The Groundhog Day Effect[1]

In the movie GROUNDHOG DAY (Ramis 1993), Bill Murray plays TV weatherman Phil Connors, who is assigned to cover the eponymous celebration in the town of Punxsutawney, Pennsylvania for the fourth year in a row. After reluctantly carrying out his duty, a blizzard forces him to stay one more night in town. On the next morning, as Phil wakes up, he slowly realizes that he is reliving the previous day. That is, he is experiencing Groundhog Day all over again, and he is the only person aware of it. This phenomenon goes on for an extended period of time—exactly how long is not specified—and brings about two main reactions in the character: At first, he appears confused and distressed. Since no action has definite consequences, Phil starts experimenting and engaging in all kinds of reckless and odd behavior. After reaching a point of desperation, he tries to put a halt to the nightmarish loop by driving off a cliff to his death. But he nevertheless wakes up in his hotel bed to relive Groundhog Day all over again. A few suicide attempts later, he finally comes to terms with the situation and starts using it for more constructive purposes: he acquires new skills, such as playing the piano and speaking French, and assists town residents with their problems by employing his capacity of "foresight." In short, Phil Connors first experiences the process as an ordeal, and later as an opportunity.

Time in gameworlds can work in similar ways to GROUNDHOG DAY thanks to the save function, which allows players to store game states and load them whenever they fail or are dissatisfied with the course of events. In this way, time can be reset (see section 1.2) and players return to past game states in order to pursue different outcomes. Janet Murray (1997, pp. 35-36), Espen Aarseth (1999, p. 37), and Mark J. P. Wolf (2002b, p. 80), among others, have already

1 An earlier version of this section was published in the anthology TIME TO PLAY. ZEIT UND COMPUTERSPIEL, edited by Stefan Höltgen and Jan Claas van Treeck (Alvarez Igarzábal 2016).

pointed out the similarity of this process so characteristic of video games to the events portrayed in GROUNDHOG DAY. A few differences between the film in question and the iterations that take place in video games should nevertheless be noted. First, player characters are usually not aware of the recurrence of events, while Bill Murray's character is. In video games, it is the players who are in Phil Connors' position, not their virtual personas. Players are punished with an iteration (and hence a delay of the reward) for losing, but at the same time given the chance to improve their performance by resetting time and erasing the consequences of their mistakes—just like Phil. Additionally, unlike the character in the film, players often exert control over these iterations. While Phil wakes up at the same time on the same day over and over again, players can create new save states as they progress, thus avoiding the tiresome repetition of already overcome sections.

In HALF-LIFE, when players are unsatisfied with a particular outcome—for example, Gordon Freeman (the player character) dies—they can always load a saved game state. This action resets the gameworld to a previous condition and allows the player to try again. Nothing in the world of HALF-LIFE suggests that Gordon Freeman himself can perform this temporal stunt. He is portrayed as a simple human being, with neither superpowers nor technology with the capacity to reverse time. In other words, the save-load mechanic is extra-diegetic—it does not constitute a part of the fictional world that Gordon Freeman inhabits. In order to load a saved game state, players need to either pause the game and go to the *load game* menu where they can select the desired file to load, press the *quick load* key that automatically loads the last quick save, or simply left-click with the mouse or press the key assigned to the *use* function when Gordon Freeman dies. Any of these actions will load an older game state and allow players to repeat the desired segment of the game until reaching a satisfying outcome.

The process of resetting the gametime in a video game to replay segments with knowledge of future events is what I call the Groundhog Day Effect (GDE for short)—a long-established characteristic of single player games. There are two requisites for the GDE to ensue. The first one is that the player must lose progress. The second is that the game needs to return to a previous state. While these two aspects might seem like the same, the loss of progress does not always entail returning to a previous state. In games with procedurally generated content in which the player never encounters the same level twice, progress is lost forever and the GDE cannot take place. In some games, the world does not go back to a previous state when the player fails and there is no loss of progress. In SPACE INVADERS, for instance, when the player loses a life, the game resumes from the

very moment the player character died, without erasing any of the progress made thus far. Hence, the first prerequisite for the effect to happen is not met in this case. The GDE does occur when the player starts the game from the beginning a second time. Additionally, returning to a previous state does not necessarily entail losing progress. In the beginning of HORIZON ZERO DAWN (Guerilla Games 2017), the main character, Aloy, is in her childhood. After a few missions, the game fast forwards to Aloy's late teens and the game narrative remains in this stage of her life until the end. If, hypothetically, the game offered flashback missions where the narrative returned to Aloy's childhood, then the game would go back to a previous state, but it would be incorrect to say that the player had lost progress. The player would still be progressing in the game, while playing at an earlier state. These passages could, for example, serve to inform the story.

This process adds a curious aspect to action-oriented predictive processing (discussed in the previous section), since the player's model of the gameworld can be updated with very precise information. When learning to ride a bicycle, the repetition of actions helps learners acquire prior knowledge on how the vehicle works, but they will know little about what is waiting around the corner the next time they go out for a ride. In games, players can know what is hiding around the corner, its location, if it is moving, at what speed, and in what direction. This knowledge can help optimize navigation and resource management to a degree impossible to achieve in equivalent real-life scenarios.

