INTERACTION AND NARRATIVE

Michael Mateas[1,3] and Andrew Stern[2,3]

[1] College of Computing & Literature, Communication and Culture, Georgia Institute of Technology
[2] InteractiveStory.net
3 grandtextauto.org

Many game designers, writers and theorists have wrestled with the vexing question: "what is an interactive narrative?". This chapter situates *Façade's* approach to this question relative to the current interactive narrative landscape. Portions of this chapter first appeared in [Mateas and Stern 2000; Mateas 2000; Mateas 2001].

Interaction and Narrative is a chapter from Michael's Ph.D. dissertation on Expressive AI (AI-based art and entertainment) [Mateas 2002]. A significant portion of the dissertation describes his collaborative work with Andrew Stern on the interactive drama *Façade* [Mateas & Stern 2004a; Mateas & Stern 2004b; Mateas and Stern 2003; Mateas and Stern 2002a; Mateas and Stern 2002b]; the purpose of this chapter was to provide a theoretical framework for interactive drama, particularly addressing the problem of agency. The neo-Aristotelian theory described in this chapter is Michael's work, the rest is our joint work.

Approaches

A number of approaches are currently being pursued in the theorizing and building of interactive narratives. Each of these approaches foregrounds a different aspect of the problem, focusing on a different point within the design space of interactive narrative.

Before continuing, a note about terminology. When speaking generally about interactive story, we will sometimes use the word *story* and sometimes the word *narrative*. We use *story* when talking about experiences that have a tightly organized plot arc, progression towards a climax, beginning, middle and end, etc., that is, experiences such as "mainstream" novels and movies, which are understood as "stories" by the general population. We use *narrative* when talking about the abstract properties or qualities of stories, and more loosely structured, "experimental", story-like experiences.

Commercial Computer Games

The relationship between narrative and game is a hot topic within the computer game design community. The contemporary gaming scene, perhaps driven by the ever increasing capabilities of computer graphics, and the resulting inexorable drive towards real-time photo-realism, is dominated by mimetic representations of physical scenes, objects and characters. With mimetic representation approaching the richness of animated movies, and with the increasing use of cinematic techniques, such as virtual cameras implementing automated shot vocabularies, comes the desire to provide a narrative

explaining who these characters are and why they are in the situation they're in. Contrast this with classic arcade games such as *Pac Man* or *Tempest*, in which the more iconic mode of representation led to games where the proto-narrative was completely dominated by gameplay, and in fact could be safely ignored.

But with this increased interest in narrative, game designers also experience a deep ambivalence. The ephemeral quality of gameplay, the experience of manipulating elements within a responsive, rule-driven world, is still the raison d'être of games, perhaps the primary phenomenological feature that uniquely identifies the computer game as a medium. Where gameplay is all about interactivity, narrative is all about predestination. There is a pervasive feeling in the game design community that narrative and interactivity are antithetical:

> I won't go so far as to say that interactivity and storytelling are mutually exclusive, but I do believe that they exist in an inverse relationship to one another… Interactivity is almost the opposite of narrative; narrative flows under the direction of the author, while interactivity depends on the player for motive power… [Adams 1999a]

This tension is reflected in the decline of the most story-based game genre, the commercial adventure game. Text adventures were a highly successful form in the 1980's, giving way to the graphic adventures of the early and mid 1990's. And through the mid 1990's, with the release of critically acclaimed titles such as *Myst* and *Grim Fandango*, the adventure game remained a vibrant form. But by the late 1990's the form was in trouble, with reviewers and critics pronouncing the death of the adventure game [Adams 1999b; OMM 2001]. But while early declarations of the death of the adventure game sometimes ended with hope (e.g. "Adventure games appeal to a market which is unimpressed by the size of the explosions or the speed of the engine, a market that for the most part, we're ignoring. But those people want to play games too. It's time to bring adventure games back." [Adams 1999b]), the decline continues to this day, with a recent review in the New York Times declaring "So far, 2002 has been the worst year for adventure games since the invention of the computer." [Herold 2002]. While adventure elements continue to live on in action adventures such as *Luigi's Mansion*, the *Resident Evil* franchise, and the *Tomb Raider* franchise, action adventures emphasize physical dexterity (e.g. shooting, running, jumping) over puzzle solving and plot progression.

In contemporary game design, narrative elements are primarily employed to provide a an explanatory background against which the high-resolution mimetic action of the game takes place. Thus characters and situations may make reference to well known linear narratives (e.g. *Star Wars*), or nuggets of backstory may be revealed as the game progresses, or the game action may occur within an inexorably progressing narrative. But strongly authored stories whose path and outcome depend on player interaction are not currently an active line of exploration in commercial game design.

Emergent and Player Constructed Narrative

Rather than viewing narratives as highly structured experiences created by an author for consumption by an audience, emergent narrative is concerned with providing a rich framework within which individual players can construct their own narratives, or groups of players can engage in the shared social construction of narratives. Autonomous characters may be designed in such a way that interactions among autonomous characters and between characters and the player may give rise to loose narratives or narrative snippets [Stern 2002; Stern 1999; Aylett 1999]. Multi-user online worlds, including text-

based Multi-User Dungeons (MUDs), avatar spaces, and massively multiplayer games such as *Everquest* and *Ultima Online*, create social spaces in which groups co-construct ongoing narratives. And simulation environments such as *The Sims* may be used by players to construct their own stories. Using the ability to capture screen shots and organize them into photo albums, plus the ability to construct new graphical objects and add them to the game, players of *The Sims* are constructing and posting online thousands of photo album stories.

Narrative and New Media Art

In fine art practice, narrative is understood as one, rather powerful, form of representation. Much of contemporary art practice involves self-consciously questioning representational modes, exploring the boundaries, breaking the representation, questioning whose power is being preserved by a representational mode, and hybridizing modes in order to create new ones. Thus, when engaging in narratively-based work, artists rarely tell straightforward narratives employing the standard narrative tropes available within their culture, but rather ironize, layer, and otherwise subvert the standard tropes from a position of extreme cultural self-consciousness. For example, *Terminal Time* constructs ideologically-biased documentary histories based on audience responses to psychographic profiles. The narrative structure of the traditional documentary form is made visible through endless replication [Domike, Mateas & Vanouse 2002; Mateas, Vanouse & Domike 2000]. *The Dr. K— Project* creates a narrative landscape that, rather than having a mimetic, independent existence, is created in response to audience interaction [Rickman 2002]. In these and similar works, interaction is used to open the narrative, to make its internal structure visible.

A highly active area in new media interactive narrative is net art. Such work, while employing multi-media elements such as sound, still and moving imagery as in Mark Amerika's *Grammatron*, or making use of interaction tropes from classic video games as in Natalie Bookchin's *Intruder*, often makes heavy use of textual presentation and literary effects, and thus is also a form of electronic literature.

