited for the horror survival game, and it mediated the effectiveness of game content and emotional responses [31]. Drawing from Lin's study [32], it was discussed that VR led to a stronger sense of presence than a less immersive medium, and it led to corresponding physiological arousal and emotional responses [31]. Two studies indicated players' level of presence when playing *Resident Evil 7* in VR. One revealed that participants reported significantly higher presence and body ownership and that the violence received and enacted by them felt more real and personally involved in VR [64]. Another study revealed that participants' sense of presence resulted greater in VR as opposed to the console modality [42]. Though presented studies compared VR horror gameplay to non-immersive modality, they primarily measured players' perceived presence using quantitative measures in one-time occurrences. My findings indicated that VR horror gameplay consistently presented participants with a high immersion throughout successive game sessions. Aligning with previous studies, participants concluded that high immersion further intensified the game's horror aspects. This was extensively illustrated by participants' in-depth descriptions during post-game interviews. Participants expressed an increased level of immersion as gameplay sessions progressed. Several participants described experiencing peak immersion during final gameplay sessions, completely unaware of their movements in the real world. And, participants expressed experiencing less motion sickness with progressive gameplay, further adding to the feeling of presence. Thematic data analysis suggests that this could be an outcome of several aspects – consistent and prominent emotional and physiological responses, adaption and investment to the game (plot), connection to the main protagonist, and an unnoticed sense of gradual enjoyment per gameplay. This finding adds descriptive and more nuanced data to the realm of relevant studies on immersion and VR horror games.

7.2 Converging Realms: Dreams Mirror Gameplay

Dream-related findings reveal a substantial connection between participants' dreams and the perceived horror game content. Participants often dreamt about settings, items, situations, combats, and character actions directly related to *Resident Evil 7*. Furthermore, the emotions encountered in their dreams paralleled those experienced during gameplay: stress,

anxiety, excitement, and fear. These associations highlight the intersection and interplay between these two convergent realms.

Identified dream reports revealed that dream content differs relatively little by age, nation-state, or culture but with an exception regarding the frequency and nature of aggressive actions [15]. Laboratory studies showed that the significant majority of dream reports included content of aggression, friendliness, or sexuality [15]. Based on these findings on dream themes, previous studies explored connections between video games and dream content. Several dream studies showed that frequent video game players were more likely to report lucid dreams, observer dreams, and dream control [17]. As discussed, Gackenbach found associations between lucid dreams with high-end gamer history and video games. She also found few differences in participants' rated sense of being there (presence) for playing a video game and having a dream about playing a video game [24]. Furthermore, findings demonstrated that physically interactive games were positively correlated with lucid dream frequency and with the incorporation of game content into dreams [57]. Time spent playing was positively correlated with the incorporation of game content into dreams, as was the incorporation of game content with more frequent lucid dreaming [57]. More dream content analysis demonstrated that video gamers' dream content included easily recognized references to games [21]. Findings indicated that dreams might serve as a mechanism to emotionally process intense gaming experiences during waking life [21]. While connections with lucid dreaming were not investigated in this study, my findings contribute to the broader body of research that has explored connections between video games and dreaming. The analyzed qualitative data furnishes supporting evidence for the effects of VR horror games on dream occurrences. Moreover, my findings provide detailed, nuanced qualitative insights into dream content influenced by recurring VR horror gameplay. Additionally, it was revealed that consistent VR gameplay correlated with a notable integration of game content into dreams. This increased inclusion of game content in dreams because of frequent VR gameplay aligns with earlier research, reinforcing the evidence that daily activities significantly influence dream content [23]. Essentially, this insight demonstrates how frequent interactive media consumption during waking life is prominently integrated into dreaming occurrences.

Gackenbach and Hunt have described that “video games are a technologically constructed alternative reality, while dream worlds are biologically constructed alternative realities”, and these two kinds of artificial realities may be sufficiently parallel to yield carryover learning effects [22]. In addition to being virtual worlds, dreams and video games share other characters. Hunt explained that dreaming and video games serve similar functions. And, they both have “narrative content of rich social worlds permeated by archetypes and both consist of visual-spatial imagery” [28]. Both video games and dreams include not just perceptual and cognitive information but also emotional and narrative content [49]. My findings vividly illustrate these discussions of dreams mirroring VR gameplay. The

descriptive data uncovered that participants' dreams often mirrored game elements, encompassing environments, objects, and intense combat scenarios reminiscent of those in the game. These findings further support the continuity hypothesis, suggesting that dream content reflects waking experiences. Specifically, participants articulated dream content rich in horror gameplay elements, likely a consequence of their consistent and frequent gameplay during the study period. Ultimately, the alignment between VR horror gameplay and dream content can be attributed to various factors, including the immersive nature of VR, recurring themes of aggression in dream reports, and the analogous functions served by video games and dreams. Despite the nuanced insights provided into how a specific VR horror game can influence dream content over an extended period, it is crucial to acknowledge the limitations inherent in this exploration.