Especially in games in which iterations have no cost whatsoever, aside from the temporary loss of progress (there are no lives or continues to worry about), the mere mindless repetition of actions can be expected to lead to precise and efficient decision making. In turn, games can up the stakes and be challenging in ways that could prove extremely frustrating without the aid of constant iterations. A game like CUPHEAD (Studio MDHR 2017), for instance, offers a jarring level of difficulty that needs to be counteracted through insistent repetition.[2]

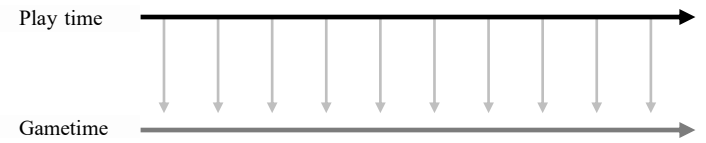
2 CUPHEAD'S difficulty caused much stir online at the time of its release, as a quick google search for the terms "CUPHEAD difficulty" can show. Some saw it as a positive trait, while others wished that the game would have been easier. Game journalist Mitch Wallace (2017), for example, praised CUPHEAD in a Forbes article, while warning players of its difficulty. Laura Dale (2017) from Kotaku UK described the game's difficulty as "infuriating."

THE GROUNDHOG DAY EFFECT IN JESPER JUUL'S TIME MAPPING

In his paper INTRODUCTION TO GAME TIME / TIME TO PLAY (2004), Jesper Juul introduced the concept of time mapping, which he further discussed in his book HALF-REAL (2005). Juul argues that video games are real and fictional at the same time—hence the book's title—and presents a model that accordingly distinguishes between *gametime*[3] and *play time*. In Juul's words: "Play time denotes the time span taken to play a game," while gametime is "the time of the events in the game world" (2005, p. 142).

As players interact with the gamespace, their actions project onto it by, for example, turning a mouse click into a gunshot or a key press into forward motion. Juul illustrates this projection as seen in figure 2.7. The top and bottom arrows represent play time and gametime respectively, and the arrows pointing down in between represent the projection.

Figure 2.7: Jesper Juul's time mapping.



Source: Juul 2005, p. 143.

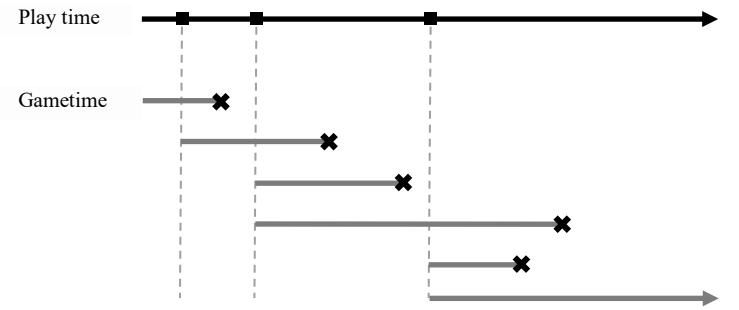
As explained by Juul, in a game like QUAKE III ARENA (id Software 1999), one second of play time is equal to one second of gametime. That is, time inside the fictional world is running at the same speed as in the real world. Other games, like SIMCITY 4 (Maxis 2003), present a different type of projection. In this case, one year of gametime may go by in just two minutes of play time (Juul 2005, pp. 143-145). But, since the GDE can occur regardless of this difference in projection ratio, its implications are irrelevant to this section.

3 In the paper INTRODUCTION TO GAME TIME / TIME TO PLAY, Juul uses the terms *event time* and *play time*. In HALF-REAL he replaced the term *event time* with *fictional time*. Other scholars have used the terms *game progress time* (Hitchens 2006, pp. 46-47) and *gameworld time* (Zagal and Mateas 2007, p. 518). For the sake of coherence, I will use the term *gametime* instead of Juul's terminology.

Juul extends his model in order to include cutscenes and loading time. Subsequently, Hitchens (2006), Nitsche (2007), and Tychsen and Hitchens (2009) expanded it even further. While most other elements described by Juul and his contemporaries fall outside of the scope of this analysis, there is one observation made by Hitchens, Tychsen, and Nitsche that will be further developed here to illustrate the Groundhog Day Effect. They stress the fact that gametime can be reset and update Juul's model accordingly. While the play time follows its customary linear fashion—as dictated by the laws of physics—the gametime makes occasional backward jumps every time the game is interrupted to reload a previously saved state. I will follow this extension of the model and take it a step further.

To illustrate the GDE (figure 2.8), I have added points to the play time that represent the moments when the player saved the game state (the black squares). From each of these points, a dotted line descends that indicates its correspondent point on the gametime. I have also broken the gametime into several segments. These breaks occur every time the game is interrupted (marked with an X) and a previous save state is loaded—either because the player lost and is thus forced to reload in order to continue playing, or they are just motivated to repeat a segment of the game in an attempt to obtain different results. Figure 2.8 shows a partial view of a hypothetical playthrough. Both timelines end in arrows, indicating that the playthrough continues.