Electronic Literature

Electronic literature is concerned with various forms of interactive reading, that is, interactive literary textual narratives. While there is certainly much exploration in this area combining multi-media elements, kinetic text, and novel interfaces, the canonical forms of electronic literature are hypertext and interactive fiction.

A hypertext consists of a number of interlinked textual nodes, or lexia. The reader navigates these nodes, selecting her own path through the space of lexia, by following links. Links may be dynamic, appearing and disappearing as a function of the interaction history, the contents of nodes may dynamically change, and navigation may make use of spatial mechanisms and metaphors rather than relying purely on link following [Rosenberg 1998]. However, a static node and link structure is the skeleton upon which such effects are added; many hypertext works consist solely of static node and link structures. The production of hypertext literature is intimately connected with the production of hypertext theory. Early theorists saw hypertext as the literal embodiment of postmodernist theories of deferred and intertextual signification [Landow 1992]. Like new media artists, hypertext authors tends to engage in theoretical explorations of the limits of narrative. Interactivity is seen as enabling rhizomatic stories that avoid the

authorial imposition of a preferred viewpoint. Every story event can be viewed from multiple points of view, with closure indefinitely deferred.

Interactive fiction is a generalized term for "text adventure", the form inaugurated with the 1976 creation of *Adventure*, a textual simulation of a magical underground world in which the player solves puzzles and searches for treasure. *Adventure*, and all later interactive fictions, makes use of a conversational interface in which the player and the computer exchange text; the player types commands she wishes to perform in the world and the computer responds with descriptions of the world and the results of commands. While text adventures have not been commercially viable since the early 90's, there remains a very active non-commercial interactive fiction scene producing many literary interactive fictions, holding a number of yearly competitions, and actively theorizing the interpretation and production of interactive fiction [Montfort 2003].

Interactive Drama

Interactive drama per se was first conceived in Laurel's 1986 dissertation [Laurel 1986], an extended thought experiment involving dramatic stories in which the player enters as a first-person protagonist. While based most closely on the genres of the text and graphic adventure, interactive drama distinguishes itself from these and other conceptions of interactive narrative in a number of ways.

- Interactive drama takes *drama*, rather than literature, fine art, or game interaction tropes, as the guiding narrative conception. With this focus on drama comes a concern with intensity, enactment and unity.
- Interactive drama wants player interaction to deeply shape the path and outcome of the story, while maintaining a tight, author given story structure. Thus interactive drama confronts head-on the tension between interactive freedom and story structure.
- Interactive drama seeks first-person immersion as a character *within* the story.

Façade continues in the tradition of interactive drama.

A Neo-Aristotelian Theory of Interactive Drama

This section describes a neo-Aristotelian theory of interactive drama, continuing a specific thread of discussion first begun by Laurel's adoption of an Aristotelian framework for interactive drama [Laurel 1986], and then more generally for interactive experiences [Laurel 1991], and continued by Murray's description of the experiential pleasures and properties of interactive narratives [Murray 1998]. As an interactive narrative approach, interactive drama foregrounds the tension between interaction and story: how can an interactive experience have the experiential properties of classical, Aristotelian drama (identification, economy, catharsis, closure) while giving the player the interactive freedom to have a real effect on the story? This section provides a theoretical grounding for thinking about this question by developing a theory of interactive drama based on Aristotle's dramatic theory [Aristotle 330BC] but modified to address the interactivity added by player agency. This theory provides both design guidance for maximizing player agency within interactive dramatic experiences (answering the question "What should I build?") and technical direction for the AI work necessary to build the system (answering the question "How should I build it?").

As described above, interactive drama is one approach among many in the space of interactive narrative. The neo-Aristotelian poetics developed here is not intended to be a

superiority argument for interactive drama, isolating it as the preferred approach in interactive narrative; rather, this poetics informs a specific niche within the space of interactive narrative and provides a principled way of distinguishing this niche from other interactive narrative experiences.

Defining Interactive Drama

In interactive drama, the player assumes the role of a first person character in a dramatic story. The player does not sit above the story, watching it as in a simulation, but is immersed *in* the story.

Following Laurel, Table 0-1 lists distinctions between dramatic and literary narratives.

Dramatic narratives	*Literary narratives*
Enactment	**Description**
Intensification	**Extensification**
Unity of Action	**Episodic Structure**

Table 0-1. Distinctions between dramatic and literary narratives

Enactment refers to action. Dramas utilize action rather than description to tell a story. Intensification is achieved by arranging incidents so as to intensify emotion and condense time. In contrast, literary forms often "explode" incidents by offering many interpretations of the same incident, examining the incident from multiple perspectives, and expanding time. Unity of action refers to the arrangement of incidents such that they are all causally related to a central action. One central theme organizes all the incidents that occur in the story. Literary narratives tend to employ episodic structure, in which the story consists of a collection of causally unrelated incidents.

Though the model developed in this paper will provide design guidance on how to generate a sense of user agency in any interactive experience, it is primarily designed to illuminate interactive drama, that is, an interactive experience with the properties of dramatic stories.

Though interactive drama is strongly related to interactive fiction, it is interesting to note that a major trope of interactive fiction, the puzzle, is in conflict with the dramatic properties of enactment, intensification, and unity of action. Puzzles disrupt enactment, breaking immersion in the action and forcing reflection on the action as a problem to be solved. As the player thinks about the puzzle, action grinds to a halt. Solving puzzles invariably involves trial-and-error problem solving. All the dead ends involved in solving a puzzle introduce incidents that expand time and reduce emotion, thus disrupting intensification. Each puzzle can be thought of as having a "halo" consisting of all the failed attempts to solve the puzzle. These "halos" are extensive; they expand the experience rather than focus it. Puzzle-based experiences tend to be episodic; individual puzzles are loosely related by virtue of being in the same world, but are not strongly related to a central action. Puzzles have an internal logic that makes them self sufficient and internally consistent, but disrupts unity of action across the entire experience.

This is not to say that puzzles lack any aesthetic value or are a uniformly "bad" idea in interactive experiences. Montfort convincingly argues that puzzles in interactive

fiction are related to the literary figure of the riddle, "…inviting the riddlee to awaken to a new vision of the world."[Montfort 2003]. It is only to say that the form of engagement demanded by the puzzle is disruptive of dramatic properties.

Murray's Aesthetic Categories

Murray [Murray 1998] proposes three aesthetic categories for the analysis of interactive story experiences: immersion, agency, and transformation.

