

Creating Effective Horror in *Project Brimstone*

Nina Cammarata

Spring 2016

Thesis submitted in partial completion of Senior Honors Capstone requirements for the DePaul
University Honors Program

Allen Turner, School of Design

Heinz Schuller, School of Cinematic Arts

Table of Contents

[Creating Effective Horror in Project Brimstone](#)

[Emotion is Key](#)

[The Significance of Suspense and Anticipation](#)

[The Importance of Sound](#)

[Predictability and Unpredictability](#)

[Artificial Intelligence](#)

[Controlling Information Flow](#)

[Controlling Information Density](#)

[Decisions That Matter](#)

[Use of Color](#)

[Setting](#)

[Conclusion](#)

Creating Effective Horror in Project Brimstone

Horror is one of the most difficult genres of games to execute correctly. There are a multitude of things that can go wrong in designing horror games. Horror requires the player to be immersed, the world has to be believable, choices have to matter, choices need to seem permanent, information must be controlled and intentionally fed to the player, there has to be atmosphere, and the mechanics need to seem natural. There are many other items beyond those listed that make horror difficult. So many, in fact, it would be impossible to list them all. Ultimately, the goal is to create fear that is psychological in nature and permeates everything that the player does in the game. In our game, *The Mandrake Hotel* otherwise known as *Project Brimstone*, we have taken these items into account and set out to make an effective horror game. We researched and considered how suspense and anxiety contribute to fear, how to balance predictability and unpredictability, how to control the flow and density of information, how to make decisions meaningful, sound design, visual design, and the influence of color theory amongst other topics in order to make our game successful. In order to create effective horror, one needs to strongly consider how to create suspense, control information, and create a believable world in addition to continuously evaluating how design decisions affect the player's experience.

“The object of fear is to advertise and escape danger to life.”¹

Ultimately, fear boils down to being alarmed by a perceived threat to one's physical or emotional life. It is for this reason that people are commonly scared of pain, darkness, snakes,

¹ J. J., 351

and spiders. These are all things that, in one way or another, contain a perceived threat to life.

Darkness is a fear that is less obviously a threat to life. Generally, it is not the darkness specifically that is the issue. The real fear is of what could be hidden inside of the darkness that is a threat to one's life. Other common, strong fears are the fears of disfavor and solitude.²

Disfavor, humiliation, loss of autonomy and solitude do not cause death but they do pose a threat to one's state of being which can be interpreted as a threat to one's emotional life. In the context of games, the threat is not to one's actual life but to the life of the player's character. As such, the player is usually more afraid of loss than death even if losing technically involves dying.³

However, loss often involves topics such as disfavor, loss of autonomy, and variants of other common fears.

Emotion is Key

When it comes to fear, emotion is first and reasoning is second.⁴ This means that humans, when confronted with a threat, will usually act before they think about what they are doing. This can be observed in the fight or flight response. Depending on the tools the player is given, they will either fight or run when a threat makes itself apparent. This will usually be decided instinctually without forethought. If they have a weapon they will likely try to fight, otherwise they will likely try to run. For example, in most horror games when the monster rounds the corner everyone will immediately run the opposite direction without thinking.

² J. J., 351

³ Vachiratamporn

⁴ J. J. 352

The two major types of fear are defined as paralyzing and exciting.⁵ Exciting fear usually causes a fight or flight response while paralyzing fear causes the player to freeze up and become unable to make a decision. Both types of fear can be useful in games in the right situation. One could use exciting fear for things like chase sequences where the player needs to act quickly. Paralyzing fear is useful for slower decisions. This would include situations in which the player has to make a moral decision that might affect the outcome of the whole game or the fate of a character. It should be mentioned that using the same situation many times will cause the situation to lose its fear factor. As such, the developers of any horror game should try and balance out the types of fear used and the variety of situations presented to the player.

The Significance of Suspense and Anticipation

Creating suspense and anticipation is one of the best ways to create fear in games. This is because it puts the player on the edge of their seat. Being on the edge of one's seat is extremely good for creating fear because a player is more likely to become scared when they are already anticipating something that may or may not be what they expect.⁶ There are several stages of anxiety which help us break down what the player is feeling at a specific time.⁷ The stages progress as follows: anxiety, suspense, and fear.

