The Psychological Architecture of Choice-Driven Narrative in Games

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The Psychological Architecture of Choice-Driven Narrative in Games

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Acknowledgements

Dedications

I want to dedicate this work to my grandmother and my uncle Mike, who both passed away during my time in graduate school. I also want to dedicate this to my grandfather, without whom I could not have pursued this undertaking, and Jane Roll, the Yoda of my life, who helped me learn what it meant to take writing and entertainment seriously.

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Thesis Abstract

This thesis focuses on choice-driven or non-linear narrative techniques in digital games, discussing the parallels between the judgment and decision-making process and dramatic narrative structure. The goal of this study is to use that information to answer concerns about focus and consistency in the production of choice-driven narrative by developing a set of tools that writers and game developers can use to establish a common dialogue and therefore collaborate more effectively. Furthermore, this thesis seeks to understand the benefits of choice-driven over linear narrative and how to effectively achieve them.

I - Introduction

Thesis Statement

By combining the psychological architecture of judgment and decision-making with traditional dramatic storytelling structure, we can develop a consistent set of tools for creating choice-driven narratives and bring a stronger sense of focus to non-linear storytelling systems in games.

Introduction

Sid Meier defined games as "an interesting series of choices" (Rollings & Morris 38). Game developers have been repeating this phrase for a very long time, and with good reason. Choice is a huge part of the appeal of the interactive genre, whether it's in defining a strategy, a play-style, or the direction of a story. The latter is what we're here to talk about, as choice-driven narrative systems are becoming increasingly prevalent the world of commercial games.

What began as the purview of role-playing games and choose-your-own-adventure books has spread through a variety of genres, including shooters, sandbox adventures, and brawlers, making way for an explosion of choice-driven narratives in games within the past ten years. It's clear that our industry sees potential in developing narratives that the player actively participates in and that audiences are eager to explore that potential. Games are spaces where we learn; where we develop skills and explore our emotions in relative safety. Stories do much the same thing, allowing authors to explore themes pertaining to the human condition through both a dramatic structure and the

development and growth of characters (Jones 165-175). Bringing the two together ideally creates a more direct connection between the story's themes and its audience by allowing them to explore those themes and the relationships that authors use to represent them firsthand, exchanging parables with experiential learning.

Problem Statement

Unfortunately, at present time narrative choice is a very under-developed tool, formed less as a tool in and of itself and more as a consequence of the specific design goals of computer role-playing games and simulations. As such there is very little consistency in the ways that game developers employ choice-driven narrative systems in different projects and very few guidelines either in the industry or academia for writers to refer to when working on such a project, aside from a fistful of developer opinions regarding their current line of products. Consequently, the quality of content in choice-driven systems is also highly inconsistent, with some products forming successful connections with their audiences while others struggle to overcome criticism.

This thesis seeks to explore the obstacles that currently define choice-driven narrative for both writers and game developers, the benefits that such systems are meant to convey, and to develop a consistent architecture that developers can employ in developing them. This will be accomplished through a survey of interactive narrative techniques and a study of the connections between the psychology of the human decision-making process and dramatic narrative principles. This will allow us to define different types of decision-making and their affect on a player's perception of a

narrative, giving us a set of building blocks that we can then use to develop narrative in the context of decisions and interactions.

Brief History of Narrative Decision-Making

Before we can begin exploring choice-driven narrative, though, we must first define it and understand how developers have approached it to this point. A choice-driven narrative is, in the simplest of terms, a narrative that the user of a piece of interactive entertainment media is able to leverage some change over. This can be achieved by changing either the occurrence of events in a story or else relationships between characters and features within the narrative. For the sake of maintaining focus, this thesis will assume the context of the player being in the role of a single perspective character or protagonist.

Early Models

The earliest and perhaps most accessible example of commercially available choice-driven narratives would be the choose-your-own adventure books of the 1970's, which organized stories as decision-trees that led to many possible scenarios and endings for the perspective character. Said character was represented to the reader in the second-person "you" in order to personalize the experience, and the reader made decisions by following instructions to turn to different pages depending on how they wanted to react to a decision, for example: "turn to page 104 to follow him; turn to page 48 to go back home." This model is so ubiquitous that it is almost universally used to convey how choice-driven narrative behaves (Costickyan).

Another form of choice-driven narrative, perhaps the more idealized model in the modern game industry, is that given by tabletop role-playing games such as Dungeons and Dragons, which also came to popularity in the late 1970's and early 1980's (Barton 17-20). In these games several players create characters in a fictional setting and participate in a story created by a "game master" who serves as a rules referee, a storyteller, and a game designer all in one; role-playing games are additionally mediated by dice in order to represent margin of error and risk in an effort to create fair mediation of the players' actions. Otherwise, the players may perform any plausible action, and in response the game master can also do or create anything. This two-way relationship of player and storyteller creates a totally personalized and totally dynamic storytelling experience.

Digital Models

Both approaches were iterated upon in several ways with the advent of digital games and personal computing. Adventure games such as *Adventure*, *Zork*, *King's Quest*, and *The Secret of Monkey Island* provided more sophisticated variants of choose-your-own-adventure book combined with elements of puzzle-solving, while computer role-playing games like *Ultima, Wizardry*, and a variety of *Dungeons and Dragons*-licensed products sought to re-create the popular tabletop gaming experience, substituting computerized rules for the game master (Barton 3-5).

In their earliest forms these computer games featured extremely limited interactive narrative mostly due to memory and programming limitations imposed by early hardware. While the ideal motivating them is total freedom to affect changes on the

narrative and explore the world inside the story, most of the time these games were no more non-linear than an ordinary book. Completion of an adventure game such as *King's Quest*, for instance, is contingent on successfully solving puzzles, which each have only one solution, some of which could be very esoteric (Gilbert). Likewise, completion of the early *Ultima* games required that a set of objectives be met. While there was some flexibility in how players achieve these objectives or what order they might pursue them in, players ultimately would always experience the same content and storyline (Barton 64-66).

Modern Models

As time, technology, and technique have all progressed, more sophisticated models arose in the interest of presenting a truly non-linear and choice-driven narrative. Games like *Baldur's Gate*, *Star Wars: Knights of the Old Republic*, and *Deus Ex* have garnered popularity and great critical acclaim for their marriage of player choice and narrative, and many developers have sought to duplicate that success (Barton 375-381). Today, action-adventures, arcade brawlers, survival horrors, and first-person shooters alike all have been known to employ elements of choice-driven narrative in addition to role-playing and adventure games.

Most of these models of late revolve around "moral choice," or the idea of using a game to explore ethical problems, and often they depend on giving the player some agency over whether their character is good or evil. Precedent for representing this scope of morality has existed since the tabletop era, where it was used to maintain consistency of player characters' characterization, preventing players who chose to be good knights

from being overly cruel or impulsive. Modern games instead attempt to use it in order affect a degree of consequentialism, seeking to create a narrative that can emerge around dramatic shifts in the player's chosen characterization. Many of them suffer from applying overly broad and overly loose concepts of morality to an otherwise unrelated narrative, however (Barton 380, Bossche), making it seem less like a contributing element of a product and more a marketing technique (Adams). Still others are so rigid that they deny players any sense of interpretation over the narrative that they supposedly control or the character that they are building, their stance of ethics overridden by that of the designer, leading to dissatisfaction (Zoss 1, Adams 2). Nevertheless, the ability to project ethical dilemmas onto digital gaming is an appealing means of enriching player experience (Zoss 3), and many developers continue pursuing it.

IV - Methodology

Identifying Need

Unfortunately, game developers don't so much study narrative choice as a tool as insist upon it as an imperative or an ideal for their products to aspire to. CRPG developer Bioware is especially vocal about this, defining game narrative as a "possibility space" rather than a scripted narrative (Sterling) and going so far as to outright reject games with linear narrative from their genre (Davey). This is consistent with many on game writing and is a mindset popularized by Greg Costickyan's article, "where stories end and games begin," which states that as a project becomes more of a story it becomes less of a game. (Costickyan). This is a very prolific point of view in the world of western

game development in particular and is propagated by a line of highly influential developers who prefer "emergent," or non-scripted storytelling entirely synthesized from the player's experience, seeing it as taking better advantage of the tools that gaming has to offer.

This is certainly a valid philosophy for developing interactive entertainment media, but as a result of its proliferation there is a lot of pressure and prestige in the game development community that comes with employing choice-driven narrative but minimal critical exploration as to what we expect to gain from it. Very little material is available relating to how it might be employed or what benefits it carries compared with the challenges it poses. Developers and game writers frequently cite how difficult it is to work with, the amount of control they need to "give up" (Bateman 71-79) in order to accommodate a player's sense of authorship or "agency" over their experience (Poremba 21), and how difficult it is to justify nonlinear content streams, as players may not even experience a significant portion of a game's content. Developers on the extreme opposite end of the argument go as far as to insist that it simply isn't worth pursuing, as incorporating more freedom on the player's part is thought to preclude good storytelling (Ingham). If we are going to accept player choice in narrative as something meant to enhance a narrative experience as so many developers would say, however, this would seem contradictory, as one would think that it should not necessarily be mutually exclusive with the quality or consistency of a narrative and its intent.

Nor should it be mutually exclusive with some degree of intention on an author's part. "An imaginary world is little more than a costume trunk of empty avatars unless it has been called into being by an external author," (Murray 152) spoke Janet H. Murray in her interactive media text, Hamlet on the Holodeck, and she makes an apt point. Someone must write the rules for a game, structuring challenges, goals, or rules by which a computer can define strategies (Sheldon 170). Likewise, someone must devise the central themes around which a story is focused, the central characters the story is about and an appealing identity for the player to empathize with or assume in order for there to be something to make any narrative--let alone a nonlinear one-- worth exploring (Sheldon 6, 8, Epstein 33-34).

Identifying and maintaining narrative focus would then seem to be a key in developing a successful choice-driven narrative. However, this is not the case, as narrative focus is often the very last priority that developers place on a game. Instead, the common practice is for game designers dictate content to writers, who are able to offer little in the way of narrative focus apart from being the ones who write the dialog (Remo 3). According to Bioware lead writer David Gaider, it's rare for even a lead on a writing team to get any degree of control (Remo 3). To give an example of the pitfalls to which this can lead, let us examine Gaider's own work, *Dragon Age: Origins*.

In it, one of the driving features is that the player is able to choose from several combinations of race (IE: human, dwarf, elf) and class (fighter, mage, rogue), and depending on what the player chooses the game provides a different set of background scenarios available to explain the player character's origin story and provide a more

personalized introduction to the game. One such introduction, that of the human fighter, casts the player as the son of a noble house. The game's overarching story revolves around a demonic menace called the Darkspawn, a kind of zombie/orc horde that's invading the country of Ferelden and bringing the world closer to an impending apocalypse every day that it rages forth, while the human noble background focuses on the politics between the player character's own noble house and a rival house in the middle of this conflict, culminating in a coup d'état that results in the death of the player character's family and the fall of his or her home.