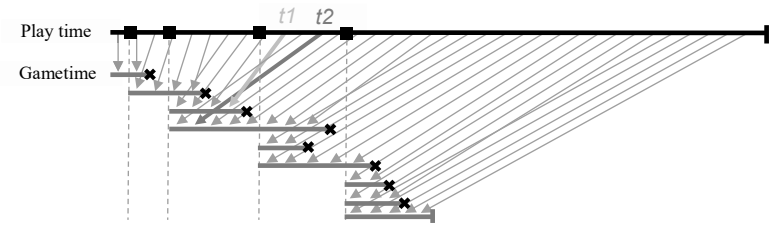
Figure 2.8: The Groundhog Day Effect.



Since the player travels back in gametime, the segments of the broken timeline overlap to different extents. The projection of the actions performed in the play time takes the form shown in figure 2.9. As the play time advances uninterrupted, the gametime zigzags back and forth. Figure 2.9 depicts a complete hypothet-

ical playthrough with the projection arrows now emphasizing the temporal displacement. Notice how the projection arrow labeled *t2* starts later in play time than the projection arrow labeled *t1*, but has an effect on an earlier moment of the gametime—albeit on a different segment.

Figure 2.9: Projection and Groundhog Day Effect.



The GDE is a direct consequence of this process of trial and error that is central to gameplay, combined with the capacity of computers to faithfully store and retrieve information. Furthermore, the punishment of failure by means of the death of the character is a common feature that increases the frequency in which save and load states are used. While a save state can be loaded to easily amend mistakes that are not as final, the demise of the player character is nonetheless a common and typically irreparable mistake.

The save state guarantees that players will not completely lose the progress they have made and eventually reach the end of the game—provided they keep trying—without having to start over from the very beginning every time they lose. Before the days of save states, reaching the end of a game was hardly to be expected. In fact, early in video game history games usually tended to increase in difficulty until the player eventually lost—the aforementioned doomed player. Emblematic games like TETRIS, BREAKOUT (Atari 1976), and SPACE INVADERS illustrate this point. These games had no intended ending, just a succession of ever-harder levels.[4] Losing all the progress and starting over from level one was

4 Many of these games have what is popularly known as a *kill screen*. These are dead ends that result from programming oversights or errors (see Giant Bomb n.d.), and come about when a player reaches a stage so high that the developers did not take it into consideration. PAC-MAN is perhaps the best known example. A bug caused it to draw stage 256 with one half of the screen visible and the other constituted by a series of random numbers, symbols, and letters, rendering it impossible to finish. This earned it the moniker "split screen." Nevertheless, as is typically the case with kill

an intrinsic part of playing games. Granted, some games featured checkpoints, lives, and even continues. But finishing a game was not the most common goal in the early days of gaming, while getting better at them by reaching higher scores and levels each time likely was.

Nonetheless, along with the increase of computer processing power and storage capacity came the possibility to save and load game states, while games themselves were also able to progressively grow in size and complexity. It is not the same to restart SPACE INVADERS from the beginning—where the mechanics remain essentially the same in every stage and there is no progressing plot nor an ending—than to restart MASS EFFECT—a game in which the decisions made have an impact on the progressing storyline, and RPG elements allow the player to customize the characters and arsenal in ways that affect the gameplay. The progress made in MASS EFFECT is not only a testament of skill. It also requires a high level of emotional and analytical investment in a complex storyline with compelling characters over several hours of gameplay that players would not be willing to erase so easily.[5]

A TEMPORAL PARADOX

The Groundhog Day Effect adds a new feature to Grodal's aesthetic of repetition (analyzed in the previous section) by allowing players to erase all traces of failure from the game state: If the player falls off a virtual bicycle and hurts a knee, loading a previous game state will do away with the injury and allow them to try again unblemished. But there is yet another twist that comes along with this temporal exploit. As players make progress in games with fictional worlds and characters by going back and forth in gametime, "[n]ot only does the event time return to an earlier state but the time reversal means that players interact with a certain game state knowing its immediate future conditions" (Nitsche 2007, p. 148). The player character, however, cannot possibly know what these future conditions are, since its fictional memory was erased with the player's progress. This discordant access to knowledge between the player and the player character produces a temporal paradox. Events that lay in the future for the play-

screens, reaching it demanded a level of skill only achieved by a minority of players. A comprehensive description of stage 256 can be found online, in chapter five of Jamey Pittman's Gamasutra feature THE PAC-MAN DOSSIER (Pittman 2009, p. 8).

5 According to howlongtobeat.com the average MASS EFFECT playthrough lasts around 18 hours (HowLongToBeat n.d.).

er character are, in contrast, past events that are about to repeat—and not necessarily for the first time—from the player's perspective.

Figure 2.10: Fight against Gozu in SHADOW WARRIOR.

Source: https://steamcommunity.com/sharedfiles/filedetails/?id=596130639 (accessed February 2, 2018).

