SPECIAL ISSUE

Simulating Philosophy: Interpreting Video Games as Executable Thought Experiments

Marcus Schulzke

Abstract This essay proposes an alternative way of studying video games: as thought experiments akin to the narrative thought experiments that are frequently used in philosophy. This perspective incorporates insights from the narratological and ludological perspectives in game studies and highlights the philosophical significance of games. Video game thought experiments are similar to narrative thought experiments in many respects and can perform the same functions. They also have distinctive advantages over narrative thought experiments, as they situate counterfactuals in more complex, developed contexts and present them to players who are participants in game worlds, rather than simply observers.

1 Introduction

One of the central debates in game studies has been the disagreement over whether games should be judged like other media, in terms of their plot, character development, and narrative, or whether they should be treated as distinctive media that are primarily defined by their gameplay mechanics. The former viewpoint is that of narratologists who interpret games according to established theories and methods of literary and media studies (Murray 1997; Atkins 2003). Ludologists favor the latter view. They maintain that games are a unique media and that they are best understood by focusing on the modes of interactivity that distinguish them (Bogost 2006, 2007; Wark 2007; Juul 2005). The debate between these perspectives has framed much of the research on video games, but these are not the only ways games may be studied.

M. Schulzke (✉)
State University of New York at Albany,
Albany, NY, USA
e-mail: ms155136@albany.edu

I will argue that games can be interpreted as virtual thought experiments akin to the narrative thought experiments that are commonly used in philosophy and other disciplines to explore counterfactuals. Video games are usually not designed to test specific philosophical problems as narrative thought experiments are. Nevertheless, even if video games are not thought experiments in a strict sense, they can function heuristically as thought experiments when they are interpreted as modeling philosophical problems. This approach involves interpreting games as models of specific philosophical problems that can be used to explain, support, or challenge theories. I will argue that video games can even improve on traditional narrative thought experiments because they include an execution element; they allow the experiments to actually be performed by situating them within simulated worlds that are far more complex and detailed than the settings described in most narrative thought experiments.

Thought experiments can be used to assess myriad theoretical and empirical research questions (Horowitz and Massey 1991). Although video games can model empirical problems, I will focus on those that address questions in fields such as ethics, philosophy of mind, metaphysics, epistemology, and political philosophy. Some studies of video games have discussed games' philosophical themes (Sicart 2005, 2009a, 2009b; Cogburn and Silcox 2009; Tavinor 2009; Schulzke 2009). However, to the extent that existing studies do use video games to function as thought experiments, they do this implicitly, without reflecting on what this means as a method of analysis. My reading of video games as functional thought experiments will make games' philosophical import explicit and help to establish a stronger methodological basis for the philosophical interpretation of video games. I will also discuss the strengths and limitations of using video games as thought experiments in order to show when this type of analysis is most useful and when it is problematic.

My proposal builds on the work of narratologists and ludologists, as the thought experiments in games are constructed using a mixture of narrative and gameplay elements. Game narratives set out explicit problems that raise philosophical questions. Gameplay mechanics set the rules that govern players' range of choices. Interpreting games as thought experiments also goes beyond the narratological and ludological positions. The function of thought experiments cannot be fully captured by narratological analysis, as games are not simply texts to be read and interpreted; they encourage audiences to give answers to the questions they pose. Thought experiments in video games often force players to find some resolution in order for the narrative to progress, making them more interactive than traditional narratives. The ludological perspective is also inadequate, as gameplay alone is usually not enough to evoke or comment on philosophical issues. Games that lack complex narratives, such as Tetris or Angry Birds would therefore fall outside the scope of this type of analysis. However, many games are based around counterfactuals that can be studied. Even sports games, which have limited narratives, can be read as raising empirical counterfactuals about how teams could be designed or about the potential outcome of games. Going beyond the narratological and ludological viewpoints is not meant to suggest that these are wrong, or that other perspectives aside from these cannot also contribute to the study of video games. Rather, my goal is to raise an alternative way of interpreting games, which emphasizes the relevance of video games for considering philosophical problems and introduces new ways that players can think about their in-game experiences.

