5 Playing the Worlds of *Prom Week*

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If, as Eco argues, a literary text is "a machine for producing possible worlds" (Eco 1984, 246), including the many worlds the audience imagines, then one way of looking at computer games is as machines for producing such machines. As audiences play games, they not only imagine possible worlds from the fiction[1] experienced thus far, but they also imagine what range of possible worlds the game system is capable of producing through play (through interaction with its operations) and may actively experiment—not only in attempting to shape the next stages of the fiction through employing different strategies, but also in attempting "counterfactual" playthroughs of parts of the fiction already experienced (and then perhaps returning to a saved game that restores the previously experienced fiction as the "actual world" of their play). Each of the experienced states and imagined possibilities of the game system is also a point from which a multitude of fictional possibilities could be imagined. This has rich potential for the experience of fiction that, unfortunately, most computer games almost entirely squander.

If we look at the player experience of many story-focused computer games, we see a form in which possible worlds are constantly produced. But these have a very particular structure. The player character (e.g., Lara Croft, Guybrush Threepwood) attempts to do something over and over, creating many possible worlds of failure. Finally, one projected world results in success, and the fiction moves on to the next scenario. As this happens, the player's effort essentially results in the reconstruction of the successful fictional world defined by the game's design, or one of a handful of such worlds, and all of the previously produced worlds are simply degenerate preliminaries to each successful stage. In short, while gameplay can create many possible configurations from which to imagine possible worlds, most game fictions have an embedded "textual actual world" (Ryan 1991, 24), and most game players are aware of this.

Marie-Laure Ryan proposes an exploratory/ontological spectrum (Ryan 2001) to describe how much power the player has in affecting the "textual actual world" of a game; interaction in games in which change can be enacted is considered ontological, while interaction in games with largely static stories waiting to be discovered and read is exploratory. But even if the appearance of a wide variety of audience-driven possible worlds in most forms of computational narrative is an illusion—with the audience tasked either with uncovering and interpreting a single fiction in the past or with performing the

prescribed actions of the game's actual world in the present—there are other forms of computational narrative that do produce a wide variety of possible worlds. Perhaps chief among these are story generation projects in artificial intelligence, as discussed by books ranging from Ryan's 1991 *Possible Worlds, Artificial Intelligence, and Narrative Theory* to Noah Wardrip-Fruin's 2009 *Expressive Processing*. Rather than the single successful world embedded in many game designs, these systems are capable of producing many worlds—with significant variations in the systems' areas of dynamism—both as final outputs and in the process of generating these outputs.

The possible stories that could be produced by these systems are varied and vast and are generated through sophisticated models of characters and authors alike. But in an experience that Wardrip-Fruin has termed the "*Tale-Spin* effect" (Wardrip-Fruin 2009, 146), this rich possibility is never translated into an audience experience. Instead, the output of most AI story-generation systems does less to prompt the imagination of further possible worlds in the audience than a middling plain text fiction.

This chapter discusses a project that combines aspects of both narrative games and story generation and, in so doing, creates an experience of exploring possible fictional worlds that is—thus far—unique. *Prom Week* (McCoy et al. 2012) is a game in which even a single successful playthrough results in the creation of a range of meaningfully different versions of the same fictional world. Driven by a social simulation, the gameplay of *Prom Week* is explicitly about imagining possible worlds of relationship among its characters and projecting how social actions could bring different types of worlds about. In other words, *Prom Week* not only attempts to deliver on the promise of games as machines for generating, through play, machines for producing possible worlds, it also is constructed so that engaging in this second-level thinking about fictional possibilities is key to successful strategy in the game.

Figure 5.1 Prom Week.

In the sections that follow, we will briefly describe the fiction of *Prom Week* (set in the week leading up to the year's final dance at a U.S. high school), its gameplay (which "rewinds" the week at the start of each level, inviting the player to produce a new possible week, focused on the concerns of a different character), and the underlying social simulation (which is inspired both by how social life functions in storytelling and by social science theory that is itself inspired by storytelling practices). We then describe some of what we have learned from this experiment, including the responses we have heard from audiences and what we have seen in examination of the "traces" left by tens of thousands of players.

POSSIBLE WORLDS IN GAMES

Possible worlds theory has been used in several discussions of player immersion in game worlds. For example, Jan Van Looy has adapted the concept of "recentering" in a fictional world (so that, for example, indexical terms refer to the fictional world) proposing a "virtual recentering" (Looy 2005), in which the player is immersed in a virtual world and reorients herself the same way a reader will when reading a work of fiction.