Studies on dream emotions revealed the prevalence of negative emotions in adult dream reports, aligning with the abundance of "negative" elements like aggression and misfortunes [15]. And, investigations using neuroimaging and EEG indicated that individuals prone to frequent nightmares exhibit heightened brain activation when sleeping, leading to atypical dream content characterized by high levels of fear and anxiety [15]. Fundamental emotions such as fear, anxiety, elation, happiness, anger, and disgust are predominantly expressed in dreams [34, 37, 40, 54]. And, fear emerged as a more common emotion in dreams than in waking experiences, with a parallel prevalence of threats [39]. Interestingly, individuals frequently find themselves entangled in aggressive interactions in dreams, often assuming the role of victims rather than aggressors [14]. Moreover, research delved into the subconscious detection of stimuli, revealing a quicker response to negative stimuli compared to positive ones [13]. Consequently, many dreams are characterized by themes of fear, anxiety, vulnerability, and helplessness, amplifying the emotional impact of these negative experiences [60, 27].

While studies investigating connections between video games and dream emotions are limited, my research builds upon examinations of the link between waking emotions and dream emotions. Previous dream studies have revealed that dream emotions mirror individuals' emotional experiences [56]. For instance, Sterpenich et al. identified brain regions activated when experiencing fear in dreams, showing that frightening dreams modulated responses to threatening stimuli when awake. Individuals reporting a high prevalence of fear-related emotions in dreams demonstrated stronger fear inhibition during wakefulness [61]. A recent study explored the effects of isolation and a COVID-19-caused lockdown on individuals' dreams, emphasizing content and prevailing emotions [25]. The results showed a higher ratio of negative dream emotions compared to positive ones, with fear and anxiety representing approximately 50% of the dreams. These findings align with existing literature, highlighting that negative emotions like fear and anxiety dominate dreams, often connected to waking experiences [25].

These discussed studies collectively reinforce the continuity hypothesis, emphasizing the significant connection between individuals' dreams and their waking emotions. More importantly, they lay substantial foundations that are pertinent to my findings. The convergence of gameplay emotions and dream emotions, as revealed in my data, indicates the effects of immersive horror gameplay and contributes to prior literature exploring connections between dreams and video games. Moreover, my findings on dream emotions further exemplify the continuity hypothesis. Negative emotions, specifically stress, anxiety, and fear, were most prevalent, mirroring the emotional experiences during immersive horror gameplays. In other words, participants' emotional encounters during immersive horror gameplay, echoed in their dream emotions. Additionally, my findings on frightening dreams potentially support existing studies on experiencing fear in both dreams and waking life. Participants' frightening dreams could be influencing responses to threatening stimuli when awake, correlating with the perceived intensified horror effects of VR *Resident Evil 7*. However, it's noteworthy that participants experienced dream emotions of fear and anxiety without dreaming specifically about game content on some occasions. Hence, my findings on dream emotions do not explicitly indicate whether they entirely reflected game emotions or represented a regular continuation of individuals' abundance of "negative" dream elements, such as aggression and misfortunes [15].

Chapter 8

Conclusion

8.1 Contributions

Recent studies have begun to explore and investigate the impacts of VR gaming on individuals because of its rapid commercialization and vast game market dominance. And, research shined a particular light on the survival horror genre because of its fear mechanics evoking stronger responses than other genres. Combined with VR's immersion and presence, survival horror games like *Resident Evil 7* elicit intense emotional responses in individuals, notably fright and anxiety. However, existing research prompted other researchers to measure emotional responses over consistent, recurring exposure to VR horror gameplay rather than immediate, brief exposures. For example, two studies that examined interactive experiences emphasized the necessity to explore the longitudinal effects of VR horror games [64, 6]. To drive and indicate design implications, the immediate and longitudinal impacts of VR horror games ought to be measured and analyzed. My findings precisely contribute to exploring individuals' long-term emotional effects and perceived horror effects/immersion affected by recurring VR horror gameplay. Notably, horror effects were consistently described as extremely intense and realistic because of perceived high immersion across all participants, aligning with previous research. And, these intensified horror effects led to participants' sustained feelings of fear, anxiety, anticipation, and excitement. This further expands on the literature revealing that individuals experienced stronger emotional intensity after playing a session of a VR horror game. My findings demonstrated that participants exhibited persistent emotional responses throughout the given time frame.