Immersion is the feeling of being present in another place and engaged in the action therein. Immersion is related to Coleridge's "willing suspension of disbelief" - when a participant is immersed in an experience, they are willing to accept the internal logic of the experience, even though this logic deviates from the logic of the real world. A species of immersion is telepresence, the feeling of being physically present (from a first person point of view) in a remote environment.

Agency is the feeling of empowerment that comes from being able to take actions in the world whose effects relate to the player's intention. This is not mere interface activity. If there are many buttons and knobs for the player to twiddle, but all this twiddling has little effect on the experience, there is no agency. Furthermore, the effect must relate to the player intention. If, in manipulating the interface elements, the player does have an effect on the world, but they are not the effects that the player intended (perhaps the player was randomly trying things because they didn't know what to do, or perhaps the player thought that an action would have one effect, but it instead had another), then there is no agency.

Transformation is the most problematic of Murray's three categories. Transformation has at least three distinct meanings.

- Transformation as masquerade. The game experience allows the player to transform themselves into someone else for the duration of the experience.
- Transformation as variety. The game experience offers a multitude of variations on a theme. The player is able to exhaustively explore these variations and thus gain an understanding of the theme.
- Personal transformation. The game experience takes the player on a journey of personal transformation.

Transformation as masquerade and variety can be seen as means to effect personal transformation.

Integrating Agency into Aristotle

Murray's categories are phenomenological categories of the interactive story experience, that is, categories describing what it *feels* like to participate in an interactive story. Aristotle's categories (described below) are structural categories for the analysis of drama, that is, categories describing what *parts* a dramatic story is made out of. The trick in developing a theoretical framework for interactive drama is integrating the phenomenological (that is, what it feels like) aspect of a first person experience with the structural aspect of carefully crafted stories. In attempting this integration, I (Mateas) will first discuss the primacy of the category of agency. Second, I will briefly present an interpretation of the Aristotelian categories in terms of material and formal cause. Finally, agency will be integrated into this model.

Primacy of Agency

From an interactive dramatic perspective, agency is the most fundamental of Murray's three categories. Immersion, in the form of engagement, is already implied in the Aristotelian model. Engagement and identification with the protagonist are necessary in order for an audience to experience catharsis. Transformation, in the form of change in the protagonist, also already exists in the Aristotelian model. Murray's discussion of transformation as variety, particularly in the form of the kaleidoscopic narrative that refuses closure, is contrary to the Aristotelian ideals of unity and intensification. To the extent that we want a model of interactive *drama*, as opposed to interactive narrative, much of Murray's discussion of transformation falls outside the scope of such a model. While immersion and transformation exist in some form in non-interactive drama, the audience's sense of having agency within the story is a genuinely new experience enabled by interactivity. For these reasons, agency will be the category integrated with Aristotle.

Aristotelian Drama

Following Laurel [Laurel 1991], Aristotle's theory of drama is represented in Figure 0-1.
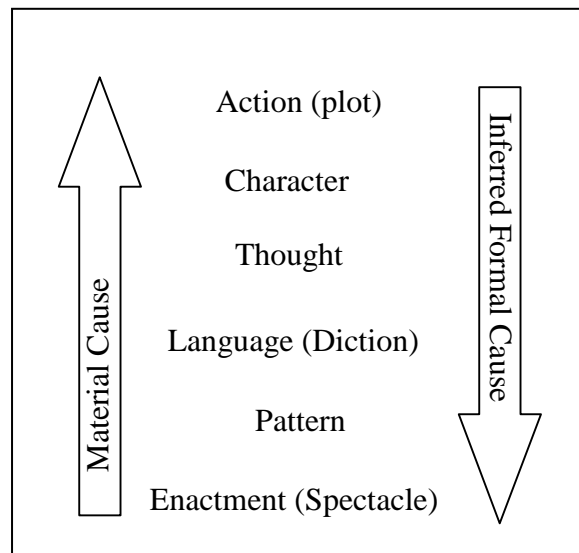

Figure 0-1. Aristotelian theory of drama

Aristotle analyzed plays in terms of six hierarchical categories, corresponding to different "parts" of a play. These categories are related via material cause and formal cause. The material cause of something is the material out of which the thing is created. For example, the material cause of a building is the building materials out of which it is constructed. The formal cause of something is the abstract plan, goal or ideal towards which something is heading. For example, the formal cause of a building is the architectural blueprints.

In drama, the formal cause is the authorial view of the play. The author has constructed a plot that attempts to explicate some theme. The characters required in the play are determined by the plot; the plot is the formal cause of the characters. The characters' thought processes are determined by the kinds of characters they are. The language spoken by the characters is determined by their thought. The patterns (song) present in the play are determined, to a large extent, by the characters' language (more

generally, their actions). The spectacle, the sensory display presented to the audience, is determined by the patterns enacted by the characters.

In drama, the material cause is the audience view of the play. The audience experiences a spectacle, a sensory display. In this display, the audience detects patterns. These patterns are understood as character actions (including language). Based on the characters' actions and spoken utterances, the audience infers the characters' thought processes. Based on this understanding of the characters' thought processes, the audience develops an understanding of the characters, the characters' traits and propensities. Based on all this information, the audience understands the plot structure and the theme. In a successful play, the audience is then able to recapitulate the chain of formal causation. When the plot is understood, there should be an "ah-ha" experience in which the audience is now able to understand how the characters relate to the plot (and why they must be the characters they are), why those type of characters think they way do, why they took the actions they did and said what they did, how their speech and actions created patterns of activity, and how those patterns of activity resulted in the spectacle that the audience saw. By a process of interpretation, the audience works up the chain of material cause in order to recapitulate the chain of formal cause.

Interactive Drama

Adding interaction to the Aristotelian model can be considered the addition of two new causal chains at the level of character as depicted in Figure 0-2. The gray arrows are the traditional chains of material and formal causation. The player has been added to the model as a character who can choose his or her own actions. This has the consequence of introducing two new causal chains. The player's intentions become a new source of formal causation. By taking action in the experience, the player's intentions become the formal cause of activity happening at the levels from language down to spectacle. But this ability to take action is not completely free; it is constrained from below by material resources and from above by authorial formal causation from the level of plot.