Lisbeth Klastrup, in a paper about the "worldness" of online gameworlds such as *EverQuest* (Klastrup 2009), discusses some limits of player immersion. In these massively shared play spaces, Klastrup observed the way players perceive the fiction. Noting that "players... have a very conscious and instrumental approach to the world, occasionally treating it and talking about it as just a piece of software," Klastrup found that the players' discourses about their own play freely switched registers between actual world events and fictional world events. Klastrup's work can be read in contrast to Van Looy's assertions of player recentering, by calling attention to player awareness of these boundaries between worlds.

In addition to her extensive work on possible worlds theory, Marie-Laure Ryan has discussed current challenges and limits for different genres of digital fiction in a 2009 article "From Narrative Games to Playable Stories" (Ryan 2009). Ryan puts forth two terms to describe approaches to interactive narrative: "narrative game, in which narrative meaning is subordinated to the player's actions, and the playable story, in which the player's actions are subordinated to narrative meaning" (Ryan 2009, 45). These categories exist along a continuum, but the space of digital playable stories has been significantly less explored than digital narrative games. One approach to creating responsive playable experiences is to build gameplay around a simulation, most commonly physics. An aspect of simulation-driven games is their ability to present the player with numerous choices and respond to a far greater degree than any human author could reasonably predict. This immensely expands the space of possible play traces through the game. *Prom Week* adopts this approach but uses a social simulation to make these diverse traces narratively significant.

PROM WEEK'S FICTION

The fiction of *Prom Week* revolves around the social lives of 18 characters at a U.S. high school in the week before their senior dance. Inspired by well-known high school movies, the game parodies the intense social jockeying of a memorable week for many soon-to-be graduates. Though the narrative of a *Prom Week* story is highly dynamic—driven by a social simulation that is in turn leveraged by the player to determine the fates of the characters—the characters themselves have statically defined backstories that determine their individual character traits and their starting social relationships with their fellow students (the "source world").

The makeup of the social landscape is always available for the player to review, but the backstory—though never changing—is not explicitly revealed to the player. Instead players learn the backstory through dialogue between the characters, who may reference past favors and grievances as motivations for their present actions. Through repeated plays of the game, players simultaneously create a new possible social and story world for the characters even as their knowledge of the source world of *Prom Week*

Figure 5.2 Oswald taunting Doug for one of his past actions, namely walking Jordan home after school. Learning this backstory between Doug and Jordan may help inform the player's future playthroughs of the level.

grows. As this knowledge grows, their ability to successfully predict how best to manipulate the social state to create a desirable destination world grows as well.

PROM WEEK'S GAME

Prom Week is a game about social dynamics. Players interact with the world of *Prom Week* solely by having characters engage in *social exchanges* with each other. These exchanges represent patterns of social behavior, such as having one character *Ask Out* another character on a date, or having two characters *Reminisce* about past experiences. When players select a social exchange, they are presented with a short scene consisting of animations and partially generated English dialogue (incorporating templates so that character names and the details of their current social situation can be dynamically filled in based on who is performing the exchange). The performance changes the social state of the world: the characters are now dating and they like each other more. Not every attempt at a social exchange is successful, however. A lonely romantic might pine for a date with another, but if the two do not share any common interests, the romantic is likely to be shot down. Since every action, be it successful or otherwise, furthers the narrative by affecting the relationships of the characters, gameplay is an exploration of a story generator's outputs.

The social exchanges available to the characters are determined by the social simulation system. This will be covered in more detail below, but briefly, it makes use of more than 5,000 social and cultural considerations or *rules* to ensure characters behave believably based on their current relationships, their personal character traits, and the previous exchanges logged in the social history. For example, characters who are friends are likely to be pleasant with each other while characters who are enemies are likely to be hostile. We say "likely" because it is rare for characters in *Prom Week* to have relationships as simple as being only friends or enemies; it is almost always the case that there are multiple factors informing how characters interact with each other. Sometimes these factors come from characters having a multifaceted relationship, such as concurrently being friends and enemies with each other, or "frenemies." Other factors might involve interactions with a third party; a soured friendship due to someone asking his best friend's girlfriend out on a date is one example.