Each stage of anxiety has a more specific definition than the previous state. Anxiety is caused by uncertainty towards an unspecific threat. This would include situations in which you

⁵ J. J., 352

⁶ Alan

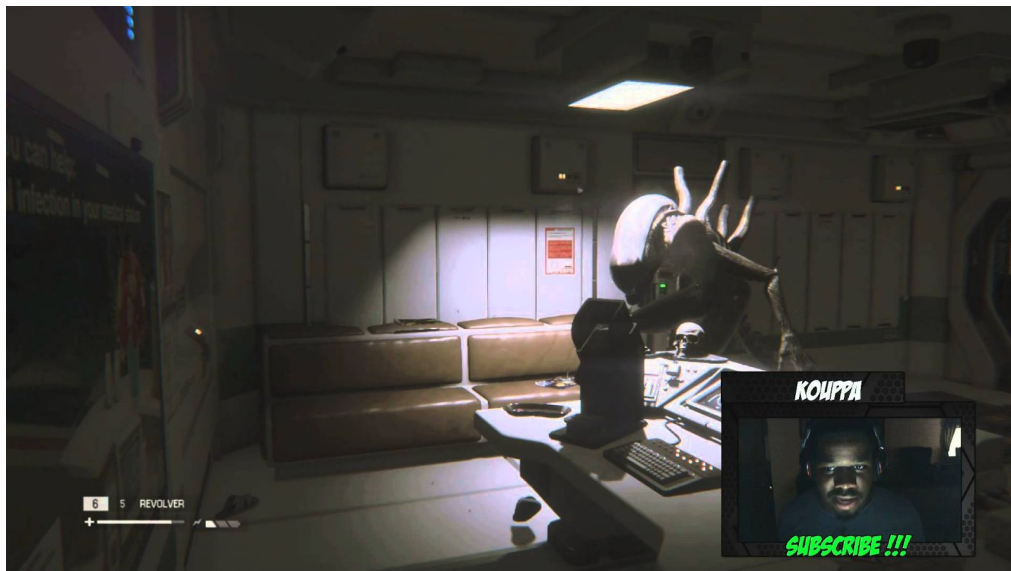
⁷ Vachiratamporn

know there's a threat, such as a deadly trap, near you but you're not sure if it's actually a trap or something else in addition to being uncertain of its exact location. Suspense is uncertainty towards an expected outcome. For example, if one is walking through a space and they are pretty sure something specific is going to happen but they are not sure where it will come from or if it will come at all. In this state the player has an outcome that they are expecting to happen or for which they are bracing. Lastly, fear is an emotional response to a threat in which the player copes with whatever they have just encountered.⁸ This state encompasses the moments where you have just encountered the monster and are now frantically running, moments where you have just escaped the monster and are hiding, and many more moments that deal with the player's response to a very specific threat.

In order to create fear the developer must acknowledge these emotional states and design the game so that it elicits these emotional states. The player must be unable to ignore the threat or the possibility of a looming threat. Creating suspense can be done in many different ways such as through music, visual cues, space, and much more. Regardless of how suspense is maintained, a threat must be initially established to get the player to enter these emotional states. Without a threat there is nothing that gets the player into the attitude of trying to predict what is a risk to their character. The player must be aware of the risk in order to try and predict it. When the player is actively anticipating they are ready to spring. When something happens the player will immediately, and often frantically, try to scramble as a result of the tension that has been building. In *Alien: Isolation* by Creative Assembly there is a situation that occurs fairly frequently in which this concept is exemplified. The Alien usually moves around in the

⁸ Vachiratamporn

ventilation system so in order to move the player must listen closely for sounds that indicate that the Alien is moving away from them. At that point the player is trying to time their advances and as such experiences a lot of tension especially when the time frame in which they must move is very small. Often the player won't make it to their destination in time and the Alien will drop out of the vents. The player then has to scramble to hide as quickly as they can. In this situation the player goes from a suspenseful state, when they were actively anticipating the Alien's moves, to a frightened state, when the Alien drops out of the vents, and back to a suspenseful state in which the player is again actively anticipating the Alien (if the player was able to successfully hide and survive).



YouTuber KouppaX being cornered by the Alien in *Alien: Isolation*

One of the immediate ways in which developers often try to create threat and fear is through jump scares. Jump scares have the potential to be both extremely effective and completely ineffective. Often jump scares are cheap and simply startle the player without affecting the player further. This happens when the fear is not maintained between jump scares

or when jump scares are used so often that the player becomes desensitized to them. Maintaining fear between jump scares requires an atmosphere that makes a threat ever present even when the jump scare has passed. If the atmosphere is not there to keep the player on their toes the threat will disappear once the jump scare and response has been completed. Developers should avoid using jump scares too often or the player will come to expect them to be around every corner. It would become unsurprising or non-threatening if a jump scare occurs because the player has learned how to handle it.