The elements present below the level of character provide the player with the material resources (material cause) for taking action. The only actions available are the actions supported by the material resources present in the game. The notion of affordance [Norman 1988] from interface design is useful here. In interface design, affordances are the opportunities for action made available by an object or interface. But affordance is even stronger than implied by the phrase "made available"; in order for an interface to be
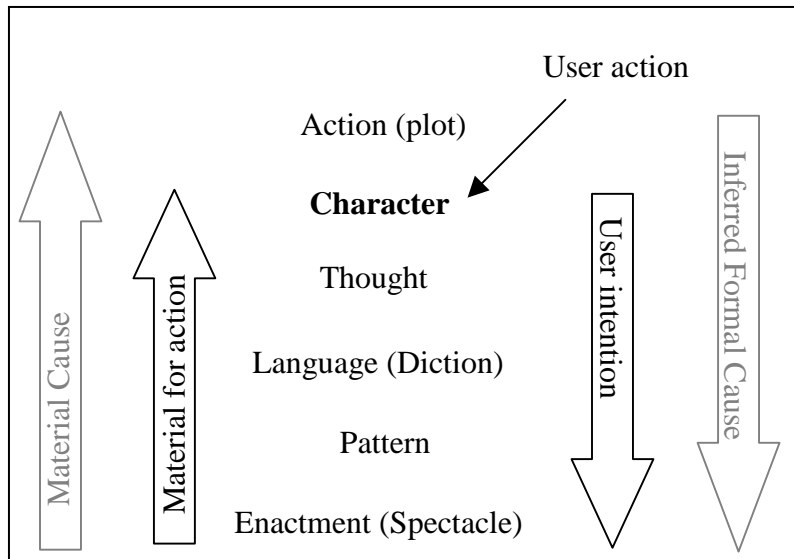
Figure 0-2. Neo-Aristotelian theory of interactive drama

said to afford a certain action, the interface must in some sense "cry out" for the action to be taken. There should be a naturalness to the afforded action that makes it the obvious thing to do. For example, the handle on a teapot affords picking up the teapot with your hand. The handle cries out to be grasped. In a similar manner, the material resources in an interactive drama afford action. Thus these resources not only limit what actions can be taken (the negative form of constraint) but cry out to make certain actions obvious (the positive form of constraint). Several examples of the material affordances in interactive drama are provided below.

The characters in an interactive drama should be rich enough that the player can infer a consistent model of the characters' thought. If the characters' thought can be understood (e.g. goals, motivations, desires), then this thought becomes a material resource for player action. By reasoning about the other characters' thoughts, the player can take actions to influence these characters, either to change their thoughts, or actively help or hinder them in their goals and plans.

The dialog (language) spoken by the characters and the opportunities for the player to engage in dialog are another material resource for action. Dialog is a powerful means for characters to express their thoughts, thus instrumental for helping the player to infer a model of the characters' thoughts. Conversely, dialog is a powerful means to influence character behavior. If the experience makes dialog available to the player (and most contemporary interactive experiences do not), this becomes a powerful resource for expressing player intention.

The objects available in the experience (I place the presence of interactive objects somewhere between spectacle and pattern) are yet another material resource for player action.

Finally, the mechanics of interaction (spectacle) provide the low-level resources for player actions. The mechanics provide the interface conventions for taking action.

In addition to the material affordances (constraints) from below, the player experiences formal constraints from above. Of course, these constraints are not directly perceived by the player, but, just as in non-interactive drama, are understood by recapitulating the author's chain of formal causation by making inferences along the chain of material causation. In non-interactive drama, understanding the formal chain of

causation allows the audience to appreciate how all the action of the play stems from the dramatic necessity of the plot and theme. In interactive drama, the understanding of the formal causation from the level of plot to character additionally helps the player to have an understanding of what to do, that is, why they should take action within the story world *at all*. Just as the material constraints can be considered as affording action from the levels of spectacle through thought, the formal constraints afford *motivation* from the level of plot. This motivation is conveyed as dramatic probability. By understanding what actions are dramatically probable, the player understands what actions are worth considering.

Agency

We are now ready to propose a prescriptive, structural model for agency. *A player will experience agency when there is a balance between the material and formal constraints.* When the actions motivated by the formal constraints (affordances) via dramatic probability in the plot are commensurate with the material constraints (affordances) made available from the levels of spectacle, pattern, language and thought, then the player will experience agency. An imbalance results in a decrease in agency. This will be made clearer by considering several examples.

Many puzzle-based adventures suffer from the imbalance of providing more material affordances than formal affordances. This results in the feeling of having many things to do (places to go, objects to fiddle with) without having any sense of why any one action would be preferable to another. For example, *Zork Grand Inquisitor* offers a rich world to navigate and many objects to collect and manipulate. Yet, since there is no unity of action, there is no way to relate current actions to the eventual goal of defeating the Grand Inquisitor. This leaves the player in the position of randomly wandering about trying strange juxtapositions of objects. This detracts from the sense of agency – though the player can take action, this action is often not tied to a high-level player intention. Notice that adding more material opportunities for action would not help the matter. The problem is not a lack of options of things to do, the problem is having insufficient formal constraint to decide between choices.

First-person shooters such as *Quake* induce agency by providing a nice balance between material and formal constraints. The proto-plot establishes the following formal constraints (dramatic probabilities):
1. Everything that moves will try to kill you.
2. You should try to kill everything.
3. You should try to move through as many levels as possible.

From these three principles, all the rest of the action follows. The material affordances perfectly balance these formal affordances. The player can run swiftly and smoothly through the space. The player can pick up a wide array of lethal weapons. The player can fire these weapons at monsters and produce satisfying, gory deaths. The monsters' behavior is completely consistent with the "kill or be killed" ethos. Everything that one would want to try and do given the formal constraints is doable. There are no extraneous actions available (for example, being able to strike up a conversation with a monster) that are not dictated by the formal constraints.

Note that though these example games are not specifically interactive drama, the model can still be used to analyze player agency within these games. Though the model is motivated by interactive drama, it can be used to analyze the sense of agency in any interactive experience by analyzing the experience in *terms of the dramatic categories* offered by the model. For example, though *Quake* has neither plot nor characters in the

strict sense, there are top-down player expectations established by a "proto-plot". This "proto-plot" is communicated by the general design of the spectacle (e.g. the design of the creepy industrial mazes) as well as the actions of the characters, even if these characters do have primitive diction and thought.

In order to invoke a sense of agency, an interactive experience must strike a balance between the material and formal constraints. An experience that successfully invokes a sense of agency inhabits a "sweet spot" in design space. Trying to add additional formal constraints (more plot) or additional material constraints (more actions) to a balanced experience is likely to move it out of the sweet spot.

I would like to conclude this section with a brief clarification of my use of Aristotle's causal terminology (this clarification will appear in [Mateas 2003]). Laurel notes that my statements "formal cause is the authorial view of the play" and "material cause is the audience view of the play" are, strictly speaking, a misuse of the Aristotelian causal nomenclature [Laurel 2003]. The actual work of authoring is correctly understood as an efficient cause, while Aristotle proposes no causal role for the audience. But what I mean to highlight by these statements is not the author or audience viewed as a cause, but rather what sort of information is directly available to author vs. audience. The author, through the act of authoring (efficient cause), arranges the elements both materially and formally. But while the material arrangement of the elements is more or less available to the audience, the formal arrangement is not. The author knows things about the play, such as why a character must be *this* character for *this* whole action (formal cause), that the audience does not. The audience must work from what is directly available to the senses, and hopefully, by following the chain of material causation, eventually recapitulate the chain of formal causation. So in referring to the "authorial view" and "audience view," I am attempting to highlight this asymmetry in knowledge between author and audience. The chain of formal cause is available to the author in a way that it is not available to the audience. And the chain of material cause is in some sense designed *for the audience* as it is the ladder they must climb in order to understand the whole action.