The game is divided into 10 campaigns or *levels*, each of which focuses on a different character—and each of which, as it begins, returns to the "source world" for *Prom Week*. These levels are then further divided into *stages*, each representing a different day of the titular week leading up to the big dance. Anything the player does in earlier stages of a level carries through to the end of the week; if a player has a character cheat on his date on Thursday, this betrayal will still be remembered on Friday. That is to say,

while each level returns to the source world, the progressive stages within a level create a new, internally consistent, possible world. Learning the consequences of this social history plays a central role in succeeding in the game, as players can begin laying the groundwork for future relationships early in the week. Having characters engage in small talk or light flirting on Monday can lead to them becoming loyal friends or doting couples by the week's end. The cumulative nature of the social history means that longer levels become more complex due to an accruing social state. To help ease new players into the game, earlier levels are shorter than a full week (i.e., a level's week may begin on Thursday, but the prom is always on Friday).

Every level provides the player with a set of goals to potentially complete. These goals are framed in relation to the character who is the focal point for the level. For example, one of the earlier levels focuses on the character Zack, who has several aspirations. One goal is to find a date. Another is to ruin a notorious bully's chances of becoming Prom King, because this is emotionally charged for Zack. The story of *Prom Week* continues even if goals are not met, but the goals provide players a guide to some of the narratively significant directions in which that level's fictional world could move.

Goals can be satisfied through an open-ended set of solutions discovered through interaction with the characters and social state. For example, to work toward the goal of getting a date, the player could have Zack form a friendship with a popular character over a shared interest. This friendship itself could eventually blossom into a romance. Alternatively, since Zack's new friend is popular, other members of the student body could perceive Zack as a member of the popular clique as well. Popularity is admired by many characters in *Prom Week* and consequently would lead to certain characters who otherwise would be disinclined to acknowledge Zack's existence suddenly becoming interested in him, in the hopes of elevating their own social status. That said, other characters—perhaps those who identify themselves as outcasts—might become less likely to accept Zack's advances and could even view his induction into popularity as a sign of betrayal. All of these possibilities are driven by the social simulation system, and no one path is inherently more correct than another. Upon completing a level, an ending sequence is performed based on the combination of goals achieved and how the player went about completing them. Through analogy with the popular physics game *Angry Birds* (2009), just as there is no single correct way to hurl the birds to knock down the towers, there is no one way to create a goal social state through action. As *Angry Birds* is a physics puzzle game, *Prom Week* could be considered a "social physics" puzzle game.

Once the player finishes a level and completes a sufficient number of goals, she can play the week over again with a different character. This projects another possible world with the same source world as the story that was just concluded, but one that is framed for the player in terms of the

concerns, situations, and hopes of a different character. Play in this new world is informed by the player's experiences in previous levels: her knowledge of the backstory, her intuition about the desires of characters, and her growing ability to successfully manipulate the social state.

PROM WEEK'S SOCIAL SIMULATION

Prom Week is driven by the social artificial intelligence system *Comme il Faut* (McCoy et al. 2014), or CiF, and is inspired by Goffman's "dramaturgical" approach to understanding social life (Goffman 1959). *Comme il Faut* is a French phrase that translates to "Being in accord with conventions or accepted standards." CiF is a model of social state, a collection of processes that can reason over that social state, and a framework for defining actions that can alter the social state. Though CiF is a powerful tool for social reasoning, CiF in and of itself is not a playable experience. Rather, it is intended to be used as a component of a game or system that wishes to leverage social dynamics, such as *Prom Week*. CiF reports what actions characters would like to take, but it is up to the game using CiF to interpret how that should be manifested to the player.

Due to the emphasis in CiF on social norms and how they guide social exchanges, the representation of each character is thin. What makes characters rich and unique is their relational situation in the social world and their interconnected history. This is a direct artifact of the sociological base of CiF; the model of characters is inspired by the concept of semiotic self, where the myriad factors of history, experience, future predictions, and social forces define a malleable self that is not lost in larger societal collectives (Bakker 2011, 187–206). The system determines the most salient social influences for a character by considering a full context of social norms, history, and current circumstance.

Every social exchange authored for a CiF story world has a single primary intent, or intended change to the social state. The intents, and thus the social exchanges, a character wants to pursue are recalculated after every social exchange in a process called *volition formation*. For each pair of characters, volition formation ranks all possible intents and exchanges based on a hand-authored set of social *influence rules*. Each rule has a weight value that adjusts volition for either a specific social exchange or for an intent (and thus a set of social exchanges) either positively or negatively. Rules are domain specific and in aggregate allow characters to behave appropriately within a specific storyworld's social context.