Using jump scares relies on a continuation of the threatening atmosphere. There are a multitude of ways for developers to maintain threat. Using physical space is one effective way to control how a person feels. When a space is narrower and less open the player tends to become anxious because there is often no place to run should a threat appear. In this way, long straight hallways can be very effective in creating suspense as the player moves down it, hoping not to get caught in the open. Level designers can use this principle to create a progression of suspense between scares. That is, combining open spaces with very tight spaces to have a dynamic between very stressful areas and areas of relief.⁹

The Importance of Sound

Sound is an effective way to create tension and suspense. It can be even more effective than the visual portion of the game because it communicates more immediate information to the player. The aesthetic of the game often establishes a baseline of expectations. That is not to say

⁹ Piaskiewicz

that the visuals of the game cannot communicate useful information during gameplay. Visuals are extremely important when communicating with the player but in different ways. It is, in fact, most effective when sound and visuals are used together.¹⁰ For example, seeing the monster at the same time that high volume sounds kick in is more effective than hearing or seeing one but not the other. For the player one of the scariest situations in a game is when you come around a corner just as the sound increases in volume and the monster is in view. The high voltage sound combined with the sight of a deadly threat causes the player to panic or otherwise urgently act.

Sound provides information such as where the monster could possibly be located. It can cause suspense especially when the player is not expecting it. For example, if the player is moving through the space thinking that they are out of the way of the monster; when the music gets louder and more urgent it will alert the player to the fact that the monster might be near or at least something is about to happen. By using sound cues one can effectively create anxiety where there might not be any otherwise. In *The Mandrake Hotel* we implemented several systems that take advantage of how the player interprets sounds. First, we placed sounds around the level such as floor creaks, the sounds of conversation, and other innocuous sounds. In playtesting the placed sounds seemed to make the player more aware of the space around them and more aware of the possibility of a threat in the vicinity. This contributes to the general discomfort that players feel while playing the game. We also attached sounds to the monster which play when the Runner player gets close enough to the monster. This gives the Runner player a sound to associate with the monster. As a result, even if the player cannot see the monster they are able to tell how close

¹⁰ Vachiratamporn 50

they are to the monster. The combination of sound with the aesthetic of the game seems to have been very effective in creating tension in discomfort in the runner player.

Predictability and Unpredictability

A large part of maintaining fear and suspense in games is maintaining a balance between predictability and unpredictability. Unpredictability keeps things fresh and keeps players on their toes. However, unpredictability becomes frustrating when things are so unpredictable that they seem random. Players like to have something to go on. That is, they need to have a language by which to understand the game. If there is no sort of semi-predictable information the game starts to seem unfair. The player needs to be able to learn and then apply the knowledge that they have learned. If the player is constantly relearning a “new” game they will be disinclined to keep playing. However, if everything is easily predicted the game becomes easy and boring. So, the developer must carefully balance these two aspects of the game. Balancing predictability and unpredictability can be done a number of different ways. A language needs to be established within the game. One could do this with a system of sounds. Sounds can cue certain events or presences specifically with a certain sound. An action that produces a sound will always produce the same sound. This creates predictability. If needed, such as it is in horror games, one could make the language subtle so there is some sort of unpredictability. For example, if two sounds sounded very similar the player would need to try and figure out which is which. It wouldn't be easy, and there is the possibility of getting it wrong. This creates unease especially if interpreting signals in the right way is a life or death decision. If all sounds were extremely distinct and the

outcome of those sound cues were clear there would be no unpredictability. On the other hand, if the sounds played were all random there would be no predictability or order. This is just one example of how predictability and unpredictability can be balanced. A similar system can be applied to things such as the presence of certain VFX, animations, or the behavior of AI.