While the foundation of this scenario seems like the stuff of Shakespeare, the execution is dictated by utilitarian demands on the game's design; it has to introduce a lot of mechanics, namely those of character interaction, dialogue, questing, and combat, in a short time, and in a safe environment. Therefore, the events that actually occur are as follows: the player is ordered by his or her father to go upstairs and deliver a message to their brother (Dad wants to see you downstairs), but is not allowed upstairs until he or she agrees to kill some rats in the pantry. Afterword, the player character sleeps for the night, only to be awakened by the aforementioned coup d'état, instigated by a visiting noble whom the player met for only a few seconds at the very beginning, with no build-up or suspicion as to his intentions and no tie-in with the aforementioned errands. This provides effectively no insight into the very extensive and detailed setting that Dragon Age represents, let alone the motives that set apart these noble houses, and therefore no means for the player to explore them or inflect an interpretation around them. This makes for a very un-interesting narrative to explore, in direct contrast to the Dwarven noble and Dwarven commoner origins, which pit the player on opposite sides of a

detailed caste system in Dwarven society and explore important class issues within the Dragon Age world. One narrative is clearly focused on a social problem that defines the player character; the other is not.

This inconsistency in the quality of content is suggests that a quest writer was able to conceive of a creative scenario but had otherwise little to no support from the game's content and level designers for following through with that setup. In the context of our example, it's as if the combat tutorial involving the rats in the closet were conceived before the noble houses, which would be consistent with Gaider's claim. Such scenarios are typical not just of choice-driven narrative but of game narrative in general. It is only natural that a game needs to structure itself around teaching its system to the player and providing interesting challenges (Sheldon 219-237). However, that there isn't a stronger dialogue between writers and game designers in these instances would seem to lead to a lack of provisions for taking full advantage of narrative context and focus, which is a key weakness of choice-driven narrative.

Disciplinary Case Studies

Our goal, then, is to address these issues with a system that can utilize traditional dramatic narrative concepts and interactivity together as tools for player interpretation and personalization, put in terms that both writers and designers can use for common dialogue and collaboration. Additionally, we want to be able to affect changes that are both emotionally and psychologically satisfying based on user interaction, to consistently maintain narrative focus, and we must do this with a logic that can account for an indefinite number of storytelling themes across a multitude of different game

structures. Therefore, we need to consult several key disciplines in order to establish what tools we have at our disposal. First we will discuss the discipline of game development, which breaks down decision-making with respect to game mechanics, strategies, and basic risk-and-reward and has much to say about what entails entertaining decision-making. Then we will discuss dramatic writing and the multitude of media that it has spread across, which can contribute some insight as to how we can make narrative flexible enough for the sake of interaction. Third and finally, we will consult cognitive psychology itself in order to inform what devices the human judgment and decision-making process uses to understand choice itself. By building parallels between this process and dramatic narrative principles, we can understand what kinds of interactions and factors contribute to an audience's conception of what makes a satisfying decision within a narrative.

Game Design

Developers often look to traditional game mechanics structure and interactive design concepts to fill in the blanks left where interaction should connect with narrative, hence why game designers often dictate the flow of narrative choice systems rather than writers (Remo 3). After all, game flow and mechanics have certain demands that require compromise as far as the story structure goes; what kinds of challenges, goals, and rewards should be employed in specific levels, for example; and how best to achieve a sense of steadily and fairly increasing challenge or excitement and implement the tools that the player is given in a design (Sheldon 170). It's these skills that best reflect for us what satisfying decision-making in an entertainment medium means, and therefore we shall orient ourselves to how games understand choice.

Exploration of choice in the realm of gaming mainly focuses on simple risk-and-reward relationships. Whether players are evaluating what weapon to use and how best to use it or crunching numbers on equipment in a role-playing game, the consensus among designers is that gamers will inevitably try to maximize their reward; therefore inconsequential or minor decisions should be minimized or avoided while necessary and important decisions, IE ones with direct and visible impact on the flow of the game, are what designers should strive to create (Fullerton). Critical decisions, IE life-and-death situations with a high degree of pressure--can become just as cumbersome as inconsequential decisions as players can be just as easily frustrated by frequent fail states as they are by frequent inconsequential choices slowing down the flow of the game. High numbers of critical decisions become an exercise in trial-and-error or punishment for curiosity rather than engaging decisions.

If we were to translate this onto a narrative-based paradigm, we could imagine a decision tree where the player is given choice A or B, and B results in an immediate fail state or being denied a major branch of the game while A progresses normally. Even if choice B is a realistic option, it's either a frustrating penalty or else a choice that common sense would dictate that nobody would ever choose if they understood the consequences; therefore there's no reason to include the decision.

Already we're able to apply a lot of fundamentals of choice in game design to choice in narrative, but readings on narrative choice as a subject itself are sparse at worst and ambiguous at best. on game development and game narrative tend to categorize this under "nonlinear" or "branching" narrative, and tend not to clearly outline the goal of

implementing such a system as much as simply outline their existence, citing tree,

module, or grid systems as a means of tracking them and simply stating that they put

control of the story more in the hands of the player than in the hands of the writer

(Sheldon 167-171). This seems an oversimplification and contrary to the point of a

narrative-based system: ideally it seems that it should enrich one's ability to tell a story

rather than limit it in favor of a superficial sense of control or authorship; make players

feel more involved with the characters rather than distance them from each other or

preclude a sense of character development. What we understand of strategy-oriented

choice and how it relates to this would support that overly open-ended decision-making

in this manner is, in fact, a dead-end, as only a handful of choices would be significant

enough with regards to the development of a story for them to be worth the player's

interest (Zoss 1). This logic would support our supposition of branching decisions as

"act breaks," or important points of dramatic tension and large-scale interpretation.

Dramatic Writing

The fundamentals of dramatic narrative have been well-catalogued since antiquity. They

state, simply, that a story is comprised of characters, their motivations, and events that

arise as part of their interactions. Ideally, as the narrative proceeds the stakes

continually raise, lending to a rising tension or sense of action. All of this is structured

with respect to "acts," traditionally thought of in terms of a three-act structure: an

introductory act that sets context; a middle act where the majority of the action is

represented, and a third act which features a climax and conclusion to the story. In

modern writing particular importance is emphasized on character as the motivating

factor behind a narrative, stating that it should evolve as a natural consequence of

characters' desires. Various writers, most famously Joseph Campbell with his texts,

The Power of Myth and _The Hero of a Thousand Faces_, have explored the structure of

a storyline in much greater detail than this, with respect to both three and five-act

templates and with respect to different mediums, but these fundamentals are relatively

consistent.

However, most of these ideas concerning the three-act formula are conceived solely

with respect to film and literature. When we step into the realm of gaming, merely

motivating a story forward becomes a challenge, and the structure of a game's flow in

particular demands unique compromises be made in order to accommodate the

patterns of challenges, obstacles, goals, and rewards that dictate a natural game flow.

In the context of choice-driven storytelling we introduce even more roaming factors,

taking what would be concrete logic and transforming it into a series of probabilities, per

Bioware designer Mike Laidlaw's assertion of the "possibility space." (Sterling)

Therefore, we need to adopt a set of ideas from a more flexible medium than literature,

that being television. Television programs tend to thrive on a sense of consistency,

going well out of their way to "return to stasis" and re-establish a base status quo by the

end of every episode (Epstein 33-35, 61-62). They also demonstrate a remarkable

capacity for altering and re-defining dramatic structure to suit their individual needs. No

television series operates under the same structural circumstances as another, as some

shows work with longer running times than others and some shows deal with more

commercial breaks than others. Therefore each individual show faces different

problems maintaining the interest of an audience, much in the same way that games do.

(Sheldon) This is a unique similarity between television and gaming that many

developers seem to have caught onto, as "sandbox" style game design, which breaks a

narrative up into independent episodes that a player can explore in any order, is a

particularly notable and successful method of developing choice-driven narrative.

Television's means of dealing with this conundrum is to re-define dramatic structure

based on those unique needs, IE to develop a unique formula to support a show and

maintain consistent quality and pacing. While the widely known three-act structure

serves as a frequent point of reference, few shows, if any, are actually broken into three

acts as a consequence of unique breakdowns of commercial time during their schedule.

Therefore, commercial breaks are often adopted as the act breaks, and shows will

consequently define four, five, six, and even seven-act structures (Epstein 67-74). Each

of these act breaks is designed as a turning point, meant to convey a significant piece of

information that changes the status quo of the story and merits discussion--thus insuring

that the audience will continue watching in order to see how the characters adapt.

This gives us several key insights. First, it shows us that dramatic structure can be

highly flexible and is not confined to any single formula (Epstein 65), which in itself is

useful to us. If television can create compelling drama structured around commercial

breaks, then games can do the same with challenges and obstacles. Maybe more

importantly, it demonstrates that there is no static formula for any narrative, and that any

individual game is compelled to find a unique, comfortable formula all its own for

delivering narrative. Second, it highlights the importance of the act break as a point of

high dramatic tension and significance, which gives us an excellent point to start refining

our concept of focusing a narrative. If we accept that choice-driven narrative is organized into decision trees and that alternate content streams are too significant an undertaking to marginalize, then we can logically conclude that the points where a decision-tree branches must be the equivalent of "act breaks," specifically designed to change the status quo and highlight issues of great significance to the narrative. Anything else encompasses the gathering of additional information and context for these proceedings. This insight will be useful in defining the basic behavior of our system.

Psychology and Decision-Making

However, gaps remain between our models of interaction and narrative in that neither of these disciplines makes it entirely clear what factors make interesting decision-making with respect to how characters interact with one another and their surroundings. Games revolve around concrete objectives and strategies rather than abstract desires belonging to idiosyncratic characters (Fullerton) while stories revolve around the gamut of elements of the human condition. This differentiation greatly limits our ability to create empathy for characters that don't follow broadly relatable archetypes. To fill this gap this thesis explored cognitive psychology to understand how psychologists break down judgment and decision-making, the better to understand the parallels between this process and dramatic narrative concepts and to duplicate it in an interactive medium. Two core processes are outlined here: those of rationality, which states that people make decisions based on risk-and-reward logic, and rule-following, which argues that people make decisions in terms of fulfilling identity. Both architectures offer a wealth of knowledge that will give us more refined tools for crafting choice-driven narrative.

Rationality

Game designers are familiar with Rationality. With respect to the name of this architecture we should not misunderstand the term "rational" to mean "intelligent" or "sound-minded" as much as we should understand it to mean "conscious" or "intentional." It simply holds that people consciously make decisions based on a risk-versus-reward analysis, intent on maximizing their reward. There is some disagreement, however, as to whether people actually do as they intend, and Rationality is divided into two subsets to account for this: Pure Rationality and Limited Rationality. Both hold that people make decisions based on probabilities, not certainty. Both hold that principal characteristics of rational decision-making include post-decision surprise--either good or bad--as well as regret--the awareness of a better choice--and risk--or potential variation in outcomes (March 1-7).