In SHADOW WARRIOR (Flying Wild Hog 2013) the player controls Lo Wang, an assassin who allies with an ancient demon, Hoji, in the search for a legendary sword. At the start of the first boss fight against a demon called Gozu, Wang impatiently asks Hoji: "How am I supposed to defeat him?" Hoji, who speaks in Wang's head and only seldom materializes, replies that he has to shoot at glowing cracks in the enemy's armor—the glow incidentally works as a visual aid, making Hoji's advice somewhat redundant. Once the player shoots at one of the cracked armor plates for a moment, it opens exposing a crystal on the demon's body. Hoji then instructs Wang to destroy that crystal. After shooting at it for a while, the crystal explodes. The same process has to be carried out with four other armor plates and their respective crystals. If the player character dies, the fight starts again from the onset. This time the player will know where to shoot, but the dialogue will play unaltered nonetheless—even though the player character might be firing directly at the right spot already. Hoji does not seem surprised at all by this, nor confused by the fact that Wang asks what to do while confidently doing the right thing. He just tells Wang to do what he is already doing: shoot at the glowing cracks in Gozu's armor. This could have been avoided with different lines of dialogue. Wang, for instance, could stay silent and Hoji could

say something like "that's right, shoot the glowing cracks in his armor" once players do so, given that conspicuous visual cues are assisting them anyway.

SHADOW WARRIOR's example stands out because of the characters' remarks, but video games are teeming with similar situations. Every time the player resets the gametime and comes back with updated knowledge and slightly improved skills, enemies and NPCs typically behave in the same way and utter the same things at the player character without realizing that it possesses information that it could not possibly have. From Hoji's perspective, Wang should be nothing short of a psychic, but he acts as if nothing out of the ordinary were happening. Programming an AI with expectations about the player character would be a curious way of dealing with the paradox, but it would just make it manifest instead of effacing it—aside from the fact that it would be a daunting task. There is nonetheless at least one game in which special kinds of enemies recognize the player character when he comes back from the dead: MIDDLE-EARTH: SHADOW OF MORDOR (Monolith Productions 2014). However, this game has additional features that deserve closer attention, so I will return to it later.

SOLUTIONS TO THE PARADOX

Through the analysis of several video games, I have come across different mechanics that address the paradoxical relation between player and player-character behavior. In what follows, I will examine these particular mechanics by classifying them in five different categories:

1. *Respawn*: the act of spawning (and respawning) is integrated into the fictional world, avoiding the need to load saved game states.
2. *Death becomes the game:* the death of the player character changes a variable in the game state instead of interrupting it.
3. *Rewind*: The act of resetting the gametime is integrated into the fictional world.
4. *Player character briefing:* Player characters are given information about the game state that eliminates the knowledge gap between them and the player.
5. *Deal with it:* The consequences of actions are irreversible.

Respawn

Spawn points are predetermined locations in the game world where the player character can appear (spawn) at the start of a match or level and reappear (respawn) after death during said match or level without loading a previous save state. Player character spawn points are common in multiplayer gaming, where saving and loading game states is not an option. When playing a round of free-for-all in CALL OF DUTY: MODERN WARFARE 3 (Infinity Ward 2011), for instance, the spawn points allow players to instantly get back in the action after being taken down by an opponent. Nonetheless, player-character spawn points are also a feature of many single-player games.

Whether in single or multiplayer games, spawn points are most commonly extra-diegetic: avatars normally pop into existence in predetermined locations without any fictional explanation needed. Sometimes, however, these spawn points can be diegetic, that is, spaces or objects in the gameworld that integrate the act of spawning and respawning into the fictional world. SYSTEM SHOCK 2 (Irrational Games/Looking Glass Studios 1999) introduced contraptions called Quantum Bio-Reconstruction Machines that were later reimagined as Vita-Chambers (figure 2.11) in its spiritual successor, BIOSHOCK. These machines reconstruct the player's avatar automatically after it dies. The same happens in BORDERLANDS (*Gearbox Software* 2009) and its sequels, where the New-U Stations are said to store the characters' DNA in order to reconstruct their bodies when they die. Hospitals in the GRAND THEFT AUTO (GTA) series, from GTA III (DMA Design 2002) onwards, have a similar function. Every time the health meter depletes, the player character respawns in front of a hospital. In GTA, however, hospitals only solve the paradox if the player dies while free roaming. During a mission, if the player character loses its health completely, the game either automatically loads a checkpoint inside the same mission or sends the player to a hospital, which means restarting the mission from the beginning.

In the case of the Quantum Bio-Reconstruction Machine the GDE disappears, since the game state is not reset, but the paradox remains. These machines need to be activated by the player character and, in doing so, the state of the character *at the moment of activation* is saved into its memory. When the player character dies later, a past version of it is reconstructed, which lacks the knowledge acquired after the machine was activated. The Vita-Chambers, on the other hand, do not need to be activated and, thus, they do not save a particular state of the player character. In BIOSHOCK the character is reconstructed as it was at the moment of his death by the nearest machine. The New-U Stations solve the paradox as well, since, when the player character dies in BORDER-

LANDS, its body gets visibly deconstructed and reconstructed again (alive, of course) next to the last machine that was activated.

Figure 2.11: A Vita-Chamber in BIOSHOCK REMASTERED.

ASSASSIN'S CREED (Ubisoft Montreal 2007) fits into this category as well, but with a particularity. In this title, the player interacts with a fictional simulation inside the game. ASSASSIN'S CREED starts in the fictional present day, where the player controls Desmond, the descendant of a long lineage of assassins. In this world, memories are stored in genetic information that is then transferred through the generations. This information is nonetheless inaccessible to the carriers unless they connect to a piece of equipment called the Animus. When Desmond interfaces with the machine, he can relive the memories of his ancestor Altaïr (and others as the series progresses) as three-dimensional simulations. If the player fails to achieve the objective while in the Animus, the memory is desynchronized and the simulation starts again. Since Desmond does not actively remember what happened in Altaïr's life, he is as oblivious of his ancestor's fate as the player, but the respawn mechanic is made diegetic, given that the player is interacting with a meta-simulation.