It is worth noting that, while the characters of a CiF world will all have their own volitions, there is no explicit encoding of theory of mind. The characters themselves do not project possible worlds based on what they believe the other characters are thinking. Similarly, there is no support for hidden information: once a social exchange transpires and relationships

change, all members of the story world will instantly take this new state into account when determining their volitions. Still, even with perfect information and no modeling of the minds of others, the potential space for possible worlds is vast. The social exchanges a character wants to engage in can be thought of as the speculations and hopes that character has for the future (e.g., "I really want this person to date me" or "I really hope I can make peace with my rival"). Each pair of characters will have its own set of desired social exchanges, and these exchanges are not reciprocal. For example, a sycophant may have a strong volition to praise a braggart, while the braggart is content to ignore his admirer. This leads to a very large branching factor in potential stories generated from CiF storyworlds; in *Prom Week*, there are usually dozens of choices for social exchanges at any given moment in the game. Each social exchange changes the story and the social state in different ways, which in turn leads to different sets of possible social exchanges.

Prom Week uses this social simulation to model a media-derived stereotype of U.S. high school life, with some notable exceptions. The rules that determine the volitions of *Prom Week's* characters were derived from an ethnographic analysis of media depictions of high school life, such as *Mean Girls* (2004), *Twilight* (2005), and *Saved by the Bell* (1989), though there is undoubtedly also influence from the authors' own memories of their personal time in high school. Using these sources for inspiration, many *Prom Week* characters highly value things such as popularity (if characters have a status of *popular,* they are generally more likely to be admired by the student body), romance (characters frequently have goals revolving around getting a date for the prom), and loyalty (if a character cheats on her date, the social fallout for all three parties involved is often swift and terrible). The authors of *Prom Week* do not claim that this is how real teenagers preparing for their actual prom are likely to behave, but rather that the system ensures that the agents in *Prom Week* will remain true to character within the world of the game, which is consistent with these other media depictions of American high schoolers.

Though creating a system that accurately depicts high school students would have ample applications, the stereotypes in *Prom Week* serve important functions themselves. For instance, they help bootstrap play through Wardrip-Fruin's notion of the *SimCity* Effect. As Wardrip-Fruin writes in *Expressive Processing* (Wardrip-Fruin 2009, 301), players bring their own (often incomplete) understanding of the domain when they play a game, use this to inform initial play, and then expand and correct this understanding given the game's feedback. *SimCity*, the simulation game that inspired the theory, places a player in the role of an all-powerful mayor. It is likely that most players have not had the opportunity to actually be the mayor of a city or devote much time to urban planning and development. However, if they find that their virtual citizens are complaining about pollution, they may recall from their own lives and knowledge that trees clean the air and

proceed to fill their towns with parks and forests. If citizens then stop complaining about air quality, players will have learned something about the simulation framed by knowledge of the real world. With respect to *Prom Week*, humans are complex creatures whose actions can differ greatly from culture to culture and from context to context. To be able to gauge their values and manipulate their social standing without any past knowledge is a tall task. Thus, the authors trust players to leverage their knowledge of high school stereotypes to instantly get a sense of the general relationships the characters are likely to have and how they are likely to respond to each other.

However, this also provides a telling contrast when players come to realize which stereotypes are not encoded or are inverted. For example, homophobia is not encoded in *Prom Week*; there are no social influence rules that take the sexes or genders of a couple into account. Though the exact qualities of a perfect romantic partner differ for every character (as individual character traits will influence the choice of a date) characters in *Prom Week* are generally attracted to those with shared experiences, who engage in playful flirting. As characters flirt with each other, their latent romantic affection toward each other increases, and as they engage in more (positive) social exchanges with each other, the characters will have more history to draw from when deciding how they want to interact with the other. All of these situations can happen with any character; with enough massaging of the social state, any character can become popular and thus win hearts more easily; any character can develop a crush on any other character, and thus be more willing to take the plunge and ask him or her out on a date. Although the few pre-existing relationships authored in the backstory of the world are heterosexual, if a male character is attracted to another female character, that attraction comes from his character traits and current relationship, as well as their shared social history together. If that same history and those same traits existed in a male character instead of female, the attraction would remain just as strong.