Examining the effects of VR horror gameplay on dreaming remains challenging as it's still unattainable to capture precise dream content using existing technology. Various dream studies have previously indicated that frequent video gaming is positively correlated with lucid dreaming and the incorporation of game content in dreams. However, there's a noticeable gap in exploring the connection between VR horror games and dreaming experiences as immersive game technology rapidly advances. Additionally, laboratory experiments often collected data based on participants' single night of dreaming or collecting only one dream

per participant [19, 20], hence also lacking longitudinal measures in addition to measuring challenges. Thus, my findings contribute to examining the connection between recurring immersive horror gameplay experiences and dreaming, while also highlighting aspects of dream retrospection. With ongoing dream journaling, participants exhibited dream content and dream emotions mirroring elicited VR horror gameplay experiences. This allows me to closely examine these subjective experiences concurrently throughout. Employing thematic analysis, I uncovered that participants often dreamed of game-related content and embodied as game protagonists taking initiating actions. Moreover, my findings showed that participants experienced dream emotions resembling those experienced in recurring VR horror gameplay, though limitations exist.

Through conducted interviews, I also found that participants actively reflected on their dream occurrences throughout this period. Repeatedly, they reflected upon their dreams and expressed what they could indicate or mean. Besides connecting them to VR horror gameplay, participants also retroactively attempted to connect their dreams to past and current waking experiences. Moreover, they expressed their heightened awareness through frequent dream journaling, which may subsequently affect their dreams during this time. These participant insights establish another important layer regarding individuals' experiences beyond simply journaling everyday dreams.

The phenomenological approach and data collection methods used in this study also contribute to existing literature from a methodological aspect. As discussed, previous research that explored the emotional effects of VR horror games often relied on quantitative measures like within-subject designs employing self-reported questionnaires and physiological indexes, neglecting qualitative measures that collect nuanced and descriptive data concerning individuals' experiences. Although studies that investigated the connections between video games and dreams employed some qualitative measures gathering descriptive data, a demand to examine dreams through gathering dream journals nevertheless exists. For instance, Revonsuo and Valli discussed that a dream journal would be a preferred data-collecting method as it allows for a larger sample of individuals' dreams [52], which is one of the main data-collecting methods used here – participants noted down their dreaming experiences during the study period, allowing for meticulous dream retrospection throughout. Ultimately, this qualitative approach allowed me to gather data consisting of detailed, nuanced descriptions of subjective experiences therefore allowing a close comparison between them.

8.2 Limitations and Future Directions

Although participants' dream content and dream emotions mirrored those experienced in VR horror gameplay, the gameplay may only be one contributing factor. Based on this finding, one limitation is that there isn't definite evidence supporting the precise reflection

of game emotions. Other than frequent VR horror gameplay, participants' waking experiences, past and current, largely contributed to dreaming occurrences during this period too. As discussed previously, adult dream reports revealed prevalent negative emotions aligning with the abundance of negative elements like aggression and misfortunes [15]. And, fear emerged as a more common emotion in dreams than in waking experiences compared to other fundamental emotions, with a parallel prevalence of threats [39]. Even without frequent consumption of immersive horror game content, studies showed that individuals often become entangled in aggressive interactions in dreams [14]. Based on several studies, dreams are often characterized by themes of fear and anxiety, amplifying the emotional impact of these negative experiences [60, 27]. Although my findings revealed participants' dream emotions echoed immersive game emotions, there's no definite evidence to support an absolute correlation between them. The intense emotional experiences elicited from VR horror gameplay of fear, anxiety, anticipation, and excitement may merely add to the existing dreams. The prevalent negative dream emotions are a continuation of living experiences and maybe modulating threatening stimuli responses besides horror gameplay. Dream journal entries showed that participants noted down dream emotions of fear and anxiety even without explicitly dreaming of game-related content, which supports the overall phenomena of dream emotions mirroring emotional experiences during wakefulness [56]. Future research should dive deeper into the specifics of dream emotions specifying whether particular dream emotions correlate with specific gameplay content.