The first section of this essay will discuss the role of thought experiments in philosophy, identify some of their defining characteristics, and explain some of the most significant advantages of using thought experiments to think about philosophical questions. In the second section, I will argue that video games can be interpreted as performing many of the same functions as narrative thought experiments. The thought experiments in games may not be intentionally created by game developers, yet they can nevertheless function as thought experiments when players read them in terms of their philosophically significant events. The third section will discuss some examples of video game thought experiments to show the range of problems these can address. These examples also illustrate the different functions these thought experiments can serve. In the fourth section, I will argue that video games have several advantages over traditional narrative thought experiments. They provide more complex decision-making environments, incorporate the effects of probability and luck, and make players active participants in the narratives. Finally, the last section will discuss and respond to some of the objections used against thought experiment analysis in philosophy and critiques of the philosophical themes in video games.

2 Thought Experiments in Philosophy

Philosophers generally use the term 'thought experiment' fairly loosely to refer to hypothetical scenarios that are used to challenge or substantiate a theory. James Brown (1993) argues that thought experiments are typically presented as narratives that lead readers or listeners through a sequence of events that reflect how one would experience the real world. Although many of the hypothetical scenarios they present are far removed from any ordinary experience, all typically proceed according to a normal sequential ordering of events that lead to a moment of decision or a counter-intuitive conclusion. The scenarios presented in thought experiments are useful because they serve as abstract models of more complex issues. They eliminate or simplify extraneous information in order to focus on the elements of an event that raise a theoretical challenge. This abstraction crystallizes the key disagreements between competing theories and brings the essential details into focus in an effort to make problems easier to resolve.

There are many benefits of using thought experiments to explore philosophical problems, but three deserve special attention since they are the strengths that turn out to be especially important for reading video games as thought experiments. First, thought experiments can be used to challenge a theory by identifying a difficult case that it cannot answer. This can expose fundamental errors in a theory and show that it has to be abandoned or changed. For this reason, Kuhn identified thought experiments as "one of the essential analytical tools which are deployed during crises and which then help to promote basic conceptual reform" (Kuhn 1977, 263). Thought experiments have played this role in philosophy many times. For example, Gettier developed several thought experiments to show that justified true belief is insufficient to count as knowledge because that are cases in which one can possess all of these and yet still lack knowledge (Gettier 1963). This insight forced epistemologists to search for alternative theories of knowledge that introduced additional requirements or took completely different routes to explaining knowledge.

Second, thought experiments can model situations that may be untestable using empirical methods. Such strange situations are often extremely important, especially when they address fundamental issues about a theory's coherence or its potential to be empirically tested. Goodman's New Riddle of Induction, which challenges the logic of induction itself (Goodman 1955), and Descartes' famous Evil Genius, which considers the possibility that all our perceptions of the world are produced by deception, are examples of thought experiments that cannot be subject to empirical testing. Other thought experiments may be potentially testable but too expensive, time consuming, or technically demanding to be practical to test.

Finally, thought experiments are much less dangerous than real-world experiments, both in the senses of their risk of physical harm and their moral harm. As Sorensen correctly points out, one of the primary reasons of discussing difficult ethical problems in terms of thought experiments is to avoid engaging in any immoral, illegal, or destructive actions that are often the subject of philosophers' counterfactuals.

> Executed experiments involve action and so can greatly help or harm people and animals. Thought experiments proceed by reflection on an experimental plan and so are only open to, at most, minor moral praise or blame. Squeamish vizualizers are sickened by the blood-and-guts scenarios favored by contemporary ethicists. But this is no more momentous than the revulsion experienced by readers of gory novels (Sorensen 1992, 243).

This advantage of thought experiments is critical for philosophers, as many of the counterfactuals they discuss would inflict serious harm on test subjects if they were performed. Actually carrying out ethical thought experiments about euthanasia or abortion might put people's lives at risk and lead to immoral acts that would contradict the goal of using thought experiments to clarify morality.

The strengths of thinking about philosophical problems through thought experiments are important to bear in mind, as they are likewise strengths of the thought experiments simulated in video games. Moreover, as the following sections will show, video games also introduce additional tools for constructing philosophically interesting thought experiments that generate important questions for academics and casual players alike.