Artificial Intelligence

One approach that developers often take when trying to balance predictability is by leveraging AI. The behavior of an AI will be slightly different each time because the AI is following a set of rules rather than a script. For example, an AI could follow a somewhat varied patrol path but if it detects a sound from the player it could move towards the player or decide what to do based on the information it has on the player's movements. AI can employ hundreds of rules which can make them extremely sophisticated. One example of AI behavior that in addition to creating unpredictability creates fear can be found in *Amnesia: The Dark Descent* created by Frictional Games. The AI monsters in *Amnesia* follow patrol paths that vary from time to time. They also have behavior that tells them when to chase the player and when to continue on their path. However, one thing that makes *Amnesia's* AI scarier than your average AI is that it will occasionally, intentionally, wander extremely close to where a player is hiding to scare them.¹¹ As long as the player hides well and stays still they will live but it is extremely frightening to the player for the monster to roam that close because of fear of discovery. This

¹¹ Grip, *Evoking Emotions and Achieving Success by Breaking All the Rules*

behavior eventually teaches the player which actions will and won't alert the monster to their presence, thus creating predictability, in addition to scaring the player in the process.



An *Amnesia: The Dark Descent* monster wandering close to a player's hiding spot as the player leans out to check the monster's location.

We chose to employ the power of AI in *The Mandrake Hotel* to make sure every game is different. Our AI follows several preset paths that intentionally keep it close to the player so the player is almost guaranteed to see the monster. The monster AI additionally listens for noises that the player makes so that it can make decisions about whether or not to pursue or search for the player.

Controlling Information Flow

Another large portion of creating a good horror game is controlling how much information the player is given and at what frequency the player is given such information. "Information" includes items such as visual effects, sounds, map data, and anything that the

player uses to assess their situation. Controlling the flow of information is a good way to create suspense and anticipation because you can control what the player knows they do not know which, as previously discussed, can generate suspense.¹² Generally, the less information the player has the scarier the game becomes. One has to be careful with this idea because too little information simply becomes frustrating. The player must be aware that they are missing information. It is the fear of the unknown that makes knowing very little scary. The more ambiguous something is, the more the player can speculate about what is really going on. For example, in *Amnesia* there are sounds you can hear but you cannot be sure if they are the monster or not because of how similar two sounds are to each other. Additionally, you can see shapes in the distance that may be a monster but also could simply be a statue. It is the idea that something *could* be threatening that is frightening. Ambiguous threats, such as the ones present in *Amnesia*, are usually more effective than jump scares because jump scares are temporary while ambiguous threats create a looming and persistent fear. Creating discomfort and lasting emotions are what truly scary games rely upon.

¹² Alan

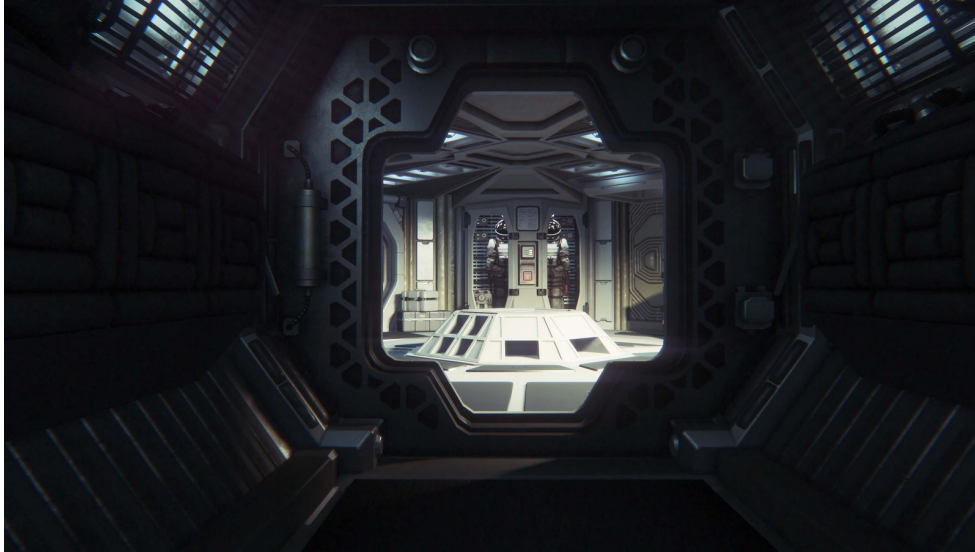


An screenshot from *Amnesia: The Dark Descent* in which the player can see the silhouette of a monster in the distance. In this situation the player could overlook its presence or be unsure if it's real.