We found this is counter to some players' worldview and particularly their view of high school culture, where any deviation from heteronormativity can be met with ostracization and derision. Because of this, some *Prom Week* players struggle with a goal in the campaign of the character Oswald. Oswald has the goal of getting a date for the prom, and his stages include several female characters and a male character, Nicholas. Many players immediately begin by having Oswald attempt to woo the females in the level. Although nothing is impossible in *Prom Week* with the right social manipulation, the female characters chosen for that level have backstories that make them disinclined to be romantically interested in Oswald, making any attempts at coupling an uphill battle. By that same token, Nicholas and Oswald's history with each other makes them naturally inclined to start dating; the player just needs to (potentially) broaden his worldview about what is possible and refine his understanding of the procedures that inform the possible worlds of the game.

Figure 5.3 A player has successfully gotten Oswald closer to achieving his romantic goals by flirting with Nicholas.

In some sense this leveraging—and subverting—of the player's understanding of high school stereotypes is foregrounding the principle of minimal departure (Ryan 1991, 48) through play and serving as an example of Ian Bogost's simulation fever. In *Unit Operations*, Bogost writes "simulation fever is the struggle between the omissions and inclusions of a source system and the player's subjective response to those decisions" (Bogost 2006, 132). In our case, "media representations of high school social life" is the source system and players make decisions in *Prom Week* based on assumptions learned from these other media. Players come into the possible worlds of *Prom Week* assuming that these worlds operate similarly to their own world and the high school worlds they are familiar with from other media. For the most part the game conforms to this understanding, but when it doesn't—such as not restricting same-sex relationships that are absent in many media depictions of high school—players are forced to reevaluate their understanding of *Prom Week* (and its underlying social model in CiF). At the very least this can change her readings of the *Prom Week* worlds she has encountered thus far, but can possibly also inspire reflection on the real world by how it differs from this fictional incarnation of it.

THE WORLDS OF *PROM WEEK*

Play in *Prom Week* involves traversing an extremely large space of possible worlds and making social maneuvers within them. This manipulation of the social space is the primary story content in the kind of high school narrative we wanted to make playable. In a very real sense, the gameplay is the story. Every action the player takes advances the game's narrative and sends ripples throughout the internal social state, which in turn affects which actions are available in subsequent turns. CiF is a partner for the player, providing the gameplay with narrative meaning and shape. This is in contrast to a "sandbox" game[2] in which gameplay may be the story, but the story is formed only in the mind of the player and not understood or reasoned over by the system.

We have characterized CiF as a "social physics" engine, which simulates a stylized social world the same way video game physics engines simulate a version of Newtonian physics. One could claim that due to the variety of ways players can solve a "platformer" level, it has just as many possible worlds as a CiF-driven game. There are several key differences that mark *Prom Week* as something new. The primary one is that while a record of a player's jump heights and positions when traversing a standard *Mario* (1985) level could be considered a narrative, it is a terribly boring one. The fiction in such games is discussed at a higher level of granularity not in the individual jumps. In contrast, the individual moves in a session of *Prom Week* do constitute material for building a meaningful narrative. For example, one *Prom Week* story might begin with the character Zack flirting with the character Chloe, on whom Doug has a crush. Threatened by Zack's advances, Doug might develop a feeling of jealousy toward him, which could result in the two of them becoming enemies. Alternatively, if Zack had at first become friends with Doug, he might be less inclined to woo Chloe, as he knows it will upset his new friend. However, since Zack has the trait "arrogant" (and presumably still is just as attracted to Chloe as he was in the original scenario), he may still have a small volition to ask her out. This would have an even greater angering effect on Doug, since he's not only viewing his crush be taken away from him, but is being betrayed by someone that he viewed as a friend. Though, like the record of *Mario* jump heights and positions, any given turn in *Prom Week* can be reduced to a dry, logical/numeric description of the state (e.g., Doug and Zack are friends is true, Doug and Chloe are dating is false), we hope it is clear that the playthroughs presented here have the potential to have significant narrative differences from each other.

Additionally, physics engines keep track of the current state of the world but not the moves that led to it. *Prom Week* does track history, and this gives the system greater power to construct a meaningful and distinct possible world with each social move. While the player may remember the exciting narrative from the playthrough of a *Mario* level, the game's system does

nothing to incorporate it. *Prom Week* can meaningfully reference previous events within this play trace. This referentiality within the play trace creates a possible world that is narratively significant.

THE STORIES OF *PROM WEEK*

The nature of *Prom Week*, as a game played in a web browser, gave us the opportunity to store the stories *Prom Week's* players were producing in the form of play traces. A *Prom Week* play trace is composed of the chronological order of social exchanges the player engaged in while playing the game, annotated with pertinent information such as the characters that were involved. Since, as previously discussed, the source world is consistent at the start of every play of the game, and character volitions are computed completely deterministically, the complete narrative the player experienced can be reconstructed through these catalogued play trace files.