Death Becomes the Game

In LEGACY OF KAIN: SOUL REAVER (Crystal Dynamics 1999) and SOUL REAVER 2 (Crystal Dynamics 2001), death does not represent the end for the player character but merely a passage to another plane of existence.

In both games, the player controls Raziel, a vampire with the capacity to shift between the material and the spectral planes. Each realm has different characteristics, which must be exploited by the player in order to solve puzzles and move forward in the game. While in the material plane, the physics resemble very much that of the real world and Raziel can interact normally with objects such as weapons or doors. In the immaterial plane, these objects are not interactive. Instead, Raziel can, for example, phase through gates that block his way, or walk on the beds of water bodies as he does on dry land.

Figure 2.12: SOUL REAVER.

Top: A location in the material realm. Bottom: The same location in the spectral realm. The most noticeable differences are the colder color palette and the distortion of space, manifested in the columns in the background.

The player can freely switch to the spectral realm at any time, but it is also accessed when Raziel's health bar depletes—that is, when he "dies." When in the spectral plane, his health gauge slowly regenerates. The material realm, in contrast, can only be accessed through specific portals when Raziel's health is full. Health can be restored by killing and absorbing the souls of enemies in both planes. By means of this plane-shifting mechanic, the GDE does not occur and, thus, there is no paradox.

It should be noted that Raziel can die in the spectral plane as well. In the first entry of the series, death as a specter makes Raziel respawn in the Underworld, where the Elder God resides and the game begins. Progress made thus far by the player remains unaltered, and so the paradox still does not take place. In SOUL REAVER 2, however, when Raziel dies in the spectral plane, the game restarts from a checkpoint, which causes the GDE—and hence the paradox. Additionally, in both games players can also save and load game states, bringing about the GDE and the paradox as well.

Rewind

In PRINCE OF PERSIA: THE SANDS OF TIME, the Prince has the ability to reverse time with the power of the titular sands (see Atkins 2007, pp. 243-244). Thanks to this mechanic, the player can undo certain actions with the press of a button. This game is a 3D platformer, which means that most of the game's challenges involve moving and jumping across platforms in the x, y, and z axes of the game's Cartesian space. The Prince—the game's protagonist—performs acrobatic moves utilizing walls, flag poles, columns, and other features of each level's architecture to access hard-to-reach areas. If players miss a jump, all they need to do is press a key and time will run in reverse—just like pressing the rewind button of a VCR. When the player releases the button or the specified limit is reached—the rewind cannot go on indefinitely—time in the game starts running forward again. Since the Prince triggers this ability himself with a magic dagger charged with the Sands of Time, the paradox is not present in this game as long as the rewind feature is used. In this case, resetting gametime is a diegetic process.

Nevertheless, the player has only a limited number of charges in the dagger. Each one of those charges allows the player to rewind time once. When all charges are exhausted, the player has to load a previous save state to continue playing. Loading a save state even when having one or more charges is also an option. When doing so, the paradox should reappear. However, a further charac-

teristic of this game prevents the paradox from occurring, which will be discussed in the next category.

Figure 2.13: BRAID.

Top: The player character has fallen into a pit. Bottom: By pressing a button, the player can rewind time and return to the moment before falling.

BRAID is a 2D platformer that introduces the same mechanic but with an explicitly lyrical intent: The rewinding of gametime stands as a metaphor for repentance. More than a narrative, BRAID presents the player with a series of reflections about romance and the irreversibility of time in the form of text, followed by levels with puzzles that can only be solved by means of the rewind mechanic—it is not just a trick that the player can make use of when dying. In BRAID not all of the objects in the gameworld are always affected by the rewinding, and

in other instances the mechanic produces (quite literal) shadows of past actions that can open doors or kill enemies in the present, making puzzles even more challenging.

Players can rewind as many times as they wish and there is no game over state, which eliminates the paradox almost completely. The only case in which the paradox could be considered to occur is if the player starts a new game. Even though the game ends exactly where it started, suggesting that the events loop, the pieces of jigsaw puzzles that the player gathered through the game remain collected. If the player starts a new game from scratch, the puzzle pieces need to be gathered again. The ending of PRINCE OF PERSIA produces a similar loop, since the prince uses the dagger to completely reverse the events of the game, erasing everything the player has done. However, the final boss fight—that takes place after the last radical rewind—changes the course of time and, consequently, the events of the game never occur. Hence, restarting the game would in principle cause the paradox to take place—but, as stated above, another feature of the game prevents this from happening.