Pure Rationality holds that people do not, in fact, maximize their reward with 100% accuracy but rather try to maximize an *expected* value based on probabilities and risk factors. Expected value analysis involves developing an imaginary decision-tree, with branches representing either acts on the part of the decision-maker or "acts of nature," or acts outside the decision-maker's control. We see, then, that there's a clear parallel in this model of Rationality and in game design as many games also represent their stories with decision trees. Almost *never* do we see an "act of nature" represented in these games, however. What would constitute a reasonable "act of nature" in a branching narrative remains to be understood, but we can suppose it would involve the player projecting the possibility of characters performing counter-decisions to their decisions, or else un-intended consequences of their actions.

Before we explore Limited Rationality, we must first explore the factors that define risk in greater detail. Those factors, as outlined by Pure Rationality, are knowledge, actors, and preferences (7). Knowledge simply refers to how much the decision-maker knows about the state of the world and any other actors in the decision-making process. Actors refers to, literally, the number of actors in the process, with each actor increasing the number of potential branches and weighing in on the probability of any given situation. Preference refers to the decision-maker's values; IE, what constitutes a good reward to them and what doesn't. Each of these factors can create a high degree of ambiguity; people can make decisions with a certain degree of ignorance about the world or a situation, experience uncertainty about what other people intend to do, or have ambiguous or conflicting preferences.

Limited Rationality states that although people *intend* to be rational, there's simply too much ambiguity and too many bottlenecks in the human decision-making process to create a sense of perfect Rationality. People don't know all alternate choices, they don't consider every consequence, and not all preferences are immediately evoked. Only a few of each are known, and they're reviewed sequentially rather than simultaneously. As such, people tend towards satisficing, or selecting an option that's "good enough" rather than maximizing, or choosing an option that's "best possible" (March 9-30). Additional constraints imposed by Limited Rationality include Attention--peoples' ability to deal with multiple signals or streams of data at once; Memory--peoples' ability to retrieve previous lessons; Comprehension--peoples' inherent difficulty in organizing information for use in a decision or recognizing its relevance; and Communication, which is more of an organization-oriented constraint than one pertaining to individual

persons, stating that knowledge is differentiated between specialized individuals with differing identities and preferences. Each of these offers designers a good set of tools for either building ambiguity where necessary and creating dilemmas or eliminating ambiguity where it isn't desired.

What this framework does for us is highlight points of differentiation between established concepts of interactive design and what players' expectations are when confronted with narrative decisions, which they expect to behave like real decisions. Interactive design dictates that important information always be exposed and made clear, while cognitive psychology maintains that people make decisions most often in absence of the necessary information. Interactive design places chief focus on the user and their convenience; cognitive psychology maintains that the user is not the only decision-maker in a series of events, that chance is an important player in a decision, that the repercussions of a decision are often beyond the player's control rather than within it, and therefore a decision-maker will inevitably make mistakes. This does not necessarily contradict our earlier conclusion regarding what decisions are worthwhile; it merely tells us that players may make "mistakes" in some way or another, and justifies the inclusion of imperfect solutions within a narrative choice system. Rationality also focuses strictly on relationships with tangible resources, an aspect not necessarily regarded in the world of narrative but key to risk-and-reward. This clearly outlines the aspects necessary to fulfill players' expectations of choice and its discernible consequence, or what we will refer to as discernibility.

Rule-Following

Rule-Following, an alternate form of decision evaluation that states that people don't necessarily think in terms of rational risk versus reward but rather in terms of trying to adhere to an identity. They recognize a situation, ask "what kind of person am I?" and then ask, "what does a person like me do in a situation like this?" In other words, they follow a set of rules. While this sounds like a relatively simple architecture compared with Rationality, Rule-following is most assuredly a very conscious and deliberate process, and the concepts of identity which drive this process can be ambiguous. People can possess multiple, conflicting identities--professional versus personal is a classic example--and can even misunderstand the identities that they possess; or they can not immediately recognize the relevance of a particular identity to a particular situation (March 57-59).

The mechanisms by which identities are built or accessed are equally as complex as the ways in which people evaluate risks in Rational theory. Those processes include Experiential Learning--"learning on the job," so to speak, experiencing rewards and punishments for specific actions and learning to evoke an identity based on those lessons; Categorization--organizing and prioritizing rules and ideas around central concepts of an identity; Recency--a principle which states that people will tend to repeat identities that have recently been evoked; and Social Context--wherein the expectations and rules of an identity become highlighted by the presence, real or imagined, of other people in the system (March 68-74).

If we were to equate Rule-Following to a term in gaming, it would most certainly be role-playing as it very literally boils down to the construction of an assumed identity by the player, which makes Rule-Following a very fitting metric for understanding decisions from the player's perspective. What Rule-Following also highlights is that this role need not be constructed by the player themselves; much of it is understood with respect to professional identities within an organization, which are notably *not* constructed by people themselves but rather constructed *for* them by the organization they are a part of, with a variety of devices outlined in the reading: the providing of models, allowing people to learn by example; the use of cues, visual, audio, or otherwise to set professional context and outline appropriate behavior; and the providing of experience itself, as outlined under experiential learning. In the context of a strongly narrative-driven experience the player almost *can't* construct their own identity outside of a few constraints based on a given title's mechanics and flexibility; the stronger the sense of character development that the developer wants, the fewer means of self-determination that there can be. These devices, then, outline a means by which developers can help players to assume the identity that they need players to resonate with, or in the case of less constrained titles, tools which they can use to make suggestions and help guide them into feeling that they have developed a strong identity. This gives us the necessary framework to understand how social risks are represented in player psychology--namely as a series of opposing rules. More importantly, though, rule-following's focus on identity presents us with the concepts necessary to define acts of character development in terms of decision-making, and in the most convenient way possible: that of rules in a system. It is therefore that these elements define for us how

we can structure a player's personalization of even the most explicit characterization, as we may develop game rules with a certain degree of tolerance or flexibility to evoke character identity.

Aspects of Narrative Choice

From both of these architectures combined with our background from the worlds of game development and narrative we have distilled two key aspects that players expect when confronted with narrative choice, those being identity-oriented personalization and risk-oriented discernibility. The former represents a measure of flexibility that the player has in interpretation through choice, the latter represents a measure of risk and consequence through concrete factors. We also have numerous tools that help us understand what contributes to these factors within a player's mind, including confirmation of the framework of the decision tree, a means of interpreting abstract character concepts into rules, and broader means of defining risk with respect to social and ethical elements.

V - Solution

General Tools

From this data we have been able to draw several conclusions, from which we can develop a system that can be used for building choice-driven narrative. In order to properly address the problems of narrative choice, our system must be able to build a dialogue and common terminology between both writers and game designers, equating the concepts of one knowledge base to the other by means of cognitive psychology. It

must be able to help them identify and maintain focus in player interactions by way of narrative themes, it must be able to help control the relative depth of alternate content streams, and it must be able to help developers identify the most opportune points in the narrative to build a sense of discernible structural change in order to satisfy an audience's expectations.

The tools that we have for building this system include the various concepts driving rule-following (IE role play) and limited rationality, which give us insight into what makes ambiguity and risk and therefore what would make for interesting character-oriented decisions. We can also use this as a means of bridging the concepts of narrative and interactive design, finding the common language between them. Finally, we have the principle of explorative storytelling--the idea of using storytelling themes as grounds for interaction--to give us the proper framing for this system and an ideal in order to aspire to, namely that of communicating narrative themes through interaction.

Decision Tree Breakdown

the decision-tree is the best foundation for this system as it serves both as the accepted model of choice-driven narrative in the game industry and the accepted abstraction of decision-making in the school of rationality. However, in order to elaborate on it and build a stronger sense of purpose and precision, it will be necessary to identify different types of choices. Our decision aspects--discernibility and personalization--will help us separate these, and it would help us to further separate the decision tree into different layers based on how close one type of choice or another is to the plot structure versus how close it is to the player and their motives for making decisions. In this regard we

can identify at least three "layers" to the decision tree: the directive layer, dictating the way that decisions influence the direction of a narrative; the interface layer, which dictates the means that a decision tree employs to make a decision; and the contextual layer, which explores the factors that motivate players into making a decision. By exploring these concepts, we can break narrative decision-making into different types of choices, creating our tools and our desired dialogue.

Directive Layer

At the highest level we have the simplest of differentiations. On one hand, there are decisions that actively branch the narrative in different directions, leading to significant changes in events. These shall be designated as structural choice due to the significant impact it makes on the dramatic structure. On the other hand, some decisions do not cause the story to branch in any significant way, but should not be ignored as they provide ample opportunity for personalizing player experience at a relatively low development cost. These decisions shall Therefore be designated as cumulative choice.

The former shall be designated as structural choice due to its significant alterations on dramatic structure; a fuller name might be dramatic structural choice. Such decisions naturally carry tremendous weight as they promise significant narrative alterations, and therefore are weighed carefully against the player's dramatic preferences, putting them closest to a rational mode of decision making; more specifically, one that fosters significant amounts of discernibility. Because of the amount of weight a structural choice carries, it is a mode best suited to moments when the player is faced with maximum dramatic tension. In storytelling formula terms, structural choice can be best equated to

an act break, wherein the central themes and motivating factors of a story come to a head; therefore structural choice is best reserved for act breaks, and best employed to draw a user's focus to the storytelling themes at hand.

An example of an ideal structural choice in action can be found in Bioware's *Star Wars: Knights of the Old Republic*, wherein the player must definitively choose to devote the,selves to either the light side of the Force or the dark side, decisively changing their relationship with the majority of their companions for the last act of the game. In this game the player avatar is Darth Revan, a former Dark Lord of the Sith and a legendary figure of evil and terror in the setting, mind-wiped by the Jedi in the hopes of removing their corruption and winning them over to the side of good. Near the game's conclusion their companion and partner, Bastila, falls to the dark side herself, makes the offer to the player to join her and overthrow the game's villain, Darth Malak. The player can accept, deciding to embrace their character's original identity as Darth Revan and reject the concept of redemption entirely by condemning both themselves and Bastila irredeemably to the side of evil. Doing so requires the player to murder two party members in cold blood, thus losing many allegiances with the more moral elements of the party. While this end is bitter, it makes a point: once evil, always evil. alternatively, the player can reject her offer and try to save Bastila from corruption, taking an entirely different perspective and proving that even those who've fallen to the darkest depths can save those who've fallen from the highest heights if they will themselves to overcome it. As the final act break, this structural choice is the definitive last word on the player's interpretation of the game's themes of light versus dark and, more importantly, redemption. While it doesn't change the content r the player's goals, as they must have

a showdown with Darth Malak either way in order to win the game, this does vastly change the player's relationship to that content.

Cumulative choice, on the other hand, carries very little weight by itself, but nevertheless affects interpretation of character, tapping into the player's personal opinion and preferences to fill in blanks regarding their avatar's identity. This is most easily equated to the storytelling concept of character development, which is simply the act of exploring the details of a character's preferences and relationships within their story-world, be they fears, likes, or dislikes. These details are readily acknowledged by writers as being insignificant to big-picture plot changes, but are regarded as indispensable for creating three-dimensional characterization and establishing motivation in a successful narrative. This further parallels the identity-building concepts behind rule-following. Therefore, cumulative choice should be thought of as a constructive device in choice-driven narrative; a necessity for allowing the player to understand their avatar's identity and motives and therefore also for providing context for structural decisions.