There are a number of ways one can control the flow of information. One of the first, and easiest, decisions is whether to design the game in the first or third person. In a first person view visual information is limited to what one can see in their view cone. The player cannot see to the rear and has limited peripheral vision. This creates immediate vulnerability because the player cannot watch their own back. In a third person view the player has all the extra information that comes with being able to see what is going on around them without moving.¹³ The player can guard their own back because they can see behind them which makes the player feel less vulnerable. In addition to camera type, there are a few other ways to control information. One can control information flow with the architecture and structure of the space. Narrower spaces

¹³ Alan

make the player aware that they cannot see across the map, around a corner, or anywhere further than their immediate space which makes the player recognize that they are missing information.¹⁴



The hallways of *Alien: Isolation* are very small and narrow which limits information given to the player. They know they cannot see around the corner and the Alien could be around the corner.

Similarly, one can use spaces to force the player to move forward and create discomfort. If the player cannot move backward and they know that there is a potential threat ahead of them they will likely become uneasy and eventually frightened. This is achieved in *Silent Hill: PT* where the player, once exiting and re-entering the hallway, cannot go back—there is only one way forward. Because the hallway in which *Silent Hill: PT* takes place becomes increasingly eerie and creepy the player knows that when they move forward something will be different and it will not be good.¹⁵ Some simpler and more easily employed tactics for limiting information are controlling light and dark areas, using silhouettes, and using vague sound cues.

¹⁴ Alan

¹⁵ Alan



An image from *Silent Hill: PT* of a hallway space the player is forced to move forward through no matter what.



The same hallway space at a later point in the game after it has changed in ways that make the player uneasy and frightened.

Controlling Information Density

Closely related to limiting the flow of information is controlling the density of information. When there are a lot of things going on in a game, the player is not paying attention to things like small sounds or even things like a story-note on a table. For example, in most shooter games the player is focused on the action while ignoring the environment, the set items around them, and anything that is not related to the combat situation in hand. It is for this reason that combat is often excluded from horror games. Combat increases the density of information and removes the focus from what is most important to gameplay. By removing combat, enemies are scarier because the player cannot fight back and must play the game differently, the player pays attention to the smaller things that are going on like a sound that might be the monster but could also be just the wind, and emphasis is placed on the situation and story of the game because there is not much else on which to focus.

While considering the possibility of adding combat, one must also think about the tools that one gives the player. The tools that you give the player define the role that the player fills in

this world. If you give the player a gun, they expect to fight and assert dominance, if you do not give them a weapon they are perhaps a civilian. The tools given to the player automatically set the expectations that the player has for the game.¹⁶ The developer must give the player the right tools for the job that they are meant to fulfill. Of course, sometimes there are exceptions to this in which you have weapons but feel helpless. Usually, this occurs in games where you have combat but it is difficult, clunky, or ineffective. One game in which this is true is *Dead Space*. Combat in this game is difficult enough that it, paired with the atmosphere, can cause players to panic. Another game where this is exhibited is *Alien Isolation* where the vast majority of weapons are ineffective against the largest threat, the Alien. One simply needs to consider how combat will affect the player's mindset, their approach to the game, and what purpose it serves in one's game.

So, considering flow of information, density of information, and combat when developing *The Mandrake Hotel* we made a few purposeful decisions. First, we decided not to have combat. We wanted the player to fill the role of a normal citizen so giving them weapons did not make sense. In addition, we wanted to promote dependence on the Voice characters so we wanted to make the Runner player as helpless as possible without frustrating them. This meant that we had to limit what the Runner player was capable of doing. Additionally, removal of combat allows the Runner player to focus on the sounds around him such as the ambient sounds, the sounds of the monster moving about the area and other sounds that the Runner player could possibly interpret.

¹⁶ Grip, Evoking Emotions and Achieving Success by Breaking All the Rules

The primary way in which we limit the flow of information is through the use of small spaces. The hallways are intentionally tight. We wanted the player to feel trapped and claustrophobic so that they look to the Voices for help. These choices seem to have been successful as the Runner player generally played in the role that we wanted them to fulfill. Additionally, the Runner player tended to play in a cautious manner which is in accordance with our goals.

Decisions That Matter

Another item that can anchor a player to the world and make the world seem more relevant to the player is forcing the player to make decisions that matter. When a player feels that their actions make a difference the player is more inclined to buy into the spirit of the game. On the other hand, if the choices the player makes feel arbitrary the player often will begin to resent the choices that they are given and will cease to care about the outcome of the game. If the player feels that the outcome is the same regardless of their actions the player will inevitably think “what is the point”.