3 The Function of Thought Experiments

There is widespread disagreement over exactly what counts as a thought experiment, so it is impossible to compare games against a definitive definition. However, it is possible to identify which of the characteristics that may be included in a definition video games satisfy and which they do not. For example, Rescher interprets the concept of a thought experiment broadly, to include almost any use of counterfactual reasoning to raise theoretical or empirical questions (Rescher 1991). This sets the standard for qualifying as a thought experiment relatively low and certainly includes video games since these present counterfactuals. Others have explained thought experiments as a type of mental modeling that allows experimenters to work with mental rather than physical manipulations to produce the experiment (Bishop 1999; Cooper 2005). Video games replace mental modeling with computer modeling, but satisfy the same basic demand as mental models because they attempt to model physical process in another medium.

A far more significant difference between the video games and narrative thought experiments is that they involve different levels of designer intent. Narrative thought experiments in philosophy, as well as those used in other fields, are designed to serve specific purposes. By contrast, events in video games may not necessarily reflect a developer's intention to make a philosophical contribution. Philosophically significant themes in games may arise by accident or as the result of the developer's goal of making a game enjoyable. Video games may therefore arguably not qualify as thought experiments in a strict sense if they must be designed with the intention of testing philosophical problems. A few games, such as Pippin Barr's Trolley Problem (Barr, Pippin 2011) and Ian Bogost's Cow Clicker (Bogost 2010), that do seem to have this goal in mind, but the vast majority of games do not. However, even if developers do not intend for their games to be thought experiments, games can still function as thought experiments in a way that is observer relative. That is, even when games are not intended as thought experiments, they can still have a similar role in philosophical analysis.

I argue that video games are best seen as thought experiments in a heuristic sense. Games can function as thought experiments even if this status is observer-relative provided they can be used in the same types of ways as narrative thought experiments. Karl Popper provides a useful typology of thought experiments that can clarify what it means for something to be a thought experiment in this functional sense. Popper groups thought experiments into apologetic, heuristic, and critical forms according to whether they support a theory, explain it, or challenge it (Popper 1968). Each of these categories is functional and does not depend on the essential characteristics of the counterfactual. As my examples of in-game thought experiments in the next section will show, counterfactuals that games create can be used in each of the three ways Popper describes.

Video games take up a broad range of counterfactuals that can be interpreted as thought experiments when this term is used in a functional sense. These counterfactuals can be presented at various levels in relation to the game narrative. The entire narrative can be based on a historical counterfactual or a fantasy world that draws attention to the importance of a specific event or problem. For example, the games of the Fallout series are set in an alternate reality in which the Cold War became a direct military confrontation that led to a global nuclear war. The entire series can be seen as a thought experiment about the potential consequences of nuclear war and of the different ways of confronting the post-war reality. Events within games can also be interpreted as thought experiments. In each game in the Fallout series, players must solve many quests that cover a broad range of problems such as the ethics of assisted suicide, the extent to which machines can resemble humans, and the types of social organization people may form. Whether they take place on the macro-level of how the world itself is constructed or on the micro-level of specific events within the game, virtual thought experiments are capable of functioning as thought experiments in one or more of the three senses Popper identifies.

Before turning to specific examples of games functioning as thought experiments, it is first important to qualify the claims about the observer-relativity that arises from reading games as simulations when they were not intended to serve this function. Observer-relativity raises the problem of identifying exactly what situations qualify as thought experiments and demarcating individual thought experiments from others

in the same game. The vagueness of what may qualify as a thought experiment in a game is an analytical challenge that interferes with formulating a precise definition. However, this is actually one of the advantages of analyzing video games in this way. Narrative thought experiments tend to have distinct limits that make them more clearly identifiable. This can make it easier to focus on a particular problem, but it also comes at the cost of creating the impression that thought experiments involve discrete problems that can be detached from contextual factors and important tangential problems. It is often possible to imagine details omitted from a narrative thought experiment fundamentally altering a counterfactual if they were included. By contrast, video game thought experiments are embedded in the experience of the game world and arise as events in an ongoing narrative.