Heavy Rain: The Origami Killer exhibits many interesting cumulative choices in its early chapters, which focus on establishing player avatar and protagonist Ethan Mars, architect, husband, and father of two boys. Each of these aspects of his character are available for the player's exploration in the game's prologue, wherein they simply go through Ethan's morning routine on his youngest son's birthday. The player acts on Ethan through a series of timed button prompts as they wander through the house, do a little bit of work on a new design that Ethan is drafting up, help his wife with the

groceries, and play with his sons in the back yard. The player can succeed or fail at each of the set of button prompts relating with these activities, exacting small changes on the way the scene plays out. He might fail at his drafts and leave blank paper at his desk; he might fail to help his wife, leaving her to prepare for their son's birthday party by herself while he plays with his sons; and, not only might he fail to best his eldest son in a sword fight, but Ethan faces the choice of which son to play with first. Each of these possibilities leaves the player to fill in exactly what reasons there might be for these actions, and their outcome will come to color the player's perception of the themes of depression, loss, and familial responsibility that will follow after Ethan loses his youngest son to a car accident and must overcome the challenges of the Origami Killer in order to save his eldest from the serial murderer's clutches. The player might just as easily see Ethan as an irresponsible, depressive deadbeat fighting to redeem himself as a loyal and responsible father brought to his knees by the villain's schemes; or, any combination of things on between, all because of a few seemingly inconsequential choices that gradually grow to inform a characterization.

This summarizes both the types of decision-making that can occur at the directional level of a decision tree-based narrative as well as their justifications, but to fully understand how decision-making affects player perception we must look at other components at deeper levels.

Interface Level

At the next level down, we must examine the interface that a decision tree employs in order to present choice to the player and execute a decision. The interface in any

interactive medium can have a great impact on the user's experience and perception. the same holds true here, except instead of talking about communicating accessible information, we're discussing the interpretation of player actions into narrative elements. Narrative choice interfaces can take on an infinite variety of forms on the user's end, but for the decision tree itself the distinction is very clear: a choice is either direct or indirect.

Direct decisions are the most easily distinguishable and obvious choices that a player can make, literally being comprised of prompts that give the player direct input over the direction of the narrative. Dialog menus and straightforward choose-a-path prompts are the most common forms of direct decisions, though in game actions such as attacking specific NPCs or entering certain locations can also be direct narrative choices. Similarly, the act of *not* doing something can be a direct choice on the player's part; for instance, the Independent game Iji places significant focus on whether the player *avoids* killing enemies, using this as the basis for major structural changes to the narrative. what defines the direct interface isn't necessarily the presentation of the game interface, but rather that the player is consciously aware that there is a decision being made, is aware of at least a portion of the risks involved, and, most importantly, feels directly responsible for the direction and consequences of that decision and is able to rationally understand and evaluate them at the time the decision is made. At their very core, these are direct questions, ranging from "what is your character's favorite color?" to "which of your friends are more important?" and they are best employed when it would be desirable to raise the player's awareness about something. This isn't to say that direct decisions always aim to draw total attention, per the weighty nature of a full structural decision, but they do aim to raise awareness, either of potential character points,

potential opportunities, or of the issues that a writer is aiming to discuss, by representing them in tangible form.

Indirect decisions, meanwhile, are not clearly prompted but rather interpreted from the player's actions over a period of time. A process in the background of the game monitors the player's actions, and, at the time when the decision must be made, the game makes the choice *for* the player, offering a response based on the collected information, whose significance is not necessarily clear until after the decision is completed. This has the effect of creating post-decision surprise as well as putting new context to earlier interactions, making for a good means of highlighting the significance of what would otherwise be isolated cumulative choices and displaying the cumulative effect of the player's micro-interactions. It also offers a viable means of representing external actors in the decision-making process, giving non-player characters and "acts of nature" a means of impacting the decision tree in the context of what might otherwise be an ordinary node along the tree.

Some of the clearest examples of indirect decision-making interfaces can be found in the Silent Hill series. Most notably, Silent Hill 2 makes a point of monitoring the player character, James Sunderland, and his health totals, damage-taking frequency, and use of healing items, equating this to some approximation of James's relative mental health. At the game's conclusion, depending on these factors, the game will decide either that James has overcome the mental instabilities that have plagued him throughout the game and allow him to return home ready to begin a new life, or it will conclude that he does not care about his own physical well-being and is therefore suicidal, and James

therefore chooses to take his own life, believing it to be the only way he can rest in peace. The game makes a point of prompting the player after the conclusion, telling them that they have unlocked one of several endings. Thus, until the completion of their first play through of Silent Hill 2, players do not consciously make this choice; it is a matter of coincidence of play style that decides the ending, and it serves to highlight that the player's actions impact the psychology and livelihood of the game's protagonist greatly. this new context transforms these actions into real issues, giving players new perspective on the game's themes and mechanics and how they connect to one another.

Silent Hill: Shattered Memories takes this concept a radical step further. The game takes place in a series of recollections in a psychiatrist's office, following the story of Harry Mason and his search for his missing daughter in the eponymous town. Many micro-interactions and cumulative choices exist in each of the game's environment, and each builds upon one of four statistics that define Harry's identity: sexuality, friendliness, alcoholism, and family. The exact nature of these statistics varies, but as the player performs interactions that influence these variables the game chooses alternate variations of characters and scenes to reflect the way the numbers grow and shrink. Inspecting a woman's underwear drawer in search of her medication, for instance, might increase his "sexuality," and the game might choose a range of changes to reflect where this score lies, doing as little as adding a small flirtatious line to a conversation with a female character or going as far as to completely alter that female character's presentation, creating a more overtly sexualized portrayal of her through her clothing, body language, and overall dialogue. In extreme cases, the player will experience

flashbacks to a family life wherein Harry has two women on his arm. Alternatively, the

variables may stack in such a way that this scene is instead replaced with one of him

being abused by his wife for cheating on her. Numerous possibilities exist from the

game's interpretation of these variables, which serve as an indirect interface through

which the player's direct actions in every scene of the game are abstracted. Perhaps

most significantly, this game makes a point of framing this with respect to overriding

character traits that are used to define both Harry Mason and the story itself, using it as

a device to highlight them for the player.

Both indirect and direct decision-making interfaces can be employed in either personal

or structural narrative choices, and different combinations of these concepts can build

tools that designers and writers can use to frame a narrative. However, this leaves

many questions open with regard to the exact impact those choices have on users

psychologically.

Contextual Layer

In order to examine that we must proceed from the level of interface mechanisms

downward one last step deeper into the decision tree, into the context of an individual

decision and what motivates a player to make it.

The best way of discerning context is to look at it from the perspective of whether it is

predominantly logical or emotional in nature, and the perspective of long term versus

short term impact on the player's perception of the narrative.

The difference between logical decisions and emotional ones are clear: logic pertains specifically to the player's preferences with respect to objective goals in the game, IE overcoming obstacles and completing tasks with sterile risk-and-reward thinking divorced from the overall emotional or thematic context of the narrative. The distinction of thematic context as opposed to overall narrative context should be made because users always perceive potential narrative when considering the logical direction that a narrative might take based on their actions and the immediately tangible variables and factors represented in the game's mechanics. logic dictates story flow at least as much as drama and thematic elements, and mechanics, play styles, and strategies are necessarily perceived as logical elements within the story flow, equally real to the characters as they are to the player. Emotion, on the other hand, simply pertains to the player's personal, emotional preferences and beliefs, all of which are intangible to mechanics but not to narrative concepts such as story themes and relationships between characters. Emotional decisions, therefore, are ones that pertain to the player's perception or desired perception of those ideas, which are just as present in the way that characters present themselves and build attachments as the threat of winning or losing is present during a competitive play session. They can be as simple but also as powerful as things like a player's preference or favoritism of one character over another--a concept often explored in role-playing games.

 It is important to note that emotional and logical context are not mutually exclusive, any more than differing identities are mutually exclusive in the architecture of rule-following, and in fact the player can be forced to face a dilemma between emotional and logical preference if both are invoked at the same time and would move the player in opposite

directions. A simple example of this would be an instance where the player would have to sacrifice the life of a major character, perhaps one with whom they especially emphasize, in order to accomplish a major goal; or perhaps inflicting a narrative/emotional punishment in exchange for what would otherwise be logically sound. For instance, Indie side-scroller Iji walks this line by presenting the logical possibility of devastating enemies with potent weapons, but offers what could be considered punishment in the form of some characters reprimanding and demonizing the player character for mass murder as a result, representing a clear dilemma of emotion versus logic.

The remaining factor, then, is long-term versus short-term impact; or simply, whether a choice's effect is immediate, simple, and short-lived, or something that leaves a persistent mark on the player's perception. While it would seem as though these concepts have clear parallels with our definition of personal and structural decisions, there is an important distinction we must make in that this aspect of the contextual level refers to the player's rationale for making a choice rather than the actual effect that a choice has on the decision tree. We are strictly second-guessing the motives that form a decision at this level, not how it changes a story.

In the context of logical decision-making, the short-term refers to immediate problems and obstacles within the game and what strategies the player might employ to overcome them, which can have significant weight on the way the player perceives their avatar, as it closely equates to the act of experiential learning per rule-following architecture. The original Deus Ex depended very strongly on these kinds of

interactions, equating the player's play style to their characterization of protagonist JC Denton and often having NPCs comment on his methods of solving problems as he pursued both terrorists and conspirators; whether he killed anyone or took them peacefully, found secret entryways, harmed civilians, or performed other actions that were relatively insignificant to the game's overall plot structure literally said a lot about what the player cared about in this world, and served to build context for a more significant decision at the game's conclusion.

Long-term logical decisions, on the other hand, pertain to decisions made with respect to meta-game preferences, most particularly the player's perception of what must be done to achieve completion of the game. Players pursue choices very differently when under different impressions of who or what is an antagonist in the large-scale conflict of a narrative, for instance, and will tend to pursue choices that would seem to obviously oppose those forces, reasoning that they must in order to "win." One game that explores this notion is Mass Effect 2, wherein players are allied with the Illusive Man, the leader of one of the antagonist factions in the previous game in the series. Players may choose to cooperate with him or not at frequent intervals, but the majority of players have been shown to distrust his intentions greatly due to the possibility that doing so may only empower a major villain or rival in a later iteration of the game, showing a logical approach based almost solely on long-term expectations from this character.

In the context of emotional decision-making, meanwhile, short-term choices are a matter of instinctual personal preference, accounting for a great number of cumulative

choices and being relatively unconscious in nature. Many of the small-scale interactions in Heavy Rain and Silent Hill: Shattered Memories are short-term and strictly emotional in nature, albeit later scenes in each game.