The involvement of participants also presents a notable general limitation, encompassing several aspects. Firstly, the nature of the phenomenological approach and research expectations resulted in a smaller number of participants, as the study prioritized exploring individual experiences rather than making broad generalizations. Thus, generalizations drawn from the findings must be approached with caution. Future research should involve more participants if to apply any generalizations. Secondly, participants were expected to actively engage in various data collection methods, reflecting a degree of interest in exploring their subjective experiences affected by immersive horror gameplay. Future studies should include diverse participants concerning their interests and familiarities with the subject to increase validity. Thirdly, the survey data revealed that participants had not yet played any VR horror games. Consequently, the emerging patterns stemmed from novel experiences rather than pre-existing phenomena. The potential heightened responses could be attributed to the novelty and excitement of VR horror gameplay. If individuals who regularly play *Resident Evil 7* were to participate, would they exhibit desensitization to the horror effects and produce less intense emotional responses? Lastly, participants' abilities to articulate and communicate their generated experiences pose a potential limitation. While data analysis eventually unveiled shared patterns, some participants were more expressive and eloquent in describing their experiences than others. Additionally, participants may encounter challenges recalling specific dreams or emotions during dream journaling or interviews, intro-

ducing an element of imprecision in eliciting subjective experiences. Therefore, there's no ultimate precision in eliciting these subjective experiences. However, this research presents the advantage of eliciting in-depth descriptions of emotional and dreaming experiences from participants. Semi-structured interviews and dream journals allow detailed descriptions of one's experiences, which is also a general advantage of qualitative research [16].

8.3 Final Words

Interactive media like video games are vastly consumed for entertainment purposes as technology continues to rapidly advance. In contrast to traditional media, interactive technologies like VR games offer a significantly more immersive experience, evoking stronger emotional responses in individuals. However, the impact of prolonged interactive VR gaming on individuals' experiences and cognition remains a subject requiring extensive exploration, encompassing emotions and dreams. Expanding on existing research, my work sheds light on some of the prevalent emotional experiences and dreaming occurrences affected by the recurring VR horror gameplay of *Resident Evil 7*. The revealed insights emphasize the importance of delving into the effects of immersive technology and interactive games, allowing us to recognize its influential implications among individuals.

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Appendix A

Consent Form



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Informed Consent Form for Participants in a Research

Research Title: Virtual Reality (VR) Horror Gameplay and Dreaming: Exploring Emotional Experiences and Dreaming Occurrences Affected by VR *Resident Evil 7*

Ethics Application Number: #30001646

1. Who is conducting the study?

Principal Investigator

Brian Fisher
School of Interactive Arts and Technology

Student Lead

Nafira Waili
School of Interactive Arts and Technology

2. Research Purpose

You are being invited to participate in this research study because we want to learn more about the effects of VR technology, specifically a VR game, on individuals' emotional experiences and dreaming occurrences.

3. Your participation is voluntary

Your participation is voluntary. You have the right to refuse to participate in this study. If you decide to participate, you may still choose to withdraw from the study at any time without any negative consequences to the education, employment, or other services to which you are entitled or are presently receiving.

4. Participant Recruitment and Selection

- a) Participants would need to be over the age of 18.
- b) Participants would not have motor control issues.
- c) Participants would have to have regular eyesight, whether equipped with glasses or contact lenses.
- d) Participants would have to have no severe health concerns such as migraine, epilepsy, Alzheimer, multiple sclerosis, or chronic pain.
- e) Participants would not need to have any prior VR gaming experience to participate.