Similarly a player in an interactive drama becomes a kind of author, and thus, as an efficient cause, contributes both materially to the plot and formally to elements at the level of character on down. But these contributions are constrained by the material and formal causes (viewed as affordances) provided by the author of the interactive drama. Hopefully, if these constraints are balanced, the *constrained freedom* of the player will be productive of agency. In these discussions, I elided efficient cause and went straight for a discussion of the material and formal causes that the act of authoring puts in place.

Clarification of the Conceptual Experiment

This neo-Aristotelian theory clarifies the conceptual experiment we are undertaking with *Façade*. The goal is to create an interactive dramatic experience with the experiential properties of traditional drama, namely enactment, intensity, catharsis, unity and closure (these experiential properties are not independent; for example, intensity and unity are related to each other as are catharsis and closure). The Aristotelian analytic categories describe the structure (parts and relationships) of a story experience that induces these experiential properties. The way in which interaction has been incorporated into this model clarifies what is meant by *interactive* dramatic experience. Here, interaction means *first-person* interaction as a character within the story. Further, the essential experiential property of interactivity is taken to be agency. The interactive dramatic experience should be structured in such a way as to maximize the player's sense of agency within the story.

The model provides prescriptive structural guidance for maximizing agency, namely, to balance material and formal constraints. So the conceptual experiment of *Façade* can now be more precisely stated as follows: build a first-person, interactive dramatic world that, in addition to the classical experiential properties of Aristotelian drama, also provides the player with a strong sense of agency.

Relationship to Immersion and Transformation

Agency was taken as the fundamental Murray category to integrate with Aristotle. In this section, I examine what the new, integrated model has to say about the other two categories, immersion and transformation.

Immersion

Murray suggests three ways of inducing immersion: structuring participation with a mask (an avatar), structuring participation as a visit, and making the interaction conventions (the interface mechanics) seamless. These three mechanisms can be viewed in turn as a way to provide material and formal constraints, as a design suggestion for balancing the constraints, or as a design suggestion for providing effective material constraints at the level of spectacle. Agency is a necessary condition for immersion.

An avatar can provide both material and formal constraints on a player's actions. The avatar can provide character exposition through such traits as physical mannerisms and speech patterns. This character exposition helps the player to recapitulate the formal, plot constraints. Through both input and output filtering (e.g. the characters in *Everquest*, [Mateas 1997]), the avatar can provide material constraints (affordances) for action.

A visit is one metaphor for balancing material and formal constraints when the material opportunities for action are limited. From the formal side, the conventions of a visit tell the player that they won't be able to do much. Visits are about just looking around, possibly being guided through a space. Given the limited expectations for action communicated by the formal constraints, the game designer can get away with providing limited material means for action (and in fact, must *only* provide limited means).

The mechanics provide the material resources for action at the level of spectacle (the interface can be considered part of the spectacle). Providing a clean, transparent interface insures that agency (and thus immersion) will not be disrupted.

Transformation

Most of Murray's discussion of transformation examines transformation as variety, particularly in the form of kaleidoscopic narratives, which can be reentered multiple times so as to experience different aspects of the story. Agency, however, requires that a plot structure be present to provide formal constraints. An open-ended story without a clear point of view may disrupt the plot structure too much, thus disrupting agency. However, transformation as variety is necessary to make interaction really *matter*. If, every time a player enters the dramatic world, roughly the same story events occur regardless of the actions taken by the player, the player's interaction would seem inconsequential; the player would actually have no real effect on the story.

One way to resolve the apparent conflict between transformation and agency is to note that agency is a first-person experience induced by making moment-by-moment decisions within a balanced (materially and formally) interactive system, while transformation as variety is a third-person experience induced by observing and reflecting on a number of interactive experiences. Imagine an interactive drama system that guides

the player through a fixed plot. As the player interacts in the world, the system, through a number of clever and subtle devices, moves the fixed plot forward. Given that these devices are clever and subtle, the player never experiences them as coercive; the player is fully engaged in the story, forming intentions, acting on them, and experiencing agency. Then imagine an observer who watches many players interact with this system. The observer notices that no matter what the players do, the same plot happens (meaning that roughly the same story events occur in the same order, leading to the same climax). By watching many players interact with the system, the observer has begun to discern the devices that *control* the plot *in the face of* player interaction. This observer will conclude that the player has no true agency, that the player is not able to form any intentions that actually matter within the dramatic world. But the first-time player within the world *is* experiencing agency. The designer of the dramatic world could conclude that since they are designing the world for the player, not for the observer, that as long as the player experiences a true sense of interactive freedom, that is, agency, transformation as variety is not an important design consideration.

The problem with this solution to the agency vs. transformation dilemma becomes apparent as the player interacts with the world a *second* time. On subsequent replays of the world, the player and the observer become the same person. The *total* interactive experience consists of both first-person engagement within the dramatic world and third-person reflection across multiple experiences in the world. In order to support the total experience, the system must support both first-person engagement and third-person reflection; must provide agency *and* transformation as variety.

A dramatic world supporting this total experience could provide agency (and the concomitant need to have a plot structure providing formal constraints) *and* transformation by actively structuring the player experience such that each run-through of the story has a clean, unitary plot structure, but multiple run-throughs have different, unitary plot structures. Small changes in the player's choices early on result in experiencing a different unfolding plot. The trick is to design the experience such that, once the end occurs, any particular run-through has the force of dramatic necessity. The story should have the dramatic probabilities smoothly narrowing to a necessary end. Early choices may result in different necessary ends – later choices can have less effect on changing the whole story, since the set of dramatically probable events has already significantly narrowed. Change in the plot should not be traceable to distinct branch points; the player should not be offered an occasional small number of obvious choices that force the plot in a different direction. Rather, the plot should be smoothly mutable, varying in response to some global state that is itself a function of the many small actions performed by the player throughout the experience. The *Façade* architecture, an overview of which is provided in **Error! Reference source not found.**, and the accompanying authorial idioms for character behavior (**Error! Reference source not found.**) and story sequencing (starting page **Error! Bookmark not defined.** of **Error! Reference source not found.**), offers one approach for supporting this variety within unity.