The vagueness introduced by admitting that functioning as a thought experiment is observer-relative makes it difficult to clearly delimit the thought experiments in games, yet this is not necessarily problematic. This is especially true when the concept of a thought experiment is understood as being heuristic rather than an essential characteristic. A vague definition can make categorizing the thought experiments difficult, but it facilitates using them in creative ways. Although thought experiments are often introduced in order to answer ongoing theoretical disputes, good ones tend to raise more questions than they answer. As Brown correctly argues that they are open to different interpretations (Brown 1993). Many important thought experiments, especially those that have had lasting influence on philosophy, have no settled meaning. They are continually reinterpreted in ways that can lead to new insights or make them relevant to other research questions. Searle's extremely controversial Chinese Room, which is continually debated and reimagined in various ways, is a prime example of this (Preston and Bishop 2002; Searle 1980). It is therefore not problematic for there to be some vagueness in defining the limits of the functional thought experiments in games, as this permits flexibility in using these counterfactuals in various ways to explain, support, or critique theories.

4 The Diversity of Thought Experiments in Games

Video games cover an extraordinary range of counterfactuals that address topics across philosophical subfields. This section will consider several of the countless possible examples of these counterfactuals to show their diversity and their utility. The issues raised in these examples, as well as the many other philosophical problems that appear in games, are generally presented without the games instructing players to respond to them in a particular way. This leaves the counterfactuals largely indeterminate and open to being interpreted in light of various different philosophical problems or theories. Despite this indeterminacy, these themes can be given shape when they are viewed in terms of the three functions of thought experiments that Popper describes. That is, can fit the thought experiment heuristic by being used to explain, support, or critique a theory.

Spec Ops: The Line is a prime example of a game that is open to being interpreted in light of important issues in ethics and political philosophy, as the game challenges the legitimacy and utility of foreign interventions. The game is especially well-suited to being read in terms of the critical function. Spec Ops: The Line tells the story of an

American counterterrorist unit sent to Dubai to assist American soldiers that occupied the city to maintain order during a natural disaster. Although the soldiers and their political leaders all seem to have good intentions, they quickly lose control of Dubai and impose martial law. Players find themselves alternately cooperating with and fighting American soldiers and their insurgent opponents. The main character's poor understanding of the city and its power dynamics leads him to inadvertently kill civilians, destroy the city's water supply, and become psychologically traumatized. The game therefore highlights the risk of well-intentioned military interventions producing unintended consequences, critiquing military interventions and raising the question of when, if ever, they are permissible.

One way Spec Ops: The Line can function as a critical thought experiment is if it is read in the context of the ongoing debates over the justifiability of humanitarian intervention. Those engaged in this debate often employ real-world cases in order to consider whether humanitarian intervention is permissible and how interventions should be carried out (Fotion 2007; Gross 2009). These commentators also rely on narrative thought experiments dealing with hypothetical conflicts. However, whether the cases are real or fictional, they all too often rely on abstract accounts of the justifiability of intervention, without considering the myriad problems that might occur if an apparently morally justified intervention were carried out. Spec Ops: The Line can be read as a critical thought experiment because it raises countless examples of how a well-intentioned military intervention to protect people from a natural disaster might go wrong due to cultural misunderstandings, poor communication, and the use of soldiers in roles that they are not trained to perform. These are problems that may only become evident when a thought experiment is executed, as they have to do with the cumulative effect of small problems that arise over time. Because it is only a simulation Spec Ops: The Line cannot provide evidence that humanitarian interventions are likely to have bad consequences, yet it nevertheless functions as a thought-provoking analytical tool that calls attention to aspects of the experience of humanitarian intervention that may be omitted from narrative thought experiments.