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5. Study Procedures

- i. **Pre-Gameplay:** After clearing the participant criteria, you will receive the digital consent form from the student lead. After you agree to participate in the study and sign the consent form, you will receive a Calendly link for booking gameplay sessions with time slots and location, which will be in SFU Surrey Room 3700.
- ii. **In-Person Gameplay Session:** You have the choice of choosing either 1 or 2 gameplay sessions each week for four weeks. Each gameplay session will be around 90 minutes in total including filling out the online survey form, engaging in VR gameplay, and a semi-structured interview. At the beginning of a gameplay session, you will be asked to fill out an anonymous survey via Google Forms. The researcher will be providing you the VR equipment, and the sessions will be one on one between the researcher and you. You will be video recorded as you engage in the gameplay, and you will be audio recorded during the interview. As you interact with the VR game, the student lead will be conducting participant observation and taking notes simultaneously. The student lead will conduct a semi-structured interview about your emotional experiences after the gameplay.
- iii. **Dream Journal:** You will be informed about digital dream journal materials through emails. You are asked to journal your dreaming occurrences on a weekly basis that lasts around 30 minutes. The student lead will be checking-in about your dreaming activities weekly.
- iv. **Individual Interviews:** You will be asked to complete an individual interview either in-person or remotely that lasts 30-60 minutes. During the individual interview, you will be asked to answer questions about your experiences including your gameplay experiences, emotional effects, and dreaming occurrences. You will be audio recorded throughout the interview.

About Resident Evil: You will be playing Resident Evil 7 in VR provided access by the researcher. This game is one of the first blockbuster games playable entirely in VR. Furthermore, it was the first full triple-A horror game sold for PlayStation VR and as of 2022, approximately more than 1 million global users have played the game in VR, which is 10% of all players (Capcom).

6. Covid-19 Safety Protocols

The research team will abide by the latest provincial health guidelines in relation to the COVID-19 pandemic. The SFU research team including the student lead are fully vaccinated against COVID-19. To

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mitigate COVID-19 risk, all individuals are required to wear a face mask and will not be in direct physical contact with the participants. In addition, hand sanitizers, disinfecting wipes, and other sanitizing items will be provided by the research team.

7. Potential Risks

There are no foreseeable risks or harm to you with participating in this study. You may experience more interesting dreaming patterns throughout the course of the study but nothing of risks. There will not be lingering consequences after your participation in the study.

8. Potential Benefits

You may be entertained by engaging in the VR game. Additionally, you may gain valuable insights about your emotions and dreaming occurrences.

9. Payment

We will not pay you for your participation in the study.

10. Measures to Maintain Confidentiality

Your confidentiality will be respected. Your name or any other identifying information will not be asked beyond this consent form. All participants will be identified only by a unique code number (Participant #), and you will not be identified by name in any reports or documents. The collected data from survey forms and interview questions will remain anonymous to protect your identities and responses. The data will be maintained for future use if the student researcher requires access to the original data set if changes to the research project are requested by their review or defense committee. The data including original audio and video recordings will be stored with security encryptions for one year starting when the researcher successfully defended the thesis before deleting the data.

11. Data Security

The data will be maintained for its own future use if the student researcher requires access to the original data set if changes to the research project are requested by their review or defense committee. The data including original audio and video recordings will be stored with security encryptions for one year starting when the student researcher successfully defended the thesis before deleting the data.

12. Data Risk

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Any data you provide may be transmitted and stored in countries outside of Canada, as well as in Canada. It is important to remember that privacy laws vary in different countries and may not be the same as in Canada.

13. Withdrawal

You may withdraw from the study at any time by contacting the student lead's email, nwa40@sfu.ca, listed above. If you choose to enter the study and then decide to withdraw at a later time, all data collected about you during your enrollment in the study will be destroyed. The submitted anonymous survey data will not be destroyed since the researcher will not be able to identify the participants.

14. Research Results

After the researcher successfully defends the thesis, participants will be informed of the research results via emails in the form of a PowerPoint presentation in plain language as well as a short report on the study. Additionally, participants can read through the research findings after the graduate thesis gets published.

- I would like to receive a copy of the study results.

15. Contacts

Contact the research student lead Nafira Waili for any queries, questions, or comments. If you have any concerns about your rights as a research participant and/or your experiences while participating in this study, please contact the Director, SFU Office of Research Ethics.

16. Acceptance of Consent Form

Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part and later change your mind, you can withdraw from the study at any time without giving a reason and without any negative impact on your grades, or employment, or any services to which you are presently entitled to receive.

- Your signature below indicates that you have received a copy of this Consent Form for your own records.
- Your signature indicates that you consent to participate in this study.
- You do not waive any of your legal rights by participating in this study.
- Your participation in the research will be confidential.

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- I accept that I will be video recorded as I participate in the VR gameplay.
- I accept that I will be audio recorded as I participate in interviews.
- I accept that I will participate in interviews during the study.