Another game that uses the rewind mechanic is LIFE IS STRANGE, an episodic graphic adventure. In this interactive story, the player assumes the role of Max, a teenage girl who, after witnessing a tragic incident at her school, realizes that she has the power to reverse time when she spontaneously does so to undo the consequences of said accident. The player interacts with the world by navigating with the protagonist and pressing contextual keys to use objects and talk to NPCs. Dialogues have different options the player can choose from, which take the conversation in different directions. The rewind mechanic is not always available, and Max can only use it for a limited amount of time. Every time an event can have an impact in the gameworld, the game informs the player with an icon. When this icon appears, the player can go back in time and choose a different course of action. When Max learns valuable information in a conversation, another icon appears on the screen and signals that the player can go back in time and use this newly acquired knowledge, which is subsequently added to the dialogue options. In one scene, Max is trying to prove to her friend Chloe that she possesses the power to rewind time by telling her what she has in her pockets. At first, neither Max nor the player know the correct answers, a fact that is represented with a set of false dialogue options that render the task impossible to accomplish. After the first failed attempt, Chloe empties her pockets and shows Max that she was wrong, which gives the protagonist (and the player) the chance to memorize each object in detail. At this point, the player can rewind until before the challenge started and tell Chloe exactly what she is carrying. The correct dialogue options now appear among a few false ones, making it still possible to

fail, but the scene can be repeated until all the right answers are selected. Therefore, LIFE IS STRANGE integrates the resetting of gametime in the gameworld, avoiding the knowledge gap between player and player character.

LIFE IS STRANGE still allows players to reload the last saved checkpoint and also replay chapters at will (apart from the fact that the game can be completely restarted), which causes the paradox to occur. Still, players can play through the entire game only using the diegetic rewind mechanic, and thus avoid the paradox altogether.

Figure 2.14: LIFE IS STRANGE.

The moment when Max (left) tells Chloe (right) what she is carrying in her pockets.

Player Character Briefing

BATMAN: ARKHAM ASYLUM (Rocksteady 2009) features the Detective Mode. With it, Batman (and the player) can examine the nearby area by seeing through walls. This mechanic also provides crucial information about the enemies, such as how many there are, which of them are armed, and in what psychological condition they find themselves (if they are nervous or calm); it also highlights points of interest in the gamespace, like vents to crawl through or weak walls that can be shattered (see figure 2.15). In this way, both the player and the character acquire knowledge about the state of the gameworld without needing to engage in a process of trial and error. Additionally, a map overview accessed by both Batman and the player details the level design. Through these features, little

information is left (some hidden collectibles remain out of sight) that the player could acquire through means of the GDE. However, this solution only works if, when Batman dies and the player restarts from a checkpoint, the Detective Mode is activated. If the player abstains from using it, the paradox appears.

Figure 2.15: BATMAN: ARKHAM ASYLUM.

Top: A level in the challenge mode with the Detective Mode on.
Bottom: The same level a moment later, with the Detective Mode off.

Several other games with stealth mechanics, like DISHONORED or BIOSHOCK INFINITE: BURIAL AT SEA – EPISODE TWO (Irrational Games 2014), have systems similar to the Detective Mode, allowing the characters to see enemies through

walls. But these games do not brief players as thoroughly as BATMAN: ARKHAM ASYLUM—both lack an in-game map, for instance. ASSASSIN'S CREED resembles the Batman game as well, in that it includes a map and the Eagle Vision mechanic that allows players to spot NPCs behind walls and detect which are hostile or the objective of an assassination.

PRINCE OF PERSIA: THE SANDS OF TIME, as we have seen, introduces a diegetic rewind mechanic that effaces the paradox as long as the player uses it. This mechanic is, however, not entirely necessary. When the player needs or decides to load a checkpoint instead, the paradox should in principle appear. But the whole game— except for the final boss fight—is, in fact, a story told by the prince. This means that every successful attempt by the player at solving a puzzle or fighting an enemy is constructed as a retelling of actions that the protagonist has already performed. Occasionally, a voice-over of the prince is heard, fulfilling his role of omniscient narrator. If the prince dies, he says "No, no, no, that's not the way it happened. Shall I start again?"—or a variation of that phrase. Furthermore, when saving the game state at one of the checkpoints, the prince exclaims "Done! I'll start from here next time." The fact that the player is playing a retelling of events erases the paradox almost completely. The character is not exactly "briefed" in PRINCE OF PERSIA, but the effect is the same: the knowledge gap between player and player character produced by the GDE is countered by a plot device that gives the character more information (the topic of narration in video games will be discussed in the next section, The Hybrid Narrator).

The paradox is nevertheless not completely erased, because the final boss fight takes place after the narrated events. Restarting this fight is the only action in the game that produces the paradox.

Deal with It

Game developer Quantic Dream strongly emphasizes the decision-making part of gameplay in HEAVY RAIN (Quantic Dream 2010). The game does not have a save-load mechanic, so the choices made will impact the storyline in ways that are only reversible by restarting full chapters or the whole game. David Cage, the game's lead designer and screenwriter, has expressed the motivation behind this design choice on more than one occasion. In the second portion of a two-part interview with G4TV in 2009, prior to the release of HEAVY RAIN, Cage confessed that he "would like people to play it once," because "that's life. Life you can only play once" (Berghammer 2009). And he continued:

"I would like people to have this experience that way, but the game allows you play [*sic!*] as many times as you want, of course, and I'm fine with that, but the right way to enjoy HEAVY RAIN is really to make one thing because it's going to be your story. It's going to be unique to you. It's really the story you decided to write, and that will be a different story from someone else. And, again, I think playing it several times is also a way to kill the magic of it" (ibid.).