There are several ways to make choices feel like they matter. One way is to force the player to confront a moral decision. An example of a choice that evokes a moral dilemma can be found in *Bioshock* by Irrational Games. The game presents a situation to the player where they must either kill a Little Sister and obtain their Adam or save the Little Sister and only receive half as much Adam. Players find this decision particularly unsettling because they can kill a small child for more power, or continue the game with less power but let the child live. It

becomes a decision about morals and whether the players themselves have the capability to kill a child. So, as we can see from the *Bioshock* example adding morals is one way to make decisions feel like they are important, which adds weightiness to decisions.



A moment in *Bioshock* where the player is forced to either save or kill a Little Sister.

There are other kinds of moral decisions that players perceive as important. These decisions include deciding where to go, where to hide, etc. As long as these choices are life and death decisions players will respond to them with more interest and investment than they would respond to a choice that has no effect on their character. One has to make sure that the decisions being made by the player will affect the outcome of game whether that means death or a change in the story.

The Mandrake Hotel is not a story driven game so making narrative, moral decisions is difficult. For us, that leaves giving the player decisions that mean life and death. We tried to give

both the Runner and the Voices choices that will heavily affect the outcome of the game. For the Runner, they are the ones controlling their locomotion, their hiding, and their interactions which gives them micro decisions to make about how to survive. The Voices, on the other hand, are concerned with the life of another so we gave them ways to directly and distinctly affect the environment by throwing and tipping furniture to communicate information to the Runner. We also gave them the high-cooldown ability that slows the monster's running speed. All of these abilities are on a cooldown timer so that the Voices must decide when and where their abilities would be most effective.

Use of Color

Color is an effective way to create mood and evoke certain emotions about a space. Everyone has pre-existing beliefs about what a color means. Most people do not look at an image and consciously interpret it based on the colors but the colors subconsciously affect how a person feels about something. These meanings are similar from person to person so they are generally reliable. Of course, every culture has different interpretations of color. This section pertains to Western interpretations of color. Colors have all kinds of different meanings. For example, blue can be melancholy or representative of intellect depending on the shade and tone. All colors have implications that vary based on the shade and tone of the color and its use.

In *The Mandrake Hotel* we picked the colors of red, yellow, brown, and orange for specific reasons. Firstly, red, brown, and gold were popular colors for affluent spaces, such as a hotel, in the 1940s. Secondly, each color has a meaning that pushes the player towards interpreting the

space as we wanted. We chose warm colors because warm colors tend to feel warm and welcoming. By choosing warm colors we were able to juxtapose a welcoming environment with a deadly threat.



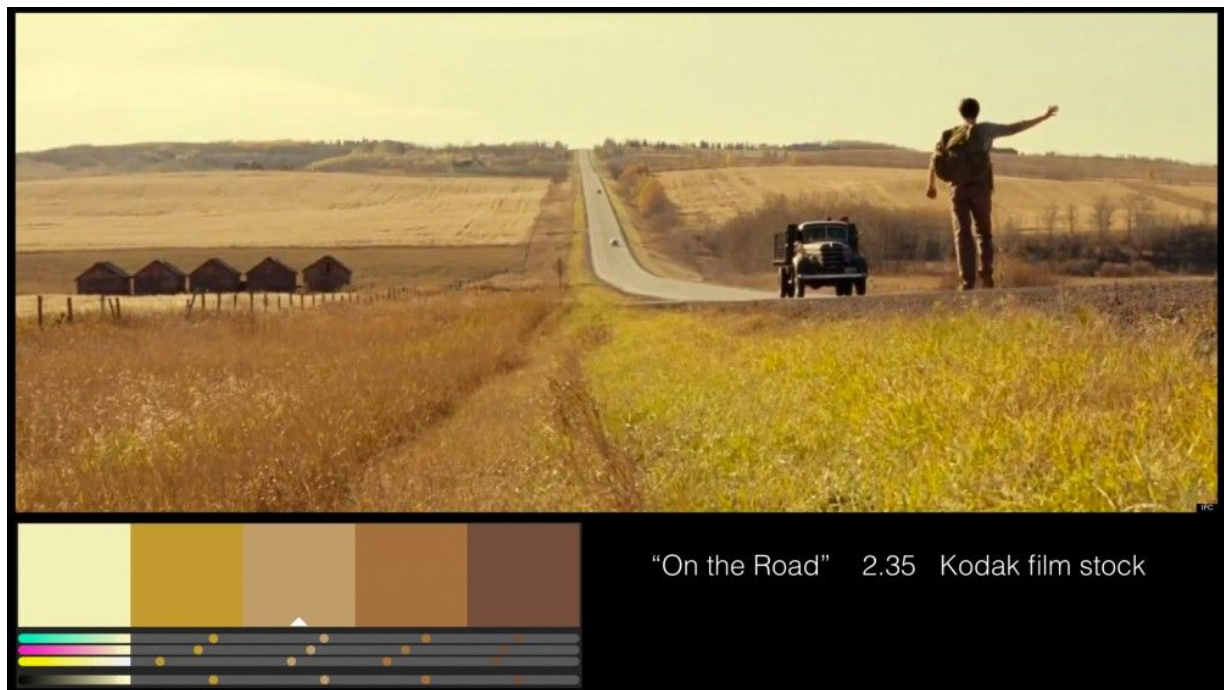
A screenshot from *The Mandrake Hotel* of a sitting room.