Technical Agenda

In addition to clarifying conceptual and design issues in interactive drama, the neo-Aristotelian model informs a technical agenda of AI research necessary to enable this kind of experience.

The primary heuristic offered by the model is that to maintain a sense of player agency in an interactive experience, material and formal constraints must be balanced. As

the sophistication of the theme and plot of an experience increases, maintaining this balance will require characters whose motivations and desires are inferable from their actions. In addition, these characters will have to respond to the player's actions. Believable agents, that is, computer controlled characters with rich personality and emotion, will be necessary to provide these characters. In a domestic drama like *Façade*, in which the plot centers around relationships, trust, betrayal, infidelity, and self-deception, language is necessary to communicate the plot. In order to convey the formal constraints provided by the plot, the characters must have a rich repertoire of dialog available. In addition, the player must be able to talk back. One can imagine a system in which the characters can engage in complex dialog but the player can only select actions from menus or click on hotspots on the screen; this is in fact the strategy employed by character-based multimedia artwork and contemporary adventure games. But this strategy diminishes agency precisely by unbalancing material and formal constraints. The characters are able to express complex thoughts through language. However, the player is not able to influence these thoughts except at the coarse level provided by mouse-click interactivity. Since part of the conceptual experiment of *Façade* is to maximize agency in interaction, *Façade* must support player dialog and thus must provide an AI solution for a limited form of natural language dialog.

The function of interactive characters is primarily to communicate material and formal constraints. That is, the player should be able to understand why characters take the actions they do, and how these actions relate to the plot. Sengers [Sengers 1998a] provides a nice analysis of how this focus on agents as communication vs. agents as autonomous, independent entities, results in changes in agent architectures. When the focus changes from "doing the right thing" (action selection) to "doing the thing right" (action expression), the technical research agenda changes [Sengers 1998]. The neo-Aristotelian model indicates that action expression is exactly what is needed. In addition, an interactive drama system must communicate dramatic probability (likely activity given the plot) while smoothly narrowing the space of dramatic probability over time. This means that story action must be coordinated in such a way as to communicate these plot level constraints. Thus it is not enough for an individual character's actions to be "readable" by an observer. Multiple characters must be coordinated in such a way that their joint activity communicates both formal and material (plot and character level) affordances. As will be seen in **Error! Reference source not found.**, this focus on communicating affordances changes the standard architectural assumptions regarding the relationship between plot and character.

Critiques of Interactive Drama

Interactive drama, in its Aristotelian conception, currently inhabits a beleaguered theoretical position, caught in the cross-fire between two competing academic formations: the narrativists and the ludologists. The narrativists generally come out of literary theory, take hypertext as the paradigmatic interactive form, and use narrative and literary theory as the foundation upon which to build a theory of interactive media. Ludologists generally come out of game studies (e.g. [Avedon & Sutton-Smith 1971]), take the computer game as the paradigmatic interactive form, and seek to build an autonomous theory of interactivity (read: free of the English department), which, while borrowing from classical games studies, is sensitive to the novel particularities of computer games (this is sometimes described as a battle against the colonizing force of

narrative theory [Eskelinen 2001]). Both camps take issue with an Aristotelian conception of interactive drama, finding it theoretically unsophisticated, an impossible combination of game and narrative (though of course the camps disagree on whether this should be decided in favor of game or narrative), and technically impossible. Gonzalo Frasca, an able proponent of ludology, offers three specific objections to the neo-Aristotelian conception of drama in [Frasca 2003], namely: neo-Aristotelian interactive drama creates an impossible-to-resolve battle between the player and the system, confuses first and third-person perspectives, and is technically impossible. Frasca's critique is representative of ludological critiques of neo-Aristotelian interactive drama, with similar critiques appearing in [Aarseth 1997].

A Specific Ludological Critique

Frasca argues that a conception of interactive drama that attempts to create a strong sense of closure with a well-formed dramatic arc introduces a battle for control between the player and system. If the system decides the ending, we have guaranteed closure without interactive freedom; if the user decides the ending we have guaranteed freedom but possibly no closure. Further, if the player is playing a prescribed role, such as Gandhi, we either have to limit interactive freedom to maintain the player's role (and story arc) or provide interactive freedom at the expense of the role (and story arc). Both these arguments have the following form: story means fate, interactivity means freedom (doing whatever you want), therefore interactivity and story can't be combined. However, the whole point of the neo-Aristotelian theory presented in this chapter is to replace the vague and open-ended term *interactivity* with the more specific term *agency*, and to then argue the conditions under which a player will experience agency: a player will *experience agency when material and formal constraints are balanced*. This is not the same as "a player will experience agency when they can take arbitrary action whenever they want". So in the case of choosing the ending of an interactive story, the player does not need the ability to make arbitrary endings happen in order to feel agency. A small number of authorially-determined ending configurations can still produce a strong feeling of player agency if reached through sequences of player actions within a materially and formally balanced system. Similarly, a Gandhi story can still produce a sense of agency without providing Gandhi with a chain gun or rocket launcher. If an interactive Gandhi story left weapons and power-ups lying about, but used some heavy handed interaction constraint (like the cursor turning red and beeping) to prevent the player from picking them up, then the experience would certainly be offering material affordances ("here's a gun for you to pick up – oops, not really") not balanced by the formal affordances (the dramatic probabilities of the Gandhi story), resulting in a decrease in the feeling of player agency. If, however, the Gandhi world never provided access to such weapons, and given the plot it never made sense to think of using such weapons, the player would still experience agency, even in the absence of access to plasma cannons. Interactive story designers do not have to be saddled with the impossible task of allowing the player to do whatever they want while somehow turning it into a well-formed story; creating a sense of both story and agency (interactivity) requires "merely" the hard task of balancing material and formal constraints.

Note that the neo-Aristotelian theory does not *prove* that if you build a system that materially balances more complex formal affordances, the player will experience both agency and "storyness". But neither do Frasca's arguments *prove* that this combination of agency and "storyness" is impossible. This is an empirical question. But the neo-

Aristotelian theory has the advantage of providing a constructive plausibility argument that can inform the technical research agenda required to search for an empirical answer.

Frasca also argues that neo-Aristotelian interactive drama confuses the first-person gaming situation with the third-person narrative situation. A narrative is an already accomplished structure that is told to a spectator. A game is an evolving situation that is being accomplished by an interactor. Since an already accomplished static structure is not the same thing as an evolving, dynamic situation, then, the argument goes, narrative and game are fundamentally dichotomous. What this argument denies, however, is the possibility for hybrid situations, such as the the storytelling situation, in which a storyteller constructs a specific story through interaction with the audience. In this situation, the audience is both spectator and interactor, and the evolving story only becomes an already accomplished structure at the end, yet still has story properties (e.g. interpreted in accord with narrative conventions) in its intermediate pre-completed forms. Aristotelian interactive drama is similar to this storytelling situation; through interaction the player carves a story out of the block of narrative potential provided by the system.