Long-term emotional choices, meanwhile, relate to interpretation on a game's thematic elements, and are more conscious and deliberate in nature in that they directly challenge a player's personal beliefs or emotional commitments on a scale too obviously significant for the player to ignore. Bioware's games frequently seek to invoke these by sewing conflict between the player's companions and forcing them, as the leader, to mediate this conflict. Lionhead's Fable 3, however, makes a significant matter of this early on in the game when the player character's evil brother confronts them with the choice of executing either their own best friend or a group of peasants, asking the player whether close personal ties are more important to them than the greater good, a set of themes that recur throughout the game, helping to immediately throw emphasis upon them in the player's mind and provide a significant motivation in future conflicts.

Suggested Use

We have thus identified eight aspects or types of narrative decision-making at three levels of a decision-tree--the context, the interface, and the structure. At this point, it is difficult to discern whether there are deeper levels or alternative decision-making schemes on the levels that we have identified, This should prove enough for the purposes of laying the foundations of our system, which we shall call a **narrative-based decision tree**. To review what tools we have identified:

- **Directional Level** - How a decision affects the direction of the narrative.

- o **Structural Choice** - Alters the structure of a narrative; most closely resembles the concept of an act break. Best employed for drawing attention to major themes and asking players to commit to an idea. Strongly represents the concept of discernibility.

- o **Cumulative choice** - Builds context for structural choices; most closely parallels character development. Best employed for exploring themes non-comitally or providing points of personalization/interpretation.

- **Interface Level -** Logic used by a decision tree to execute a decision.

  - o **Direct** - Decisions consciously made by the player. Best employed to draw immediate attention.

  - o **Indirect** - Decisions made by the game, interpreting data gathered from the player's actions, necessarily without their knowledge. Best employed to represent non-player actors in the decision-making process, or to draw attention to the significance of personal decisions.

- **Contextual Level** - Player's rationale for making a decision.

  - o **Logical -** Motivated by concrete logic; inclusive of play strategies and actions pertaining to overcoming obstacles.

  - o **Emotional** - Motivated by abstract or emotional concepts; inclusive of personal reactions to concepts within the narrative.

- o **Long-Term** - Motivated by the perception of persistent consequences.

  - ▪ Logical decisions encompass metagame concepts such as what best contributes to completing the game

  - ▪ Emotional decisions encompass overt narrative concepts too significant for the player to ignore.

- o **Short-Term** - Motivated by immediate circumstances.

  - ▪ Logical decisions encompass immediate problems and obstacles and the player's strategy for overcoming them.

  - ▪ Emotional decisions encompass simple elements of personal preference.

With this taxonomy of narrative choice now at our disposal, in the context of building blocks in a narrative decision-tree, we have a clear method for not only defining, but also refining a choice-driven narrative with respect to the goals of a narrative as well as the in-game mechanisms that can be coupled with them to build and maintain a connection between the story and its audience. A game developer would begin by outlining a story premise alongside base mechanics, and then start at the structural layer, identifying not necessarily the exact events but the motivating storytelling themes that they wish the player to exercise agency over and the desired potential interpretations, therefore creating focus within the narrative choice system at the same time that focus for mechanics and overall story are identified and presenting

opportunities to suggest connections with those foundational components of the game. As the project develops a concrete setting, important characters are identified, and events and scenarios are outlined by content designers or writers, they can then choose which of these things shall be employed as choice interfaces and what kind--either direct or indirect--would be most effective in representing each of these factors. Finally, as the game's content is planned and constructed at the low level, the motivating factors of emotion and logic can be identified within the context of individual events, strategies, setting elements, goals, obstacles, and character relationships, thus clarifying what types of interactions would best represent the structural decisions that hold sway over the game's plot, and what opportunities exist to create personal decisions and provide context for those decisions. This can be performed with reference to any material brainstormed at the higher levels.

This method carries many advantages. First, is accessible to both game designers and writers, allowing designers to design with narrative concepts and material as a jumping-off point and writers to develop ideas with respect to interactions. Second, it is scalable to narratives of many sizes, and can be employed at the topmost level to dictate a large, over-arching plot as well as at the level of individual characters' story arcs. This allows multiple relationships between the player and various characters and ideas, all within the same project, to be compartmentalized, analyzed, and designed simultaneously by different teams. Third, it allows common reference for fostering iterative design in a collaborative writing environment. For example: a team responsible for planning a specific character's story arc might identify the key turning points in their narrative, but require additional context; they can then identify a set of cumulative choices to build that

context and when those interactions should occur, then bring them back to the lead

design team to reference it against the overall story structure, identifying existing

decisions that coincide with the ones they seek to build as well as scenes that present

opportunities to add new ones. If other teams are responsible for specific scenes

already represented here, they can collaborate with one another to integrate the first

team's decision node into the second team's decision tree, thus coordinating different

elements of the plot together more cleanly than if they were simply developed

separately with one overseer. Fourth, it imposes no specific scheme, morality,

mechanics, or values upon developing a narrative choice system, but instead provides a

set of tools that developers can use to create their own systems, tailoring the concept of

narrative choice to the goals of a project and the themes of its narrative rather than a

project to the concept of narrative choice. Fifth and finally, none of the types of

decisions here are mutually exclusive, nor is any specific one an imperative for every

project; thus, it can be adapted to projects of varying degrees of scripting or emergence,

varying levels of openness or structure, and varying degrees of linearity or non-linearity

to help clarify what interactions create tangible connections between mechanics and

audience and how. As an example, we applied it specifically to the level *No Russian* in

Call of Duty: Modern Warfare 2, clearly illustrating both the scalability of the narrative-

based decision tree and its applicability even in a linear narrative.

Application to Linear Play
Call of Duty: Modern Warfare 2
Level: "No Russian"

Summary: Player takes on the role of a CIA agent working undercover with a terrorist cell.

Begin Level

Logical or emotional; Depends on varying degrees of hesitance

Means of Execution

Pressure developed by context of terrorists

Kill Civilians/Don't Kill Civilians

Cumulative/Indirect

Failure to attack leads to suspicion at lack of reaction

Player maintains cover, But is queasy

Reaction/Proximity to Makarov and Associates

Cumulative/Indirect

Logical or emotional; depends on varying degrees of hesitance; Makarov creates context

Means of Execution

Makarov encourages use of Grenade launcher; most brutal weapon and most effective

Players forced to use grenade launcher face stronger sense of irredeemability

Kill Spetznaz officers/ don't kill them

Emotional/Logical Dilemma – High Risk sways player's moral code

Distance or proximity to terrorists Indicates many emotions in the player

End of Level; Makarov executes player

Varying reactions and interpretations of United States' innocence or guilt possible from varying interactions in this level.

Simple introduction of flexibility during this level creates a compelling interactive experience, with players evaluating moral code and building strong sense of context for the rest of the game

Figure 1 - Breaking down a linear game with respect to our decision tree architecture reveals significant psychological effect of subtle micro-interactions.

Thesis Prototype

To illustrate narrative-based decision tree architecture at work in the context of a working project, I developed a point-and-click adventure game whose structure was developed using these principles. This type of game was chosen because the toolset, a free game engine called Adventure Game Studio, lent itself especially well to creating narrative content quickly and efficiently, and because it maintained focus specifically on narrative content so as to help emphasize the structure of the narrative over the structure of mechanics.

The game, titled *Maddox: The Retail Rebellion*, follows the story of Dr. Robert Maddox, a mad scientist whom the bank forecloses on, forcing him to seek legitimate employment. He seeks such employment at a retail giant called U-Mart, where he works a series of blue collar jobs, unsuspecting of a diabolical plot that lays beneath its friendly veneer. The overarching themes of this game are that of personal pride and identity versus social acceptance and humility.

Component 1 - Conflicting Rules and Risks

This is represented by conflicting sets of rules: those of Dr. Maddox's volatile temperament and code of pride as a mad scientist, and U-Mart's very explicit code of conduct and mutual employee respect. Maddox's identity is dictated by a gauge in the upper-left corner of the screen called the "Madness Meter," which in deference to traditional morality systems is more of a pressure gauge than an abstract measure of characterization. The gauge builds as Maddox represses his personality for the sake of others. This means bowing out of arguments or purposely avoiding asserting his intellect in favor of telling people what he thinks they want to hear, and also performing menial work. The more menial the task Maddox is performing, the more it will cause the Madness Meter to rise every time he performs an action. When it reaches 100%, Maddox suffers a psychotic break and is thrown into the mental hospital, which is a "lose" state for this game, albeit no less of a valid ending for a character who by definition is crazy. However, by purposely indulging in cathartic behavior, IE creating crazy inventions or otherwise purposely going out of his way to assert his intelligence, Maddox is able to vent Madness out from the Madness Meter, staving off the day he goes into the padded room just a bit longer (figure 2).

Figure 2 - Maddox can perform schemes, such as modifying his friend's appliances, to relieve his Madness.

The second set of rules is represented by the way that people react to Maddox during his day at work, and insures that frequently venting Madness carries a risk in that Maddox's interests frequently cause him to unsettle his co-workers. Every NPC is on a "two strikes" system, tallying a strike whenever Maddox upsets them strongly enough and reporting him to U-Mart management if he arrives at two; this tallies an additional strike on U-Mart's own "two strikes" system. This is not done during segments of the game that are based on exploration or problem-solving, as it would be unfair to penalize players for seeking potential solutions to a puzzle. Rather, during these segments the player's relative success or failure on a puzzle is monitored instead, leaving Maddox's

impact on his co-worker's attitude through direct character interaction contingent on the first impression (Figure 3). At the end of one rotation at work all the strikes accumulated tally up and the player is evaluated by U-Mart's human resources representative, who reports to them what their co-workers thought of them and whether they performed their duties well. Based on that information, Maddox is then re-assigned to a new position-- one that could be either better or worse than the one that he currently has, placing him alongside different characters with different challenges. As a rule more menial positions evoke the Madness Meter more frequently, creating a tangible risk in the way that Maddox conducts himself. The player can't lose specifically through U-Mart's feedback, IE Maddox will not get fired, but can be put in a position where it is more difficult to win by appeasing them.

Figure 3 - Maddox must take care to manage both his madness and his co-workers' expectations.

This base system would be easy enough to exploit on its own were we adopting a

traditional morality system, but here the actions that are logically rewarded per

Maddox's overall sense of identity are actions that are penalized within the context of U-

Mart, and the actions that are logically rewarded by U-Mart are the ones that are

penalized within the context of fulfilling Maddox's identity. This effectively evokes the

principle of conflicting identities per the rule-following architecture (albeit doing so

through a rationalized resource management goal) creating ambiguity in every dialogue

that the player has with NPCs and in how he performs his job. One way or another the

player has to break the rules on both sides in order to maintain the delicate balance of

Maddox's personality versus his well being at work, but it's entirely up to the player as to where and with whom these rules will be broken and why, creating an effective device for character interpretation in spite of Maddox's strong characterization and maintaining this narrative theme's consistent focus and sense of challenge.

Component 2 - Narrative Decision Tree Structure

This system gives us a foundation on which to outline the decision tree for this game, which is detailed in the figures below. A color-coded key has been provided to show what types of choices are used per the architecture outlined in the my methodology, and an in-game indicator shows cues when these types of decisions are invoked. These charts detail to what end decision-making inflects characterization, and break the game up into three separate segments--the introduction, the initial job interview, and the main body of working at U-Mart, which then cycles back into an interview.