The first color we chose was red. Red is an active color which promotes movement and activity. This was not why it was chosen but it does help in keeping the player alert and feeling as if they should keep moving through the space. The primary reason that red was chosen is because red is powerful and communicates wealth. It seems richer than other colors and makes the space seem as if it were meant for the powerful and the wealthy.¹⁷ In addition, dark red specifically is thought of as regal, mature, and elegant which promotes our idea of a wealthy hotel space. One of the main goals of the hotel was to communicate that this space was not

¹⁷ Bellatoni, 3

meant for lower class society. As such, the wealth and maturity that red afforded us makes it an effective color choice.

The second color we chose was yellow. Yellow is primarily used as an accent color in our game because yellow in large quantities can be quite jarring. We primarily used warmer yellows that are reminiscent of serene sunbathed scenes to create a feeling of nostalgia.¹⁸ Because warm yellows are nostalgic, they are often used in flashback scenes that go back to a better or happier time in a character's life. We are using yellow for the same reasons. Because our game is set in the past we wanted the player to feel as if they are immersed in a world from a golden age which has long since gone by. By using yellow in smaller, but noticeable, quantities we are able to achieve this.



An image from a color grading analysis by Adam Myhill. The yellow color palette emphasises nostalgia and of a time past.¹⁹

¹⁸ Bellatoni, 42

¹⁹ Myhill

Lastly, we chose orange. Orange, unlike the previous two colors, has two purposes. The first is to further emphasize nostalgia. Because orange is so similar to yellow it can also promote feelings of an era long gone. When unobstructed by darkness and kept bright, orange makes something seem like a memory. However, when you pair orange with areas of darkness it becomes threatening. For example, an orange spotlight in an otherwise dark room, as seen in *The Godfather*, takes on a foreboding tone.²⁰ It is dramatic, and the warm color oozes power when it is juxtaposed against a dark color such as black. This is advantageous for us because the gameplay in *The Mandrake Hotel* relies on the Voices turning lights on and off to make a space more threatening or more inviting.



An image from *The Godfather* of an orange light paired with darkness. The orange light, darkness, and situation all contribute to the threatening atmosphere of this scene.

²⁰ Bellatoni, 115

Setting

One of the seemingly smaller decisions we made was where to set the game. Though the decision seems small, the location of the game makes a difference in terms of tone. For example, environments like asylums, hospitals, and run down buildings are common places for horror games to take place. When one uses one of these common locations it immediately makes the player aware that this is a horror game because of their prior awareness and experience with horror game tropes. For this reason we picked a lesser used setting. While hotels are sometimes used, it is not on a frequent basis. Hotels, in addition, are spaces that are associated with hospitality and safety. While not necessarily the safest places in the world people are less likely to assume that something nefarious is afoot in a well-reputed and well-maintained hotel. We tried to take advantage of this by further lulling the player into a false sense of security by using a safer space. This proved to be fairly successful as we have evidence of players feeling safe at first, then experiencing a lingering discomfort once a threat was realized.