BioShock is an example of how video games can raise questions about free will and determinism. Although it is a linear game consisting in successive tasks that must be completed in a particular order, BioShock offers players the freedom to determine how they accomplish their objectives and even simulated moral decisions. Being allowed to make these decisions creates a feeling of control over one's actions. However, near the end of the game, players find that the perception of free will was illusory, as the character they control was under the effects of mind control that forced him to act as he did. Thus, the game provides a convincing simulation of how one might feel a subjective sense of freedom while still being trapped within a predetermined path. This is a classic problem in the debate over free will and determinism—determining whether the subjective experience of freedom can be illusory. BioShock's simulation of this problem can be read as an explanatory thought experiment that introduces this problem to players that may be unfamiliar with it. It can also support the determinist position and challenge the possibility of free will by showing how easy it is to create an illusory feeling of freedom. Moreover, the game issues this challenge to the notion of free will in a far more compelling way than a narrative thought experiment could. Narrative thought experiments lack the same power to create the subjective experience of the illusion of having free will.

In Fallout 3, players may encounter robots who think they are Thomas Jefferson and Button Gwinnett. Players learn that each robot was programmed to act like these signers of the Declaration of Independence as closely as possible and that this leads to confusion. With their identity entirely shaped by facts about these historical figures' lives, the robots become convinced that they are the real Jefferson and Gwinnett, raising the question of what their true identity is. At another point in the game, players may encounter people who literally exist as brains in a vat. These people are test subjects who are kept in a state of hibernation, with their brains experiencing a computer simulation of a stereotypical idyllic 1950s American town. This simulation does not allow them to have any knowledge of the real world, so the simulation is their only source of experience. These events address some of the central issues in metaphysics and the philosophy of mind, such as what constitutes personal identity and whether simulated experiences are real. They also deal with the ethical implications of these issues as players must decide whether to attempt to convince the misguided robots that their identities are false and whether to shatter the happy illusion generated for the people who exist as brains in vats.

Fallout 3's confused robots and brains in vats can function as thought experiments in multiple ways. These situations could be used as pedagogical simulations of classic philosophical problems, thereby taking on the function of explanatory thought experiments. They could also be interpreted as cases to challenge or support theories in philosophy of mind. For example, one might argue that the Jefferson and Gwinnett robots provide an example of how machines with advanced artificial intelligence might be capable of emulating human consciousness even though this consciousness is purely derived from information about real people. The game suggests that this form of feigned consciousness could feel very convincing even though it is not genuine. Furthermore, the interactions with these robots raise the problem of whether players should treat these robots that closely resemble humans with respect, as if they were people with consciousness and emotions, or whether the robots are merely machines that can be used instrumentally.

Finally, Portal confronts metaphysical questions about space, time, and motion. The central game mechanic is a portal gun that allows players to form connections between physically distant surfaces. This gun allows players to connect discrete spaces and instantly travel from one location to another. The portal gun introduces the possibility of alternative conceptions of space and confronts some of the implications changes to space would have for the laws of physics. Because the portal gun is used in many different ways throughout the game, the questions it raises about the nature of space and the action of physical laws are continually restated in different settings.

Thought experiments involving issues of physics and metaphysics are among those that can most benefit from being incorporated into simulations. It is extremely difficult to think about how objects may move through space or how laws of physics might operate if spatial limits were changed in the context of narrative thought experiments, as there are simply too many different variables at play in such situations. However, Portal makes use of an extremely realistic physics engine that can simulate how the laws of physics might act when certain elements of them are changed. The ability to move instantly through space in the game world simulates what strange phenomena that have been observed at the subatomic level, such as quantum nonlocality, by which subatomic particles at a distance interact with each

other, might be like if they were experienced in ordinary life. The passages created by the portal gun can also be interpreted as being like worm holes. These hypothetical entities have been a popular subject of thought experiments, since they might permit long-distance travel through space. Portal simulates what worm holes might be like and how they might affect people or objects passing through them.

5 Adding An Execution Element

One of the limitations of narrative thought experiments is that they are abstractions. They only model a few real world conditions that their designers consider to be important, leaving out the many extraneous conditions that would influence real-world experiments. As Sorensen points out, the most significant omission is the lack an "execution element" (1992, 242). This is the experience of actually putting an experiment into motion and seeing whether unexpected results may arise. Sorensen considers execution to be an optional part of experiments, as counterfactuals can reach important insights even without going through empirical testing. While Sorensen is correct in arguing that execution elements are not essential, execution can add depth to a counterfactual and discover important details that may be excluded from narratives. Executing experiments in video games holds the advantage of accounting for more relevant conditions and influences on the problem while still allowing the counterfactual to be carried out without empirical testing. The addition of an execution element leads video games to overcome some of the limitations of narrative thought experiments.