We have analyzed these play trace files in two ways, both of which revealed qualities of the system that we as the creators could not have predicted. One analysis approach is *distant,* looking at the range of ways the fictional worlds were shaped. The other analysis approach is *close up,* looking at how a particular exchange of dialogue can play different roles in the fictional worlds of different players. The former is looking at the shape of play traces, while the latter examines how particular dialogue appears in context. Both are ways of trying to understand the different worlds *Prom Week* creates through audience interaction.

STORIES AT A DISTANCE

Analyzing play traces generated from real play situations enables evaluating the impact players have on possible worlds projected through their unfolding stories. Even with the large amount of variation supported by CiF in a story world as content-rich as *Prom Week*, players could potentially be exploring only a small area of the potential story space. To gain a better understanding of the variation in stories that players experience through *Prom Week*, a holistic and detailed understanding of the play traces is useful.

To get a sense of how CiF's simulation and *Prom Week*'s gameplay impact the actual choices presented to the player, level traces were analyzed and visualized using the Façade Log Analysis and Visualization Tool (Sali and Mateas 2011; Sali 2012) a visualization tool that aims to enhance the current toolset for studying interactive narratives. This tool helped in forming an understanding of how players were interacting with the released version of *Prom Week*. Even though the player has many options of social exchanges to choose from, it is not clear without evaluation that there are enough paths through the story space to create meaningful reflections of the play of each individual player.

Furthermore, story goals, level casts, and the desires of the characters themselves may restrict the options available in such a way that many players will be forced down a narrow few paths in their pursuit of story goals.

We found there was a very large degree of variation in the possible worlds players were able to create through *Prom Week*. We took a sample of 263 play traces of the final stage of the character Simon's level and discovered that no two were exactly alike; the space was rich enough to allow for an entirely unique play trace per player. Though several play traces of that stage began similarly, it only took any given player about four social exchanges to create a world experienced by no one else, unique to her.

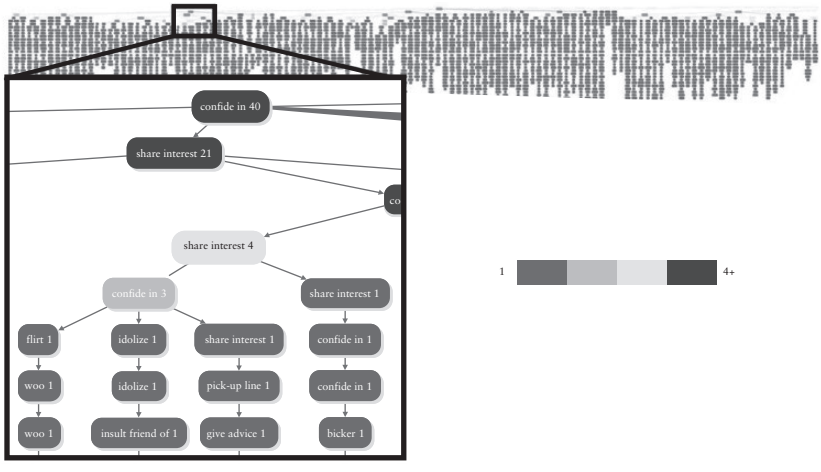

Figure 5.4 Play trace graph showing how often each distinct path through Simon's story was traversed (shown by the number associated with each node, emphasized with color). The large band of nodes seen at the top of the diagram represents approximately one third of the total size of the complete graph. The cutout shows a section of the map in detail including examples of social exchanges (like "pickup line" and "confide in") that appeared in more than one play trace. The majority of play traces are unique.

Even traces with subtle differences in gameplay actions (for example, the sequence of social actions *Reminisce*, *Confide in*, *Ask Out* as opposed to *Confide in*, *Reminisce*, *Ask Out*) can result in two remarkably different possible worlds, as the ordering of these social exchanges could potentially drastically alter the actions the characters want to take. The general trend of play traces becoming unique for players held true across all levels of the game and is particularly evident in the more difficult later levels.