Participant First Name:

Participant Last Name:

Participant Contact Information:

Date (YYYY/MM/DD):

Participant Signature:

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Appendix B

Survey

1. What is your age?
2. With which gender do you most identify?
 - Man
 - Woman
 - Non-binary
 - Prefer not to answer
 - Prefer to self-describe
 - Other:
3. Do you play video games?
 - Yes
 - No
4. If so, what video games do you play?
5. Have you ever played a virtual reality (VR) game?
 - Yes
 - No
 - I can't remember
6. If you ever played a VR game, elaborate. Which game was it? Did you like it? Why or why not? What was your gameplay experience?
7. Have you ever played a VR horror game?
 - Yes
 - No
 - I can't remember

8. If you ever played a VR horror game, elaborate. Which game was it? Did you like it? Why or why not? What was your gameplay experience?
9. Developed by Capcom, have you heard of the media franchise *Resident Evil*?
 - Yes
 - No
 - Not sure
10. Have you ever played *Resident Evil 7: Biohazard*?
 - Yes
 - No
 - I can't remember
11. If so, what was your *Resident Evil 7* gameplay experience?
12. In early 2017, *Resident Evil 7* became one of the first blockbuster games playable entirely in VR. Have you ever played *Resident Evil 7* in VR?
 - Yes
 - No
 - I can't remember
13. If so, what was your *Resident Evil 7* VR gameplay experience?
14. Have you ever done dream journaling?
 - Yes
 - No
 - Not sure

Appendix C

Interview Forms

C.1 VR Gameplay Interview

1. Describe in as much detail, how was your overall experience with this gameplay.
2. What were the most intense or memorable moments you experienced during this gameplay? Can you describe how they affected you emotionally?
3. Were there specific game elements that heightened your emotions? How did the game environment affect your emotions?
4. Did you feel fully immersed or were there moments when you were aware of being in a virtual environment? How did your level of immersion affect your reactions?
5. Were there any instances where you felt a strong connection to game characters? If so, how did you feel?
6. Could you describe any physical sensation that you experienced during the gameplay? How do you think they were related to your in-game emotions?
7. How did your emotions change throughout gameplay?

C.2 Dream Interview

1. Over the past two weeks, did you notice any recurring themes, symbols, or emotions in your dreams? If so, can you describe them and share your thoughts on why they might be recurring?
2. Were there any specific dreams this past two weeks that had a significant impact on you emotionally or psychologically? Can you discuss those dreams and how they affected you?

3. Reflecting on your dream journal entries for two weeks, have you identified any potential connections between your dreams and your waking life experiences, specifically your gameplay sessions, consisting of but not limited to recent events, concerns, or relationships? Can you elaborate on these connections and what they might mean to you?
4. Throughout the two weeks, since you started to play the game, did you notice any changes in the quality, intensity, or content of your dreams? Can you describe these changes and discuss any factors that might have contributed to them?
5. Did you experience any vivid or lucid dreams this week? If so, can you describe them, and how your level of awareness or control might have affected them?

C.3 Final Interview

1. You've been playing VR *Resident Evil 7* for some time now, describe your overall gameplay experiences in as much detail as possible.
2. What were your initial impressions when you first started playing in VR? Think about the overall gameplay experience – e.g., immersiveness and interactivity.
3. Have your impressions changed as you progressed? Why or why not?
4. As you have been playing in VR, do you think being in an immersive environment intensifies the horror effects of the game? Why or why not?
5. Describe your overall emotional experiences during gameplay.
6. There are a lot of memorable moments in the game, could you categorically describe how you felt or what you were going through consciously in those moments? What were your reactions?
7. After each gameplay, what were the lasting emotional effects you experienced, if any?
8. How were you able to cope with these lasting emotional effects if any? What were your coping strategies?
9. Ever since you started the gameplay, have your dreaming activities changed regarding frequencies or intensities?
10. What was the most memorable content of your dreams ever since you started the gameplay?
11. In these dreams that you just described, what were the dream emotions that you can recall specifically?
12. When you wake up from these dreams that you described, immediately after or in the morning, what were the lasting emotional effects you experienced?
13. Did these dreams or lasting emotional effects affect your day-to-day life? If so, elaborate.

14. Last question before we wrap it up, do you have anything that you would like to add about your emotional or dreaming experiences during this time?

Appendix D

Dream Journal Prompt

Date	Sleep Activity	Dream Content	Dream Emotion	Awake Response	Coping Strategy

Participants adhered to the dream journal prompt, documenting their dream experiences throughout the study.