The introduction details how Dr. Maddox lost his lab, putting players in his shoes as he threatens the Prime Minister of England with a Doomsday device, is subject to a repossession agency's meddling, and forced to room with his best friend, Jacob. As the "first act" of this game, its job is establishment, therefore it is built primarily with emotional choices and character context in mind. Prior to the foreclosure the player is able to dictate demands to the Prime Minister, suggesting possible motives behind Maddox's diabolical deeds and sowing the seeds of potential characterization in the user's mind by way of recency effect (figure 4). At Jacob's apartment, the player is able to experience the morning of the interview, wherein the game allows them to choose from one of several morning routines--either taking a bowl of cereal, making bacon and

eggs for both Maddox and Jacob, or else modifying Jacob's coffee machine without his permission in order to achieve caffeination more quickly. Each of these suggests further potential characterization, and while none is inherently more good or bad than any of the others, they each evoke a different tone. (Figure 5).

Figure 4 - The introduction of "Maddox" seeks to define Maddox's character in the player's mind with a series of emotional choices coupled with the recency effect.

Introduction – Establishing Identity and Context

Goal: Cumulative Decisions establish context and early character development

What motivates Maddox as a mad scientist?
Spite, power, greed, or pure madness?

Introduction Sequence → Maniacal Banter → Maddox's Lab is Shut Down → Jacob's Apartment – Maddox needs a job

How does a mad scientist prepare for a job interview?

Breakfast, Morning of Interview

Make Bacon and Eggs → Maddox displays patience and personal concern

Eat Cereal → Maddox displays distaste and impatience

Leave Without Breakfast → Maddox is rushed, but subdued

SCHEME - Modify Coffee Machine → Maddox shows initiative and control, but low consideration for others

Make Coffee → Coffee Machine Fails

Maddox Asserts it too slow, shows impatience

Job Interview

Key – Types of Choices

- Emotional Choice
- Logical Choice
- Structural Choice
- Indirect Interface

The game's introduction primarily revolves around establishing characterization, employing a series of cumulative decisions prior to the main body in order to give the context of Maddox's personal identity. Here it is established in the player's mind whether he is a capable mad scientist who the world doesn't get along with, or a delusional madman enslaved by his personal pride, or some where in-between.

Figure 5 - Narrative Decision tree for Introduction segment.

Job Interview Process

Goal: Structural decisions are introduced as a reaction to the player's logical choices, which follow their established characterization.

First interaction with Madness Meter – How much does a mad scientist try to please an interviewer?

U-Mart Job Interview

Line of Questions

Interviewer assigns job based on professional conduct

Assignment of Job

Poor Conduct – Assigned to Storage Room

Good Conduct – Assigned to Electronics Dept.

Job Begins

Player chooses to evoke or repress aspects of Maddox's character versus interviewer's questions

Key – Types of Choices

Emotional Choice

Logical Choice

Structural Choice

Indirect Interface

Player is introduced to their first line of both logical and structural decisions as well as the dilemma of personal versus professional identity that guides this game. Based on experience, the player learns that their actions at U-Mart have concrete consequences and that they need to manage Madness carefully in order to survive.

Figure 6 - Narrative Decision Tree for Interview segment.

Armed with this sense of context for Maddox's character, the player then proceeds to the job interview, which is both the introduction to the Madness mechanic as well as a simple template for how the player can expect decisions to be laid out with respect to U-Mart's rules (figure 6). This is achieved through a variety of dialogue options, which in these segments each hold Madness values so as to invoke the risk and reward of the Madness system (figure 7). The player must weigh this risk against the social context of the interview. However the player chooses to respond, they do not directly decide what

department they are assigned to; rather, this is interpreted through an indirect interface based on their professional conduct. The available departments are broken down in the context of what Maddox would deem more menial or tedious, as his character is averse to tedium. Lower-level positions have a greater chance of inflicting Madness, while higher ones have more complex puzzles to solve in order to achieve a high rating at U-Mart.

Figure 7 - Players must balance their Madness with U-Mart's expectations carefully.

Finally, the act of performing Maddox's assigned duties is represented in a more complex form. Initially, the player is confronted with another dialogue, wherein they

have the opportunity to make their first impressions on their co-worker as well as vent or

accumulate more Madness. Past this point the game enters into a more exploration-

oriented mode, wherein the player can speak with co-workers and perform their duties.

Said duties are unique to each station, but follow the same overall formula: the player

must perform a simple puzzle to achieve a satisfactory rating. They have two

opportunities to do this, both before and after a lunch break, and in the middle of lunch

players are free to wander and speak with NPCs without the immediate pressure of

work. Each job contains a "scheme," a secondary puzzle reflecting Maddox's ingenuity,

which enables the player to circumvent their job and achieve a satisfactory rating more

easily. In the final employee review the player is evaluated both by the hidden value of

"UMart Points," which measure how productive Maddox is, and their relative disposition

with their co-workers, who report Maddox to HR for the final round if they're overly

abrasive, though Maddox's increased productivity as a result of his scheming is also

taken into account to counter these factors.

Body – Job Cycle

Job Begins

First Impression

Player may be cooperative or uncooperative with their new supervisor

Final opportunity to vent or accumulate madness

Does supervisor get along with Maddox?

Player's final Madness rating defines a strategy

Minigame or puzzle taking place across the various rooms at U-Mart

Working the Job

Player is presented different activities depending on which job they're working. In any case, the game functions on a timer, giving the player a limited space of time to explore U-Mart and accomplish their presented task. "Lunch break" at U-Mart gives them time for free exploration. Red herrings exist as intentional distractions.

Play Strategy

Did player complete tasks successfully?

Did player discover scheme or "invention" for circumventing work?

Whatever the outcome—success or non-success—the player is free to interpret as to why and project conclusions about Maddox's character

Final Evaluation

Interviewer accumulates information based on performance, conduct, and scheme completion

Final Interview Question

Player determines Maddox's final attitude – resolution, compliance, or defiance – based on their experience.

Player is free to interpret as to why they chose their approach, but...

Interviewer assigns new job based on factors and final answer

Ending

Key – Types of Choices

- **Emotional Choice**
- **Logical Choice**
- **Structural Choice**
- **Indirect Interface**

The body of the game revolves around the player's reactions to different characters and situations, and builds structural decisions based on a logical strategy in response to the Madness Meter mechanic and social pressures.

Figure 8 - Narrative decision tree for Body or Job segment.

Playtest Data

To ascertain whether this approach was successful in creating a compelling user experience, a pool of 10 user tests was conducted (Figure 9). Users were asked to rate on a scale of 1-5 their satisfaction regarding their influence over the direction of the game's plot, Dr. Maddox's characterization, his relationship with other characters, as well as the contribution that decision-making elements had to their overall enjoyment. A score of 1 is very poor, 2 is poor, 3 is average, 4 is good, and 5 is great. Our users were also posed several questions to ascertain which decisions they had made in an effort to determine potential weaknesses in the narrative decision tree or its execution, as well as questions regarding what parts of their experience stood out most strongly, both positive and negative.
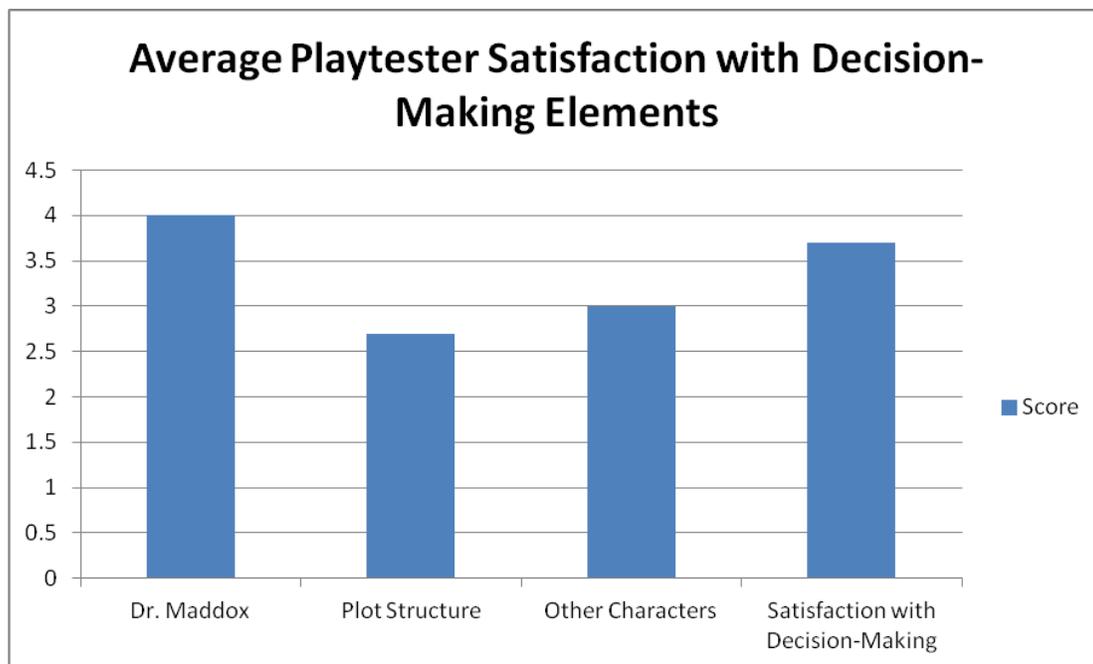
Figure 9 - Playtest Data

All playtesters agreed that Dr. Maddox's characterization was very strong, that it lent greatly to their enjoyment of the experience, and that they also felt like they had a strong degree of influence over it, with the average rating of 4 having been reported unanimously. One user reported, "I don't feel like I change his point of view on things much, but I feel like I have control over what parts of his personality are coming out." No one, however, reported a score of 5, or "great." This is possibly due to limitations of the game's scope or limitations of the users' perception of what choices exist, as not all are immediately suggested.

Users who were unable to perform their job well tended to report lower scores in both plot, relationship-building, and decision-making satisfaction than other users, though none rated any element of the game at a 2 or lower and the least satisfactory user still reported overall satisfaction at a 3. The testers in this group did not feel that their "failure" was an issue inasmuch as they simply felt their goals as to how to advance were unclear, and that they were dissatisfied with the timer mechanic. Users who were able to achieve schemes, on the other hand, reported higher scores and greater satisfaction with the overall product, though it is notable they did not report greater satisfaction with Maddox's characterization than users who failed.

It is especially notable that users reported a very wide variety of combinations of decisions, creating very unique takes on the overall narrative and their own points of view on co-worker relations. A particularly successful user reported being able to discern both the "electronics" scheme and the "breakfast" scheme, and related this to his own nature as a Machiavellian manipulator in his own social life. Another particularly

unsuccessful user, who had become hugely distracted by red herrings and clumsily blundered through Maddox's day at work, all the while insisting that people call him "doctor," reflected somewhat somberly on his own life at work. While this type of reflection wasn't common to all users, it suggests that the philosophy guiding this project is heading in the right direction in that the project was able to elicit such clear reactions.