Though play traces with similar actions in different orderings have the potential to lead to very distinct worlds, intuitively they are likely to be less distinct than two play traces that involve entirely different social exchanges and

characters. Some work has been done to automate the process of determining how dissimilar two play traces are from each other (Osborn et al. 2014). In other words, steps have been taken to chart the universe of *Prom Week's* possible worlds, determining how close or distant any two worlds are from each other.

Mapping this space is valuable for several reasons. Seeing the clustering, if any, of *Prom Week's* possible worlds is interesting in and of itself and highlights whether there are certain high-level strategies that are employed by many players. Finding the outlier worlds—worlds that greatly differ from any other—and analyzing their corresponding play traces can reveal insights into particularly unique approaches to the game. This in turn can help answer important game design questions, such as whether *Prom Week* enables creative or subversive play.

Comparing and contrasting the completed destination worlds generated by players is one way to illuminate the expressivity of the system. However, additional details about the possible worlds of *Prom Week* can be gleaned by narrowing our focus down to the level of the dialogue generated by the system.

STORIES UP CLOSE

To illustrate the range of roles that an element of *Prom Week* can play in the construction of different possible worlds, the following section provides interpretations of play traces of actual players involved in a single social exchange outcome (of which *Prom Week* has more than 800). This is an example of the "story sampling" approach to understanding widely varying narrative systems (Samuel et al. 2014). While it cannot be said for certain that the player that generated the gameplay interpreted the sequence of social exchanges in the ways described, the provided interpretations are indicative of the dramatic social drama *Prom Week* is able to create because story content is directly linked to the social state managed by CiF.

The example is a possible outcome of the social exchange *Ask Out,* in which the responder tragically refuses to cheat on the person he or she is already dating—despite sharing feelings for the initiator of the social exchange. This scene of dialogue will be referred to below as the "tragic rejection." The uninstantiated dialogue for the tragic rejection is:

> INITIATOR: RESPONDER, I have a proposition for you. Hear me out. I know you're dating DATING_RESPONDER, but you need someone who really understands you and cares about you, too. Someone … like me.
>
> RESPONDER: Oh, INITIATOR. I would be lying if I said I didn't sometimes wonder whether we could be together. But I just can't right now. I'm with DATING_RESPONDER, and I couldn't cheat on PRONOUN_OF_RESPONDER. It just wouldn't be right.

INITIATOR: But, we're so right for each other! Can't you see we were meant to be together?

RESPONDER: Stop it. Just stop. We can't. We just can't, okay? You should go.

INITIATOR: I'll always be here if … if you change your mind.

When put into the context of particular characters and varying social history, this scene of dialogue takes on a variety of narrative roles and meanings.

One interpreted story from a play trace involves the characters Monica and Nicholas (who are dating) and Cassandra. The story begins with Nicholas trying to break up with Monica and Monica talking him out of it. Next, Monica, feeling rejected, makes several romantic moves toward Cassandra, to which Cassandra reacts poorly. Nicholas, feeling jealous and irritated at Monica, chews her out for flirting with Cassandra. Now, the tragic rejection: Cassandra, given some time to think about Monica's advances (which were confusing to her at first), asks Monica out. Monica, feeling bad for making Nicholas angry, has decided she doesn't want to be a cheater, and refuses.

In this story, the tragic rejection has taken on narrative meaning that neither the system nor the authors anticipated, though is consistent with the characters and the choices the player has made. In the context of the story, Monica's torn refusal to date Cassandra implies that Monica felt remorse for her previous flirtatious behavior. It also paints her earlier actions with Cassandra as baiting Nicholas into caring about her. Once Nicholas showed her he cared, by getting angry with her, her desire to get together with Cassandra was lessened. This interpretation of the tragic rejection reveals Monica to be manipulative and gives us reason to pity Cassandra.

Another play trace involves the characters Doug and Jordan (who are dating) and Chloe (who is friends with Jordan). It begins with Doug and Jordan having a tender moment where Jordan reveals something embarrassing about herself, and they talk about how they need to trust one another. Next, Chloe flirts with Doug, and he responds politely. Next, Jordan goes to confront Chloe about this, and she can't bring herself to be mad at her friend. Then, right after Jordan compliments Doug, Chloe tries to date Doug, and the tragic rejection plays out (where he admits to having feelings toward her but ultimately rejects her). In this case, the tragic rejection can be interpreted as revealing both Doug's weakness for romantic attention and his loyalty to his present romantic partner.