Three years later, Cage reiterated this argument in an interview with Videogamer (Kelly 2012), while discussing BEYOND: TWO SOULS (Quantic Dream 2013) and in 2016 he did it once again, this time talking to Gamespot (Cage 2016) about his game DETROIT: BECOME HUMAN (Quantic Dream 2018).

Cage's games have branching storylines with different possible endings that rely on decisions made by the player to move forward. His goal is to create narratives that deeply engage the player by means of interaction. Each scene presents players with a series of choices, some of which can have a significant impact on the story's outcome. Thus, players are not vicarious observers of someone else's life, but share responsibility for the consequences of each decision made by the characters. Cage's games allow players to replay chapters directly after finishing them, but the games never present the player with a game over screen or any sort of clear failure condition. The story simply pushes forward according to the decisions that the player makes. Additionally, the consequences of these choices are not always readily noticeable, so it is not necessarily clear what effect a decision made in one chapter might have on subsequent ones.

Cage's bet is that players become so invested in the characters and story that restarting a full chapter (or the complete game)—and thus losing a significant amount of progress—will be less desirable than to follow the events until their conclusion. For these stories to have a strong impact on players, it makes sense to discourage them from facing the GDE.

Some characters can die in predetermined parts of the plot in Quantic Dream's games. This tends to happen close to the conclusion of the narrative as part of one of the many end states of these games. Being so story and character-driven, they do not let their protagonists die early in the game—since it would be irreversible. But there are other games that apply the feature of permanent death from early on.

Figure 2.16: A father-son moment in Quantic Dream's HEAVY RAIN.

Source: http://www.gamersglobal.de/screens/10992 (accessed February 2, 2018).

Permadeath—shorthand for permanent death—is the most punishing solution to the paradox. In DIABLO III (Blizzard Entertainment, 2012) this is an optional feature present only on hardcore mode. When playing on this mode, the save and load functions are only implemented so that players can resume their game where they left it the last time. When the player character dies, however, it is final. Player characters are created at the start of DIABLO III, so, if the game is restarted, the player needs to create a new one. Several games implement this mechanic, and there is even a whole category of games known as *roguelike*, named after the game ROGUE (Toy and Wichman 1980), that has permadeath as one of its defining characteristics.[6] Irreversible death and other features make playing these games a highly challenging task.

Nevertheless, permadeath alone does not solve the paradox completely. If you die in a game and have to start again from square one, and the entire game remains unchanged, then the paradox persists. Roguelike games have another characteristic that, together with permadeath, erases all traces of the GDE and the paradox: procedural generation of the gamespace. With this method, stages

6 There is no actual consensus on a definition of *roguelike*, but the Berlin Interpretation created at the Roguelike Development Conference 2008 is a useful approximation (RogueBasin 2013). Among numerous other features, the definition states that roguelike games need random environment generation, permadeath, turn-based gameplay, and grid-based gameworlds. Following this definition, the three games listed above are not roguelikes. Terms like *hybrid roguelikes* or *roguelike-likes* have been coined to classify games that utilize some elements of the roguelike genre.

are not predesigned by the developer by hand, but by algorithms that autonomously create the level for the player in a quasi-random manner. Procedural content generation makes it impossible to memorize the level design in order to master the game. Games like DON'T STARVE (Klei Entertainment 2013), THE BINDING OF ISAAC: REBIRTH (Nicalis 2014), or SPELUNKY (Mossmouth 2008), while not considered roguelikes per se, include both procedurally-generated stages and permadeath as an inescapable feature of the gameplay. In these games, neither the player nor the character know what is going to happen in each new playthrough. The design of the level, including the amount and locations of enemies and resources, is unknown every time the player restarts a game. But the player does acquire some knowledge of general mechanics, types and behavior of enemies, and uses of items that the character should forget after death. Since each new game is started with the same character, the paradox is only solved partially.

Permadeath with procedural level generation is a definitive solution to the paradox in cases where a new character is created with every new game. The second time players play a game like BIOSHOCK or HEAVY RAIN, they know exactly what to expect. In contrast, dying in ROGUE means losing all progress and starting the game from square one with a new character on a completely unknown map. The only issue with this solution is that it is not well-suited for storytelling in a traditional sense. If a designer wishes to tell a story with fixed characters, locations, and a predetermined succession of events (even if it features different branches and endings), they need more control of the design of the game (at least for the time being).

"ONCE WASN'T ENOUGH FOR YOU, EH? WELL, TWICE IS FINE BY ME!"[7]

MIDDLE-EARTH: SHADOW OF MORDOR is an interesting collage of four of the above-described categories. The game starts as Talion's (the main player character) family is slain. Talion is murdered as well, but he becomes possessed by the spirit of the elf Celebrimbor. So, the protagonist lingers in the world of the living

7 The title is one of the several phrases that Uruk captains and warchiefs utter when they encounter the player character again after killing him in the video game MIDDLE-EARTH: SHADOW OF MORDOR.

in a state that is neither alive nor dead, sharing his body with another conscious being.[8]

Since Talion becomes Celebrimbor's vessel, the player can switch between them at will. While the player spends most of their time as Talion, shifting to the spectral form of Celebrimbor activates a number of valuable special abilities. This alliance between an elf's spirit and the body of an undead man is the plot device—and mechanic—that provides most of the solutions to the paradox.