Finally, Frasca argues against neo-Aristotelian interactive drama on the grounds of technical impossibility. It is very difficult for a human author to write a single drama. It would be even more difficult to write multiple dramas, in real-time, in response to player interaction. Since the current state of AI is nowhere near the point of producing systems that can write good linear plays on their own, then certainly interactive drama is not possible. This argument, however, assumes that an interactive drama system must have the capability to construct stories out of whole cloth, denying human authorship of the AI system itself. But any AI system consists of knowledge (whether represented symbolically, procedurally or as learned probability distributions) and processes placed there by human authors, and has a circumscribed range of situations in which the system can function. The "only" thing an interactive drama system must be able to do is represent a specific space of story potential and move appropriately within this space of story potential in response to player interaction. As argued above, the system doesn't need to handle arbitrary player actions, but only those that are materially and formally afforded by the specific story space. While still hard, this becomes a much easier problem than building a system that can do everything a human playwright can do and more.

Frasca has proposed an interesting alternative conception of interactive drama based on the dramatic theory of Augusta Boal [Boal 1985]. Frasca's "video games of the oppressed", rather than attempting to immerse the player in a seamless dramatic world, instead invite the player to reflect on and critique the rules of the world, and to communicate this critique to other players by authoring their own behaviors and adding them to the game [Frasca 2001]. For example, someone dealing with alcoholism in their family may create an alcoholic mother character for a *Sims*-like environment and make the character publicly available. Others may download the character, play with it, and offer their own comments and commentary on alcoholic families by posting new alcoholic family member characters. This is certainly a provocative direction to pursue. However, Frasca notes that this Boalian conception of interactive drama provides both a better theoretical *and practical* framework for constructing interactive pieces. But the Boalian technical agenda of building powerful social simulation environments in which non-programmers can use easy-to-learn languages to simulate complex social phenomena is as challenging a technical project as the neo-Aristotelian technical agenda of building dramatic guidance systems. If one is inclined towards making technical impossibility arguments, it is unclear which agenda should be labeled more impossible.

Narrativist Critiques of Interactive Drama

Narrativist[1] critiques of interactive drama, inherited from their critiques of interactive fiction, are concerned that the interactive freedom resulting from making the player a protagonist *in* the world disrupts narrative structure to the point that only simple-minded, "uninteresting" stories can be told. This position is often held by hypertext theorists, who feel that the proper function of interaction in narrative is to engage in structural experiments that push the limits of narrative form, resulting in the "…resolutely unpopular (and often overtly antipopular) aesthetics promoted by hypertext theorists"[Jenkins 2003]. This overtly antipopulist stance can be seen in hypertext theorists reactions to interactive fiction:

> Digital narratives primarily follow the trajectory of *Adventure,* a work considered venerable only by the techies who first played it in the 1970s, cybergaming geeks, and the writers, theorists, and practitioners who deal with interactivity. Hypertext fiction, on the other hand, follows and furthers the trajectory of hallowed touchstones of print culture, especially the avant-garde novel. [Douglas 2000:6-7] (quoted in [Montfort 2003]).

Bernstein specifically places *Façade* within the category of interactive fiction and makes similar arguments to Frasca's, specifically that a first person story inevitably introduces a disruptive battle between the system and the player, and that no AI system will ever be able to respond to the space of actions a player will want to take within a story [Bernstein 2003] (see also Stern's response with respect to *Façade* [Stern 2003]). Of course Berstein's conclusions are the opposite of Frasca's. Rather than remove all narrative structure to open up the space of interaction, Berstein wants to limit interaction by making the reader a witness, a minor character on the periphery of the action. Our response to this is similar to our response to Frasca. While we find hypertextual experiments in narrative structure conceptually and aesthetically interesting, we reject any attempt to establish such experiments as the only "culturally legitimate" approach to interactive narrative. And *Façade* is precisely a theoretical, technical and story design experiment in the problems and potentials of building a first-person dramatic story that is about adult relationships, not the heroic travel narrative that narrativists believe first-person interaction inevitably produces.

Middle Ground Positions

A number of theorists have assumed middle ground positions, attempting to find a place for both game elements and narrative elements in the study of games.

Jenkins [Jenkins 2003] argues that while not all games tell stories, a number of strategies are available for weaving narrative elements into a game world, including:

- evoked narratives, in which elements from a known linear narrative are included in the spatial design of the game (e.g. *Star Wars Galaxies*)
- enacted narratives, organized around the player's movement through space (e.g. adventure games),

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[1] We use the term "narrativist" as opposed to the more natural "narratologist" to refer to a specific, anti-game, interactive narrative position. While the narrativist position is often informed by narratology, this is not to say that all narratologists are anti-game or that narratology is intrinsically opposed to game-like interaction.

- embedded narratives, in which narrative events (and their consequences) are embedded in a game space such that the player discovers a story as they progress through the game (e.g. *Half-Life*)
- emergent narratives, narratively pregnant game spaces enabling players to make their own stories (e.g. *The Sims*).

Interestingly, perhaps purposely restricting himself to the current technical state of the art in commercial game design, he does not mention the strategy of actively weaving a player's activity into a story.

Ryan [Ryan 2001], while acknowledging that not all games are productive of narrative, defends the use of narrative as an analytic category in game studies:

> The inability of literary narratology to account for the experience of games does not mean that we should throw away the concept of narrative in ludology; it rather means that we need to expand the catalog of narrative modalities beyond the diegetic and the dramatic, by adding a phenomenological category tailor-made for games.

Ryan's proposal hinges on the relationship between the diagetic and mimetic mode. What allows us to bring narrative analysis to bear on movies and plays is that they are virtually diagetic: an audience member, were they to reflect on and describe their experience, would produce a diagetic narrative. Ryan proposes extending this virtuality one step further, in which a game player, were they to reflect on their action in the game, would produce a dramatic plot. Thus gameplay is virtually mimetic, which is itself virtually diagetic.

Both the ludological and narrativist critiques of interactive drama open up interesting conceptual spaces. We find Frasca's conception of Boalian "videogames of the oppressed" extremely interesting, and hope that he pursues this idea. And the structural experiments of the hypertext community continue to create new modes of literary expression. We certainly don't believe that the conception of interactive drama described in this chapter is the only proper conception of interactive story-like experiences. Nor do we believe that all interactive experiences must be assimilated to the concept of narrative. The ludologists commonly use examples such as chess, *Tetris* or *Space Invaders* in their analyses, and we agree that such games are most profitably studied using non-narrative analytic tools (but conversely, denying any story-like properties to games such as *The Last Express*, *Grim Fandango*, or *Resident Evil* also does not seem profitable). However, we reject the notion that games and stories are fundamentally irreconcilable categories, that providing the player with an experiences of both agency and story structure is impossible. The neo-Aristotelian theory, and the concrete system that we are building, are a theoretical and empirical investigation within this hybrid space of interactive story.