Conclusion

By learning and utilizing the causes of fear we were able to create an effective horror game. We found that the root of fear is a fear for one's own life. Whenever a threat to living makes itself evident, fear generally manifests. In the context of games this means a fear of losing. In the case of horror games losing almost always means character death. So, we had to make the player care about what happens to their character and the outcome of the game. We didn't want the player to feel like they had too much information or too little information. The

game could not have too many distracting or unnecessarily complicated mechanics. It came down to making everything seem “right” so that the player was not distracted by things such as complicated gameplay or too much information. As such, we tried to keep the player in a constant state of suspense and anticipation through sound and AI primarily. Throughout playtesting we constantly adjusted how sound and AI systems functioned to improve the player’s experience. Initially our sound system seemed random so we made it more defined so that the player could predict more easily the actions of the monster. We performed similar tweaking with the monster’s AI. Throughout the project we continually changed how the AI functioned to make it seem ever present and that it was a real threat.

We also maintained suspense by controlling the flow and density of the information. We decided to take away combat so that there was less information in the game. The focus needed to be on the atmosphere, the presence of the monster, and the subtle audio cues and not on any sort of combat action. This ended up being effective at getting the player to focus on what’s important in the game but it also exposed the errors in design, art, and sound because the focus had been placed firmly on those aspects of the game. As such, we continually worked to patch the holes so that the player had a seamless experience.

Lastly, in order to create a believable world we tried to stay as true to the 1940s aesthetic as possible by researching how hotels in the 1940s were often arranged and decorated. In addition to decor we tried to emphasize that this was a time period from the past by using warm colors that evoke feelings of nostalgia but could also become threatening when paired with the right lighting. Lighting became a major stumbling point for our game. The lighting needed to work well with the design of the game in addition to working with the art of the game. Because

of this there was a lot of discussion between artists and programmers about what was best for the lighting and what compromises could be made. Ultimately, during testing we were able to discern what was confusing and what was clear in terms of depth perception and orientation.

Of course there are many ways in which our game can improve to create better psychological horror. More sophisticated sound systems, AI, and lighting would all contribute to creating the kind of atmosphere for which we are striving. However, based on playtest data we succeeded in creating an aura of unease and keeping the player on edge. Because of the decisions that we made based on our research, we were able to, in large part, achieve our goal of creating a baseline of effective horror on which we can improve.

Bibliography

- Bellantoni, Patti. *If It's Purple, Someone's Gonna Die: The Power of Color in Visual Storytelling*. New York: Focal, 2013. Print.
- Gray, Jeffrey Alan. *The Psychology of Fear and Stress*. Cambridge: Cambridge UP, 1987. Print.
- Jack, Alan. "Scary Games: Why Fear Should Be Easy In Games (but It Isn't)." *Gamasutra*. Gamasutra, 10 Dec. 2014. Web. 22 Feb. 2016.
- Dillard, James Price, and Jason W. Anderson. "The Role of Fear in Persuasion." *Psychology & Marketing* 21.11 (2004): 909-26. *Wiley Online Library*. 22 Sept. 2004. Web. 22 Feb. 2016.
- Grip, Thomas. "Evoking Emotions and Achieving Success by Breaking All the Rules." GDC .Vault. Proc. of Game Developers Conference Europe 2011, Cologne, Germany. Game Developers Conference, n.d. Web. 22 Feb. 2016.
- Roalfe, W. R. "The Psychology Of Fear." *The Journal Of Abnormal And Social Psychology* 24.1 (1929): 32-40. *PsycARTICLES*. Web. 22 Feb. 2016.
- Thomsen, Michael. "Revival Horror: New Ideas in Fear-Making." *Gamasutra*. Gamasutra, 1 June 2010. Web. 22 Feb. 2016.
- Vachiratamporn, Vanus, Roberto Legaspi, Koichi Moriyama, Ken-Ichi Fukui, and Masayuki Numao. "An Analysis of Player Affect Transitions in Survival Horror Games." *Journal on Multimodal User Interfaces J Multimodal User Interfaces* 9.1 (2014): 43-54. Web.
- J., J. "The Psychology of Fear." *Science* 8.193 (1886): 351-52. *JSTOR*. Web. 02 June 2016.
- Piaskiewicz, Mateusz. "Composition in Level Design." *Gamasutra*. Gamasutra, n.d. Web. 02 June 2016.
- Grip, Thomas. "SOMA - Crafting Existential Dread." *GDC Vault*. GDC, n.d. Web. 02 June 2016.
- Albrecht, Karl, Ph.D. "The (Only) 5 Fears We All Share." *Psychology Today*. N.p., n.d. Web. 02 June 2016.
- MyHill, Adam. "Color Grading." *Adam Myhill*. N.p., n.d. Web. 02 June 2016.