One of the most glaring omissions from narrative thought experiments are probability calculations. For some topics, probability may not matter. However, failing to account for probability can come with a high cost, especially when studying morality and political philosophy. As Williams and Nagel point out, luck can have a powerful influence on determining how people form intuitive moral judgments, making it an important, but often neglected, component of moral philosophy (Williams 1981; Nagel 1979). The difference between a good course of action and a bad one may depend on whether the action is successful. This is especially true for act consequentialism, which must make some judgment about which course of action produces the best consequences. Luck egalitarians make a similar point, as they maintain that one's place in society depends heavily on conditions that are beyond personal control (Rawls 1999, 2001). Judgments about justice and fairness may depend on confronting the luck shapes life circumstances and opportunities.

Computers are far better at calculating the probabilistic nature of actions in the world than humans. Video games can either include or exclude execution elements and even allow players to control how much these influence the game. Games have already demonstrated this advantage, as some games complicate their thought experiments by adding probability mechanics to assess the influence that luck might have on a decision's outcome. The Fallout series is noteworthy for doing this. Luck is one of playable characters' basic attributes, and it has a significant role in determining how the game world responds to a player's actions. Everything from the probability of shooting an opponent to the probability of carrying out a successful negotiation may be influenced by luck, just as these would be affected by contingent factors beyond one's control in the real world.

Because video games can simulate entire worlds rather than just limited scenarios, they can include many other contextual elements in addition to probability. This can limit bias. Kohlberg argues that moral thought experiments can be misleading because they lead audiences to search for abstract principles to serve as the basis for moral conduct. This is largely a consequence of the decision-making context that narratives construct, which include few background details that can be used to weigh different courses of action. Abstraction may lead thought experiments to give tacit support to consequentialist and deontological moral philosophies that tend to offer abstract, decontextualized guidance while detracting from contextually sensitive moral theories, such as virtue ethics.

Kohlberg's argument can be generalized to thought experiments beyond moral philosophy, as any decontextualized question or problem may favor abstract answers. This bias in favor of abstraction is much less likely to occur in video games. The completeness of game worlds is important for immersion in a decision-making context. Even the simplest video game worlds tend to include far more detail than narrative thought experiments. The completeness of the worlds is also important for assessing whether the thought experiment is convincing and determining what contextual factors might alter them.

Finally, video games allow players to encounter and resolve thought experiments as engaged actors rather than as disinterested spectators. It is relatively easy to answer traditional narrative thought experiments idealistically, without considering what demands that a given course of action would impose on the decision maker. This can lead philosophers to misunderstand the contexts in which decisions are made and the potential costs of those decisions. In one of his critiques of utilitarianism, Bernard Williams argues that moral philosophers are mistaken when they think about thought experiments in purely abstract terms because they impose unrealistic standards on their hypothetical actors (Williams 1973). As Williams correctly points out, it is easy for philosophers speculate about what is right in a particular situation when they do not have to make the decision themselves. To use his example, a utilitarian might say that it is better to kill one person than to allow 20 to die, but this claim does not account for the psychological costs that killing a person might inflict on the person who must do the killing.

By contrast, players encounter thought experiments in video games as moments in an ongoing gameplay experience in which the avatars they control will have to live with the consequences of players' actions. These consequences are much lighter than they would be in real life, yet they still simulate cost and benefit calculations that are largely absent from narrative thought experiments. The scenarios may threaten the survival characters that they have spent hours developing or may require players to sacrifice achievements or points. This allows video game thought experiments to add depth to the decision-making experience by imposing costs on players. For example, in BioShock there is a recurring moral dilemma of whether to rescue girls called Little Sisters or to harvest their bodies for ADAM, which can be used to purchase genetic modifications. The dilemma is relatively simplistic in the sense that it involves a binary choice between clearly good and evil alternatives. However, the game makes the evil course of action more tempting than it would be in narrative thought experiments because it makes the player-controlled character more powerful and allows players to make greater use of the game's genetic modifications.