There are two main ways to shift to Celebrimbor: one involves the simple press of a button. This action switches between characters every time it is performed. The second way entails pressing and holding the button that aims the bow, a weapon that only Celebrimbor can wield. Once the button is released, the character switches back to Talion. When using Celebrimbor, the appearance of the world changes. The player character's surroundings dissolve into a deep-blue darkness, a spectral wind begins to blow, and living creatures become colored silhouettes that can be seen through walls (while the shapes are usually blue, the tint can vary in enemies according to type). Wraith Vision, as it is called, resembles the Detective Mode in BATMAN: ARKHAM ASYLUM or the Eagle Vision in ASSASSIN'S CREED. This mechanic introduces the first solution to the paradox: *player character briefing*.

Furthermore, since Talion is technically not alive, he cannot die. Thus *Death becomes the game* is not just an occasional aspect of SHADOW OF MORDOR, but it spans across its whole duration. There is nonetheless a health bar that depletes as Talion takes damage. When it empties, Talion and Celebrimbor respawn at the top of Forge Towers that are scattered throughout the gameworld, but the game state does not return to a previous condition. Even though the nature of the towers remains largely unclear, the elf's spirit appears to be tied to them. This connection is suggested by their ghostly appearance (the towers glow and have a light-blue tint, just like Celebrimbor) and the fact that they can only be seen standing out amidst the darkness in Wraith Vision, i.e. through the eyes of Celebrimbor. They only materialize for Talion when standing close to them but, otherwise, all the player can see is ruins. In short, these towers perform the function of diegetic spawn points, just like the Vita-Chambers in BIOSHOCK or the New-U stations in BORDERLANDS. Forge Towers need to be activated by Celebrimbor. Once this is done, the player characters will respawn in the nearest one—not in the one that was activated last. *Respawn* is thus added to the list of solutions featured in the game.

8 While the details are somewhat more intricate than that, I shall largely omit them for the sake of brevity.

The fourth and last category that SHADOW OF MORDOR contains is *deal with it*. The game introduces an original mechanic called the Nemesis System that keeps track of the ranks in the army of Uruks—the most common enemy in the game. Uruks have three ranks: soldier, captain, and warchief. One of the game's layers (see section 1.2) allows players to see a diagram of the Uruk ranks. This information can be used in different ways across the game's missions. Players can dominate a captain and send him to fight against another captain or a warchief, or they can eliminate him themselves. When captains and warchiefs are disposed of, however, a lower ranking Uruk can take their place. In this way, players never lack nemeses to fight against. When captains or warchiefs eliminate Talion, they level up and become stronger. Since SHADOW OF MORDOR lacks a load-game menu or any function that permits players to go back in gametime, the only way to remedy this failure is to confront the now tougher Uruk once again and take revenge. As mentioned earlier in the text, captains and warchiefs will remember Talion. If the player confronts a captain or warchief Uruk for a second time after being killed by him, the enemy will react surprised at Talion's comeback with expressions like "And here I thought that you were already dead and rotting," or "Once wasn't enough for you, eh? Well, twice is fine by me!"

Figure 2.17: MIDDLE EARTH: SHADOW OF MORDOR – LORD OF THE HUNT (Monolith Productions 2014).

The start of a new confrontation against an Uruk Warchief, Zugor Beast Butcher, after losing against him more than once. The subtitle reads "Have you lose [sic!] count of how many times I've killed you? Let me remind you!"

LATHER, RINSE, REPEAT

The aesthetic of repetition so common in video games has not escaped the sight of game scholars. Players learn to interact with video games through trial-and-error processes, just as they would with real-world activities. The Groundhog Day Effect adds a new element to an otherwise everyday heuristic process, allowing players to reset the gametime and thus undo the consequences of unsuccessful efforts. In games with fictional characters, this process generates a gap between the knowledge acquired by the player from previous attempts, and the player character's knowledge, which is reset along with every other element in the gameworld every time the player loads a saved state. This, in turn, creates a paradoxical relation between the behavior of the player and the player character.

Nevertheless, the analysis of several video games has shown that there are mechanics and plot devices that help avoid the knowledge gap between player and character. Their implementation was likely motivated by reasons other than an interest in solving the paradox—such as increasing the replay value or the difficulty of the game—and, therefore, they sometimes address only part of the issue. However, there are cases where the paradox is completely avoided. Games like MIDDLE EARTH: SHADOW OF MORDOR and LEGACY OF KAIN: SOUL REAVER achieve this by turning death into a gamestate. On the other hand, PRINCE OF PERSIA: THE SANDS OF TIME and LIFE IS STRANGE apply mechanics that integrate the resetting of time in the gameworld and eliminate the paradox at the same time. The combination of permadeath, procedural content generation, and character creation seems to be the most effective way to avoid the paradox; but this is (at least presently) not the best means for storytelling. It cannot go without saying that there might be more solutions that have not been discussed here and, surely, many new ones could be designed and implemented in the future. These could be the subject of subsequent studies.

In the context of game development, a game designer that wishes to tell a compelling story and create believable characters might want to take the paradox into account. These solutions may help them set the focus more effectively on narrative and character development, consequently enhancing the player's experience.

A further problem that arises when telling stories in video games with the GDE involves the figure of the narrator. The following section will look into this figure and how it is shaped by the temporal iterations of video games.