Façade Design Goals

This chapter has situated interactive drama within the space of different approaches to interactive narrative, and has further refined the notion of interactive drama by means of the neo-Aristotelian poetics. This section concludes with a description of our specific design goals for *Façade*.

Project Goals

The project goals are the overarching goals for the project, independent of the particular interactive story expressed within the system.

Artistically Complete

The player should have a complete, artistically whole experience. The system should not be a piece of interactive drama technology without a finished story, nor only a fragment of a story. The experience should stand on its own as a piece of art, independent of any technical innovations made by the project.

Animated characters

The characters will be represented as real-time animated figures that can emote, have personality and can speak.

Interface

The player will experience the world from a first-person 3D perspective. The viewpoint is controlled with the keyboard and mouse.

Dialog

Dialog will be the primary mechanism by which a player interacts with characters and influences how the story unfolds. To achieve dialog, the player types text that is visible on screen; the computer characters communicate with spoken speech. The conversation discourse is real-time; that is, if the player is typing, it is as if they are speaking those words in (pseudo) real-time. The system should be robust when responding to inappropriate and unintelligible input. Although the characters' natural language capabilities are narrowly focused around the topic of the story, the characters have a large variety of responses to off-the-wall remarks from the player.

Interactivity and plot

The player's actions should have a significant influence on what events occur in the plot, which are left out, and how the story ends. The plot should be generative enough that it supports replayability. Only after playing the experience six or seven times should the player begin to feel they have "exhausted" the interactive story. In fact, full appreciation of the experience requires the story be played multiple times.

Change in the plot should not be traceable to distinct branch points; the player will not be offered an occasional small number of obvious choices that force the plot in a different direction. Rather, the plot should be smoothly mutable, varying in response to some global state that is itself a function of the many small actions performed by the player throughout the experience.

Even when the same plot plays out multiple times, the details of how the plot plays out, that is, the exact timing of events and the lines of dialog spoken, should vary both as a function of the player's interaction and in response to "harmless" random variation, that is, random variation that expresses the same thing in different ways.

Distributable

The system will be implemented on a platform that is reasonably distributable, with the intention of getting the interactive experience into the hands of as many people as possible. It should not just be an interesting demo in a closed door lab, but be experienced by people in the real world. At the time of this writing, all of the *Façade* architecture has been implemented, and the first part of the story has been written using the architecture. This has provided enough experience to validate the architecture and story design. Authoring work continues, with the goal of publicly releasing *Façade* in Fall 2003.

Story Requirements

The story requirements describe the properties that the story itself should have. These are not intended to be absolute requirements; that is, this is not a description of the properties that all interactive stories must have. Rather, these requirements are the set of assumptions grounding the design of our particular interactive story.

Short one-act play

Any one run of the scenario should take the player 10 to 15 minutes to complete. We focus on a short story for a couple of reasons. Building an interactive story has all the difficulties of writing and producing a non-interactive story (film or play) plus all the difficulty of supporting true player agency in the story. In exploring this new interactive art form, it makes sense to first work with a distilled form of the problem, exploring scenarios with the minimum structure required to support dramatically interesting interaction. In addition, a short one-act play is an extreme, contrarian response to the many hours of game play celebrated in the design of contemporary computer games. Instead of providing the player with 40 to 60 hours of episodic action and endless wandering in a huge world, we want to design an experience that provides the player with 10 to 15 minutes of emotionally intense, tightly unified, dramatic action. The story should have the intensity, economy and catharsis of traditional drama.

Relationships

Rather than being about manipulating magical objects, fighting monsters, and rescuing princesses, the story should be about the emotional entanglements of human relationships. We are interested in interactive experiences that appeal to the adult, non-computer geek, movie-and-theater-going public.

Three characters

The story should have three characters, two controlled by the computer and one controlled by the player. Three is the minimum number of characters needed to support complex social interaction without placing the responsibility on the player to continually move the story forward. If the player is shy or confused about interacting, the two computer controlled characters can conspire to set up dramatic situations, all the while trying to get the player involved.

The player should be the protagonist

It was our original intention that the player should experience the change in the protagonist as a personal journey. The player should be more than an "interactive

observer", not simply poking at the two computer controlled characters to see how they change. Unfortunately, over time we have had to cut the content that would have most directly served to make the player feel like a protagonist, specifically the "love story" subplot in which a romance develops between one of the characters and the player. While the player is still more than an "interactive observer", she is not the primary protagonist, but rather more like an equal with Grace and Trip.

Embodied interaction should matter

Though dialog should be a significant (perhaps the primary) mechanism for character interaction, it should not be the sole mechanism. Embodied interaction, such as moving from one location to another, picking up an object, or touching a character, should play a role in the action. These physical actions should carry emotional and symbolic weight, and should have a real influence on the characters and their evolving interaction. The physical representation of the characters and their environment should support action significant to the plot.

Action takes place in a single location

This provides unity of space and forces a focus on plot and character interaction.

The player should not be over-constrained by a role

The amount of non-interactive exposition describing the player's role should be minimal. The player should not have the feeling of playing a role, of actively having to think about how the character they are playing would react. Rather, the player should be able to be themselves as they explore the dramatic situation. Any role-related scripting of the interactor [Murray 1998] should occur as a natural by-product of their interaction in the world. The player should "ease into" their role; the role should be the "natural" way to act in the environment, given the dramatic situation.

The Story

Façade is a domestic drama in which you, the player, using your own name and gender, play the character of a longtime friend of Grace and Trip, an attractive and materially successful couple in their early thirties. Tonight is a bit of a reunion; you all first met in college, but haven't seen each other for a couple of years. Shortly after arriving at Grace and Trip's apartment, the evening turns ugly as you become entangled in the high-conflict dissolution of Grace and Trip's marriage. Their marriage has been sour for years; deep differences, buried frustrations and unspoken infidelities have killed their love for each other. No one is safe as the accusations fly, sides are taken and irreversible decisions are forced to be made. How the façade of their marriage cracks, what is revealed, and the final disposition of Grace and Trip's marriage and their friendship with you depends on your actions. By the end of this intense one-act play, the player has changed the course of Grace and Trip's lives – motivating you to re-play the drama to find out how your interaction could make things turn out differently the next time. The story's controlling idea: To be happy you must be true to yourself.

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