Future Improvements

Many of the flaws in this project stem less from the implementation of narrative decision tree architecture and more in its execution within the point-and-click-adventure game genre, which dictates modes of puzzle-solving and exploration that preclude failure states and a model that is contingent on the player's action in order to advance (Gilbert). Any future improvement on the method would involve operating under a different type of game. Any improvement on the product, on the other hand, would mainly involve tailoring the decision-making formula to take better advantage of adventure game elements, which were admittedly difficult to integrate together due to both shortcomings in the Adventure Game Studio toolset as well as my general inexperience with developing adventure games and puzzles. Additionally, not every opportunity for exploring the decision tree system was explored due to limitations of development resources, as a greater degree of exploration could have been achieved were individual character relationships also represented here. Additionally, a wide variety of micro-interactions simply are not supported due to project development limitations. Nevertheless, this prototype and its test results show a solid conceptual foundation.

VI - Conclusion

By taking a critical eye to the development of choice-driven narrative to date and game developers' perspectives on it we have been able to determine a series of key weaknesses to current methodologies and practices. Key among these is a lack of tools and provisions necessary for the narrative focus necessary for creating an interesting thematic landscape to explore and maintaining the development focus necessary to insure well-structured and compelling material. By re-orienting on the goals and ideals behind choice-driven narrative, those being to build a device for engaging players with the themes that dictate a story and to personalize their experience, we have been able to draw from the disciplines of dramatic writing, game design, and psychology to build a conceptual bridge between player interaction and storytelling principles. Furthermore we have been able to refine a series of tools for analyzing, understanding, and developing choice-driven narrative in great detail and with terms that can be used to build a dialog between game designers and writers alike. This is accomplished by breaking down the universal concept of a decision tree into a taxonomy of decisions based on directive, interface, and contextual layers, giving us multiple degrees of sensitivity and a framework that can scale to a variety of development needs.

Perhaps the most important thing we have determined from developing the Narrative Decision Tree architecture is that there is no one-size-fits-all solution to choice-driven narrative, but rather that each nonlinear narrative has its own set of needs based on mechanical structure and what narrative elements exist to take advantage of as opportunities for interaction. Therefore we have developed not a single system for a universal narrative structure, but a series of tools, building blocks, and vocabulary that

can be used to tailor a game's narrative structure around its characters and thematic principles. In the prototype developed for this thesis this was performed in conjunction with a supporting set of game mechanics in order to establish risk-reward relationships in order to establish a consistent thematic struggle. These mechanics were based off the previously outlined psychological principles of risk and ambiguity as a template and focused on realizing the explicit, formal characterization of Dr. Robert Maddox.

This proved a highly effective collaboration of ideas that led to a unique and fulfilling user experience that effectively evoked the selected themes and character of our chosen narrative, per the playtest data presented. This, however, is only the foundation of a fuller study on choice-driven narrative. Every individual type of choice at every level of the Narrative Decision Tree architecture --structural, cumulative, indirect, direct, emotional, logical, long-term and short-term--can be explored in much greater detail. Different varieties of character expression such as dialog and problem-solving merit a great deal of additional study, and the various micro-interactions for fully customized characters have not been explored in the context of our methodology, as such interactions lay outside the scope of our established project. Meanwhile our study on psychology only scratched the surface of a wealth of tools that can be employed to evoke interesting decisions.

The prototype presented here represents only one of dozens of different types of games and only a very small development scope, and it would be highly advantageous to ascertain the effectiveness of this thesis's methodology across a bigger variety of game structures. For instance, what our Narrative Decision Tree architecture means for

multiple, simultaneous users has yet to be explored. However, our goal was not to create rules for every specific need, but rather to establish a foundation where little common agreement previously exists. Because our methodology does not confine itself to any single narrative formula, any single set of themes, or any single gameplay structure, but rather tailors itself around a game's specific needs, this should prove an effective foundation for exploring all of those possibilities in the future. Pursuing this exploration, hopefully, will allow us to broaden our conception of how choice-driven narrative can be approached as a deliberate tool rather than a distant ideal to struggle for, and empower us to form tangible connections with our users through their interactions.

Appendix - Figures and Charts

Application to Linear Play
Call of Duty: Modern Warfare 2
Level: "No Russian"

Summary: Player takes on the role of a CIA agent working undercover with a terrorist cell.

Logical or emotional; Depends on varying degrees of hesitance

Logical or emotional; depends on varying degrees of hesitance; Makarov creates context

Begin Level

Means of Execution

Means of Execution

Pressure developed by context of terrorists

Makarov encourages use of Grenade launcher; most brutal weapon and most effective

Players forced to use grenade launcher face stronger sense of irredeemability

Kill Civilians/Don't Kill Civilians

Cumulative/Indirect

Kill Spetznaz officers/ don't kill them

End of Level; Makarov executes player

Player maintains cover, But is queasy

Failure to attack leads to suspicion at lack of reaction

Emotional/Logical Dilemma – High Risk sways player's moral code

Distance or proximity to terrorists Indicates many emotions in the player

Reaction/Proximity to Makarov and Associates

Varying reactions and interpretations of United States' innocence or guilt possible from varying interactions in this level.

Simple introduction of flexibility during this level creates a compelling interactive experience, with players evaluating moral code and building strong sense of context for the rest of the game

Cumulative/Indirect

Figure 1 - Breakdown of a linear narrative with Narrative Decision Tree architecture

Figure 2 - Illustration of scheme mechanic in action.

Introduction – Establishing Identity and Context

Goal: Cumulative Decisions establish context and early character development

What motivates Maddox as a mad scientist?
Spite, power, greed, or pure madness?

Introduction Sequence → Maniacal Banter → Maddox's Lab is Shut Down → Jacob's Apartment – Maddox needs a job

How does a mad scientist prepare for a job interview?

Breakfast, Morning of Interview

Make Bacon and Eggs → Maddox displays patience and personal concern

Eat Cereal → Maddox displays distaste and impatience

Leave Without Breakfast → Maddox is rushed, but subdued

SCHEME - Modify Coffee Machine → Maddox shows initiative and control, but low consideration for others

Make Coffee → Coffee Machine Fails

Maddox Asserts it too slow, shows impatience

Job Interview

Key – Types of Choices

- ■ Emotional Choice
- ■ Logical Choice
- ■ Structural Choice
- ■ Indirect Interface

The game's introduction primarily revolves around establishing characterization, employing a series of cumulative decisions prior to the main body in order to give the context of Maddox's personal identity. Here it is established in the player's mind whether he is a capable mad scientist who the world doesn't get along with, or a delusional madman enslaved by his personal pride, or some where in-between.

Figure 3 - Narrative decision tree for introduction segment.

Job Interview Process

Goal: Structural decisions are introduced as a reaction to the player's logical choices, which follow their established characterization.

First interaction with Madness Meter – How much does a mad scientist try to please an interviewer?

Player chooses to evoke or repress aspects of Maddox's character versus interviewer's questions

U-Mart Job Interview → Line of Questions → Interviewer assigns job based on professional conduct → Assignment of Job → Poor Conduct – Assigned to Storage Room / Good Conduct – Assigned to Electronics Dept. → Job Begins