These advantages over narrative thought experiments do not mean that video games are superior to narrative thought experiments in all respects, only that they are uniquely suited to capturing certain elements of counterfactual thinking. Video games do suffer from several limitations. The most notable limitation is that, although video games provide examples of a wide range of philosophical problems, there are likely many problems raised in narrative thought experiments that have no analogue in video games. Moreover, because of the costs associated with developing games, it is generally impractical to develop games for the sole purpose of simulating philosophical problems. Video games should therefore be seen as an alternative way of engaging in counterfactual reasoning that comes with a unique set of strengths and weaknesses compared to narrative thought experiments.

6 Assessing the Value of Virtual Thought Experiments

Because treating events in video games as functioning like thought experiments is a novel suggestion, there is no established literature addressing the strengths and weaknesses of this perspective on games. Nevertheless, the literatures on thought experiments and on the philosophical themes in video games offer several important arguments that could be made against interpreting video games as functional thought experiments. The critiques of moral thought experiments and moral choice in games are especially strong and the point at which the literature on thought experiments and video games overlap the most, so I will focus on responding to these.

Dennett calls thought experiments "intuition pumps," as they lead us to make intuitive judgments about their problems, thereby reinforcing our intuitive judgments (1985). The consequence is that "even great intuition pumps can mislead as well as they instruct" (Dennett 1984, 18). Similarly, Harman (1986) argues that moral thought experiments are fundamentally flawed because they bring up difficult moral problems and invite audiences to think about how they would intuitively solve those problems. Harman considers this to be a conservative way of thinking about morality that leads to the application of common sense and directs attention away from alternative perspectives. This critique could be applied to thought experiments in games.

Games reflect the biases of their designers and many are relatively conservative in the sense that they generally do not challenge players' intuitive views of morality or other issues. Most games that evaluate players' moral decisions tend to do so according to a common sense standard of how people should act (Schulzke 2009). This may reflect the developers' beliefs, cultural biases, or misguided intuitions that should be carefully scrutinized rather than being tacitly accepted. However, games also question intuitions by continually presenting different and more extreme challenges. Games must appeal to players by introducing new gameplay mechanics, new aesthetic standards, and new game worlds. They shock players with things like more graphically realistic violence, more challenging moral dilemmas, and more complex decision-making contexts. These innovations can potentially disrupt preconceptions and challenge players to think about familiar topics from different points of view.

Video game thought experiments may also raise new problems of bias, as they make players participants in the game world. Personal investment in a character may prevent players from assessing the problems they encounter from a disinterested

perspective. The risk of this type of bias is stronger in video games than it is in narrative thought experiments. This type of bias can compromise philosophic detachment. However, this risk should be seen as a factor to weigh when choosing the right tool of analysis rather than as a serious limitation of games. As the previous section showed, narrative thought experiments run into the opposite problem, as they risk of being too detached. The different levels of personal engagement in narrative thought experiments and video games, and the observe risk of biases that arise from these, indicates that these might be most effectively used in conjunction, to explore problems from both a detached and an engaged perspective or that these two types of analysis be employed according to which seems to be most effective at addressing a particular problem.

Sicart raises a much different concern, as he questions whether video games are capable of raising meaningful moral problems at all. He argues that moral choice evaluations in video games are severely limited because they usually only allow players to take two or three different courses of action, which are deemed good or evil (Sicart 2009b). The application of these simple binaries can oversimplify the complex moral dilemmas games construct and create the impression that such dilemmas can be easily resolved by simply choosing to be good or evil. If true, this criticism would suggest that the counterfactuals in games are fairly simplistic and philosophically uninteresting. This would, by extension, undermine the prospect of using games to function as thought experiments, as there would be little for philosophers to gain from using games as models of philosophical problems.