The space of possible worlds in most single-player video games is highly limited by the amount of pre-authored narrative content. As discussed above, CiF enables a very wide degree of narrative responsiveness during play. Play trace data collected from *Prom Week* suggests that these possible worlds not only exist, but they are also being explored. While an individual stage might present only a few initial options, the possibilities branch out

extremely quickly. After just a few moves, players are almost all in their own unique world. Given the narrative significance of these differing worlds, CiF enables numerous playable stories.

CONCLUSION

We may be seeing the emergence of a new kind of experience of fiction, based on play with a story generation system that projects possible worlds. As we write, we believe *Prom Week* is the first example of this. The second, *Ice-Bound,* is forthcoming—it makes story authoring the metaphor for this form of play and is co-created by Aaron Reed (*Prom Week*'s lead author) and Jacob Garbe. Other projects are in the works.

While only time will reveal the impact of this approach, our experiences with *Prom Week* are already giving us a sense of some of what may be significant. We have suggested a few aspects above. For example, how making each level of *Prom Week* a new version of the same week creates a fictional experience that foregrounds possibility spaces (rather than, say, foregrounding fate). Or how the exploration of possibility spaces slowly, and incompletely, allows audiences to build up an understanding of the underlying rules by which these fictional worlds are created (which may be at odds with their understanding of the genre or the world).

In this final section we would like to discuss one additional experience some players have through the combination of play and story generation. We will begin with play. In many forms of play, as players understand their situation (consciously or not), they take actions that they feel are their own, rather than fully dictated by the game's designers. This could be executing a long, deep Go strategy or lunging for the ball in Tennis. Naturally, players of *Prom Week* feel that the choices they make about how characters will interact are similarly their own.

But in *Prom Week* this can combine with experiences that are more common with fiction. An audience member may feel empathy with a character's situation or speculate about how one character might react if a second character takes some action with a third character, exercising her own theory of mind abilities in the fictional context. And then *Prom Week*'s underlying social situation enables the creation of a fiction, based on the audience member's actions, that reflects insights gained through these kinds of engagements with the fictional world.

As a result, we have seen a new kind of fictional experience reported by *Prom Week* players: a feeling of *responsibility.* Reports have come from a variety of players. For example, as Craig Pearson wrote on the games website *Rock, Paper, Shotgun*:

> I presumed I'd need to be nasty, but that route got me nowhere. Not that it wouldn't have worked, and horribly it makes me want to see

> if I could destroy Buzz, but I won the game by accidentally being nice and friendly.
>
> So now I feel bad and impressed, and want to play it all over again ... Next time I'll be looking at more upbeat solutions, because the alternative, frankly, is hating myself.
>
> (Pearson 2012)

And similarly, as Alastair Stephens, co-host of the *Storywonk* podcast, wrote:

> The complexity of these relationships is absolutely, intricately mechanical—but like all successful stories, it swiftly moves beyond the mechanical, beyond the ludic, to the personal and emotional. The temptation to manipulate these characters is enormous, but crossing that line feels… wrong… In the end, I stopped playing *Prom Week* because I didn't like the person I felt like when I played it, and I can think of no greater compliment than that.
>
> But I'll be back tomorrow, Simon. You and me, buddy. You and me.
>
> (Stephens 2012)

It might seem odd to conclude this chapter by quoting two people saying they felt bad about themselves after experiencing *Prom Week*. But it points to something important about the playful projection of possible worlds as an experience of fiction. We might feel bad after watching *The Bicycle Thief* (1948) or *The Wire* (2002). We might feel bad because of the interconnected empathy we have with the characters and understanding we develop of a social system. But we don't feel a sense of personal responsibility for how we decided to engage with that system and shape the lives of those characters.

Audiences do feel those things with *Prom Week*. Perhaps this is most obvious when they feel bad about their choices. But it also operates when they feel joy—as one player reported to us when he successfully inverted the high school's popularity structure and saw the results of his inventive strategy in characters' lives. If it turns out that *Prom Week* is the first example of an experience of fiction that will grow and diversify with time, we believe this potential for a feeling of responsibility may be a key reason.

NOTES

1. Fiction here refers to the non-real components of a game—such as its setting, characters, and plot—with which the player interacts through the very real rules the game imposes (i.e., gameplay). Elsewhere in this volume, particularly in Hatavara's chapter, fictionality is discussed in a different, fine-grained manner. For more detail on how the term fiction has been used in game studies, see Jesper Juul's *Half-Real* (Juul 2005).
2. "Sandbox" games de-emphasize linear goals in favor of players' free movement through a simulated world. Also known as "open-world" games.

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