Key – Types of Choices

Emotional Choice

Logical Choice

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Player is introduced to their first line of both logical and structural decisions as well as the dilemma of personal versus professional identity that guides this game. Based on experience, the player learns that their actions at U-Mart have concrete consequences and that they need to manage Madness carefully in order to survive.
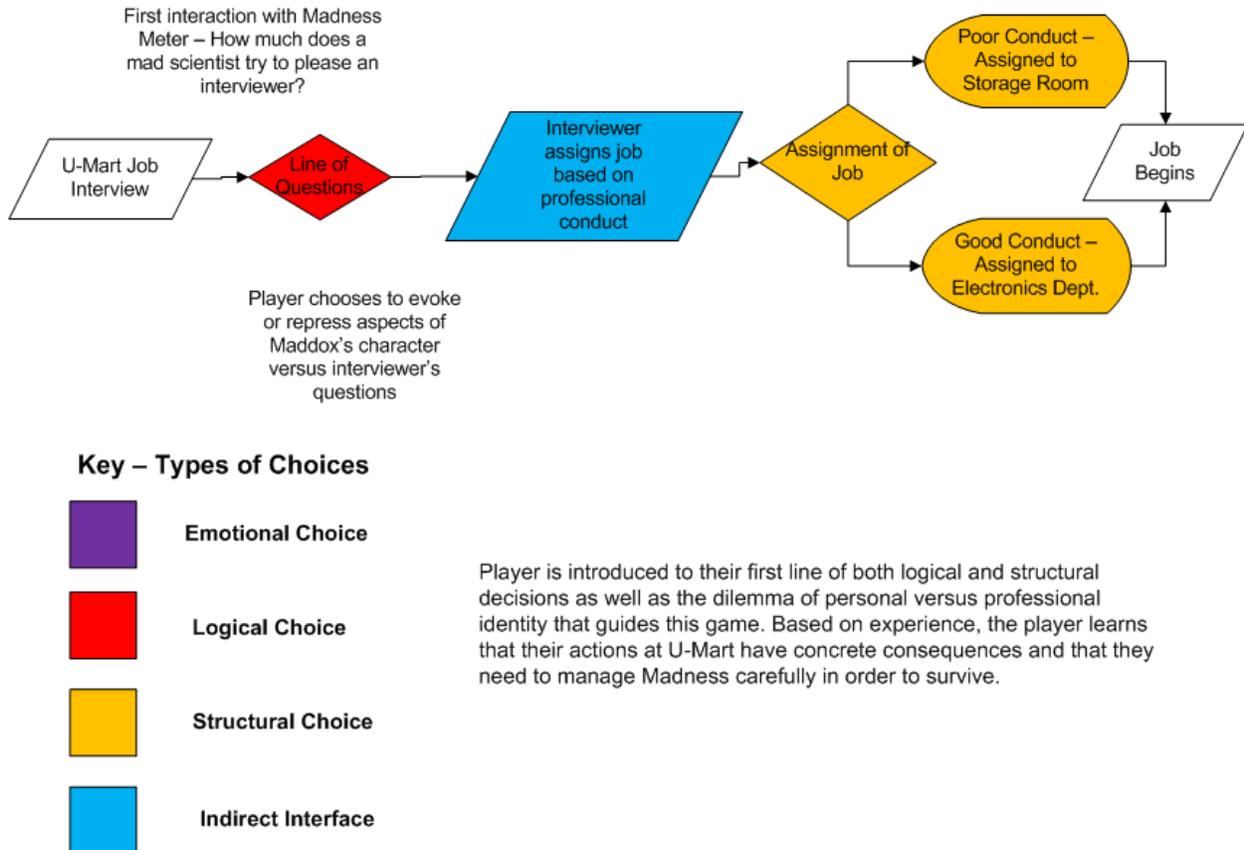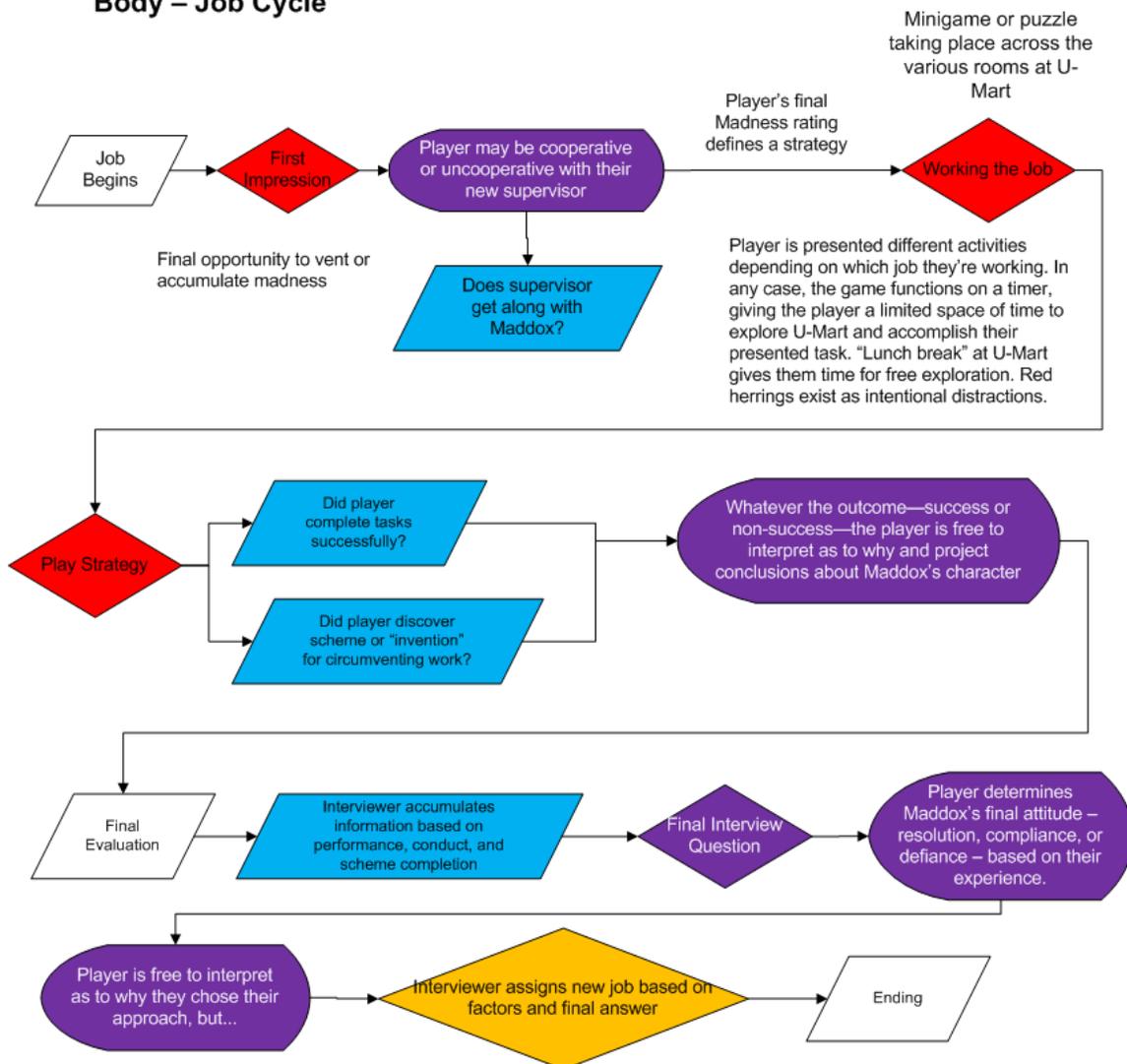
Figure 4 - Narrative decision tree for interview segment.

Figure 5 - Illustration of opposing ruleset.

Body – Job Cycle

Job Begins

First Impression

Player may be cooperative or uncooperative with their new supervisor

Final opportunity to vent or accumulate madness

Does supervisor get along with Maddox?

Player's final Madness rating defines a strategy

Minigame or puzzle taking place across the various rooms at U-Mart

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Did player complete tasks successfully?

Did player discover scheme or "invention" for circumventing work?

Whatever the outcome—success or non-success—the player is free to interpret as to why and project conclusions about Maddox's character

Final Evaluation

Interviewer accumulates information based on performance, conduct, and scheme completion

Final Interview Question

Player determines Maddox's final attitude – resolution, compliance, or defiance – based on their experience.

Player is free to interpret as to why they chose their approach, but...

Interviewer assigns new job based on factors and final answer

Ending

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The body of the game revolves around the player's reactions to different characters and situations, and builds structural decisions based on a logical strategy in response to the Madness Meter mechanic and social pressures.
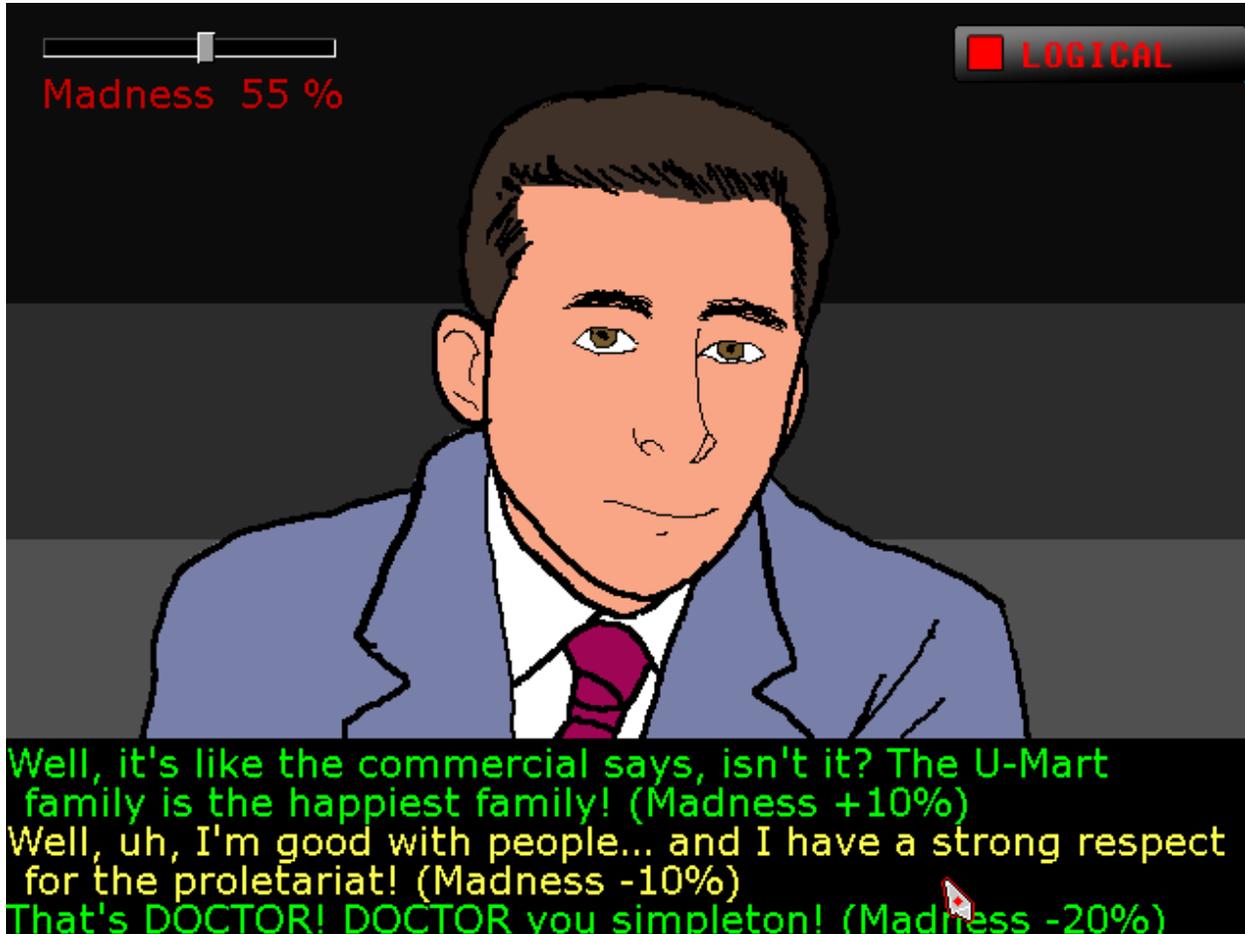
Figure 6 - Narrative decision tree for job cycle.
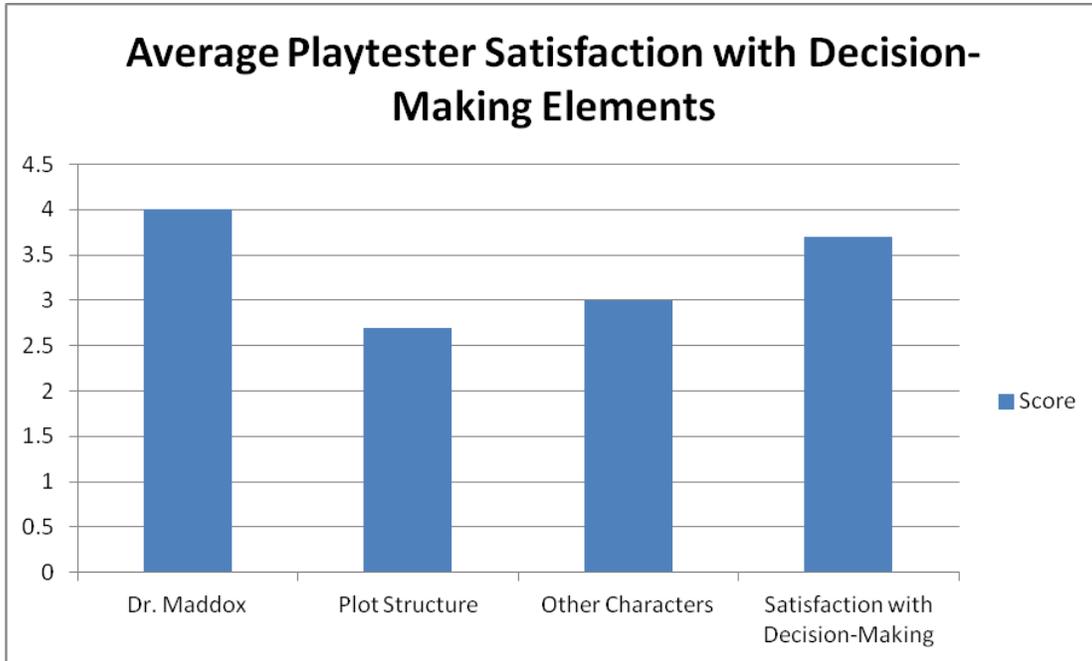
Figure 8 - Illustration of opposing rulesets.

Figure 9 - Player satisfaction with decision-making elements.

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