Sicart's criticism is apt, but only when applied to certain games. He focuses on games like Fable and Knights of the Old Republic and does not discuss games that have raised more nuanced moral challenges and permitted greater freedom for players to solve these challenges in novel ways. Other games, such as those in the Fallout series, give players an array of choices when they face moral dilemmas and therefore show that games can give players more freedom of action when facing thought experiments than Sicart acknowledges. Moreover, as games become more technologically sophisticated the range of choices open to players will likely increase. Sicart's argument reveals the importance of carefully assessing the quality of video game counterfactuals, but it does not pose any fundamental concerns that prevent games from functioning as meaningful thought experiments.

It is also important to point out that games can pose important questions even if these are not problems that players resolve in the game. As Packer shows in his analysis of BioShock, games can address important philosophical questions tangentially by immersing players in worlds that are structured around counterfactuals (Packer 2010). Many of the most interesting moral problems in games are ones that are not framed as moral choices. Few games signal the moral thought experiments they introduce, yet almost any game can be judged in terms of morality when the scope of analysis is expanded beyond the player's choices. This point can be extended to thought experiments that address topics other than morality. Thought experiments need not be presented as explicit choices in order to raise problems for players to consider. The issue of personal identity posed by the robots who think they are Thomas Jefferson and Button Gwinnett in Fallout 3 is not a game quest that players can resolve. Rather, the game presents this identity issue tangentially as players communicate with the robots to complete other quests. The question of the

robots' identities is nevertheless a clear problem that invites careful consideration. Thus, even if games restrict players to making relatively simplistic choices, they may still pose significant questions for consideration.

Finally, Tavinor argues that the types of problems that games introduce are unrealistic and that this undermines their theoretical value. Like Sicart, he bases this argument on the simplistic treatment of morality in games. "The fictional worlds of video games are usually populated by moral caricatures rather than realistic ethical beings, where characters do things for morally banal reasons, and where the impacts of their actions are hardly ever revisited or reflected on." (Tavinor 2009, 99). Tavinor is right to say that video games do tend to rely heavily on simplistic heroes and enemies that are absolutely good or evil. Although this style of binary ethical dilemmas does seem to be in decline as games like the Witcher 2 and Skyrim increase the level of moral ambiguity in games, simplistic or unrealistic counterfactuals remain a concern.

Nevertheless, as with the simplistic choices Sicart objects to, the simplistic characters Tavinor identifies are not necessarily problematic. Many narrative thought experiments likewise involve unrealistic scenarios populated by caricatures. Thought experiments need not be realistic to be theoretically interesting if they use their exaggerations to raise or respond to important questions. The same is true of the characters in them. They can be unlike real people or one dimensional in their thoughts or actions and yet still be theoretically significant. In fact, this kind of simplicity may actually facilitate the construction of thought experiments, as it can show the faults of a particular belief system or way of acting when it appears in a strong form. As with Sicart's argument, Tavinor's indicates the importance of distinguishing between differing levels of quality in video game thought experiments, but does not challenge the utility of reading video games as thought experiments.

7 Conclusion

As this essay has shown, video games can be interpreted as functioning like thought experiments even though they are usually not designed with this purpose in mind. Games can perform each of the three functions Popper associates with the thought experiment function, as they can introduce, support, or challenge theories. Viewing games from this perspective depends on taking both narrative and ludological elements of a game into account and attempting to read events in the game or the game itself as addressing philosophical problems. The thought experiments in video games usually do not make a clear attempt to solve the theoretical problems they invoke. Rather, they tend to raise problems without giving answers. This leaves the problems open for casual players and philosophers to use according to the various functions thought experiments can perform.

The thought experiments in video games are valuable to philosophers and to scholars in other fields, as they deal with familiar problems that span a wide variety of research interests by resituating them in much more developed and engaging contexts than narrative thought experiments. This allows the thought experiments to be reconsidered as executable experiments without introducing the limitations or dangers associated with conducting experiments in the real world.

Interpreting games as thought experiments can also contribute to the substantial and growing literature on video games and pedagogy (Gee 2007; Lieberman 2006; Michael and Chen 2006; Prensky 2001). The thought experiments in games encourage players to reflect on their gameplay experiences. Because games can entertain while also offering players the chance to consider the deeper meaning of the events they experience, the philosophical problems games address are ideally suited for teaching outside of a normal academic setting.

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