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## **Stories for Eye, Ear, and Muscles**

### **Computer Games, Media, and Embodied Experiences**

#### *Computer games, media, stories, and the embodied brain*

A common way of describing representational structures is by way of media. Central problems such as ‘narrative’ or ‘point of view’ are explained by referring to those media forms in which we ordinarily find manifestations of such structures. Some researchers e.g. define narratives by referring to literary works, others, like Brenda Laurel<sup>1</sup>, describe computer games and other computer applications by reference to theatre and theatrical structures. Such descriptions have some advantages, but also problematic consequences, because phenomena like ‘story’ or ‘narrative’ are then only defined in relation to their media realizations, not by their relation to unmediated real life experiences and those mental structures that support such experiences. This raises special problems for describing mediated activities such as virtual reality and computer games because these activities are in several dimensions simulations of real life activities. Media representations are better described as different realizations of basic real life experiences. As early as 1916, the Harvard psychologist Hugo Münsterberg<sup>2</sup> showed how the film experience might be described as a cued simulation of central mental and bodily functions. Such an approach provides many advantages for describing computer games, because, as I will argue in detail in the following, computer games and other types of interactive virtual reality are simulations of basic modes of real life experiences. This also entails that cognitive psychology provides many advantages as a tool for describing computer games compared with a semiotic approach; even if games may be provided with some symbolic signs, most of the game activity consist in seeing, hearing and doing in a simulation of a real world interaction.

Before proceeding further, let me provide a definition of ‘story’<sup>3</sup>: a story is a sequence of events focused by one (a few) living being(s); the events are based on simulations of experiences in which there is a constant interaction of perceptions, emotions, cognitions and actions. An example: Harry sees the dragon coming, he is upset, thinks that he needs to grasp his sword, he does that and he kills the dragon. The experience of stories is based on central embodied mental mechanisms. The primary story-regulating brain structures are located in amygdala-hippocampus, the left peri-Sylvian region, the frontal cortices and their subcortical connections<sup>4</sup>, but these structures rely on many other cognitive and emotional mechanisms<sup>5</sup>. Our experience of stories exist as representation of exterior worlds and they may be described as such, but at the same time they are body-brain-internal processes that need to follow the innate specification of that platform.

The story-mechanisms in the brain provide the superior framework for our experience of events by integrating perceptions, emotions, cognitions and actions. When going to the supermarket, for instance, a micro story in our mind tells us that we have left home because we desired to buy vegetables, that we are now at the entrance of the mall and tells us our ideas of how to find the grocery store. The micro story thus orients us in space, describes our desires and projects and thus guides our motor actions. Damage to some brain structures important for ‘narrative’ may lead to confusion: where am I and why, where shall I go etc. The story includes a quest and its motivation. The story can also be a medium one: I met Linda, we had some lovely days in San Diego, she disappeared, but I want to find her again. The story can furthermore be a macro story of my life up till now, including how the past set up some agendas for my future<sup>6</sup>. In such stories there are actors and settings, actions and happenings, but not because such elements exists in mediated representations, like novels dramas or video games, but because such things are important for my experience of, navigation in, and interaction with the world. Stories are based on innate mental

functions that match the ecological niche of humans, they are not just social constructions or media constructions. Even if the basic story structure (agency, setting, actions etc.) is based on functions shaped in our embodied brain by evolution, we may of course fill in real as well as invented material in our stories, and learning mediated stories may enhance our ability to structure non-mediated events.

Human motivations exist in a nested hierarchy. There are high-order goals, like those folktale motives of being married or becoming a king, or high-order existential goals like survival, as in horror fiction. High-order goals may presuppose lower goals, like courting or fighting dragons, the last may presuppose getting a good weapon, a magic sword or laser gun. Such goals presuppose that you sleep and eat. At a basic level you may have simple muscular activations and very basic perceptions. The representation may focus on high order goals and motivations, because such goals are emotionally very activating, and may to a varying extent recruit nested activities. Some scholars may think that such high order 'dramatic' events are essential to a definition of stories. However, realism or modern high art narratives may however focus on low-level events, like kitchen sink realism, stream-of-consciousness and Sarraute's *tropismes*. Video games may have some high order motivations, but for a series of reasons games will often also have a strong focus on the execution of low-level (sub)goals like simple navigation and handling processes. An intro to the game may provide the superior motivation, say, to crush an evil empire, and this will provide motivation for the lower order processes.

My characterization of a story accords with state of the art psychological descriptions and has the advantage in comparison to those definitions that define narrative as 'cognitive-logical' patterns that it make explicit how many story events that are described as 'logical' consists of emotional-motivational reaction patterns. In *Moving Pictures*<sup>7</sup> I have shown how film experience may be described by a flow model: the fundamental narrative flow is based on the way in which incoming perceptual (story) information relevant for some vital protagonist concern cues emotional activation linked to the protagonist's preferences. The emotional activation of body and brain informs the problem solving activity of the protagonist and motivates motor actions that are relevant for the concerns and preferences. The basic story experience consists of a continuous interaction between perceptions (I see a monster approaching), emotions (I feel fear, because I know or feel that monsters are dangerous), cognitions (I think that I better shoot the monster), and an action (the actual motor act shooting that changes the motivational emotion fear into relaxation). The flow model also explains a series of experiential consequences that may be caused by blocking the canonical flow in different ways and at different stages of the perceptual-emotional-cognitive-enactional processing. Narrative forms based on autonomic reactions, like sorrow or laughter, are based on blocking the motor outlet. Associative form is created by blocking the flow from the associative parts of the brain before it get a scenic and linear-narrative form. Experiences based on 'pure' perceptions, such as perceptions of abstract form, only activate the first stage of the flow. Narrative models, like those of the French structuralists that dominate narrative theory, do not concern themselves with the brain implementation of narratives and cannot account for the intimate relation between perception, emotion, and action in narrative structures.

The story experience need not have any verbal representation, the ability to 'hold' the story in consciousness (including ideas of future possibilities) that is important for prolonged action patterns can take place on a non-verbal perception-emotion-motor-level. Thus the neurologist Antonio Damasio describes core consciousness as a wordless storytelling and proceeds<sup>8</sup>: 'Movies are the closest external representation of the prevailing storytelling that goes on in our minds. What goes on within each shot, the different framing of a subject that the movement of the camera can

accomplish, what goes on in the transition of shots achieved by editing, and what goes on in the narrative constructed by a particular juxtaposition of shot is comparable in some respects to what goes on in the mind, thanks to the machinery in charge of making visual and auditory images, and to devices such as the many levels of attention and working memory.’ This mental film is of course not a silent one, it is only lacking that possible ‘constant voice over’ of doubling the experiences with a phonological stream of words, that is, an inner monologue. A verbal ‘voice over’, an inner monologue may strongly enhance our cognitive analysis of our experience and make it easier to manipulate the experience, e.g. to compare it with other experiences or to imagine possible consequences. But the ‘inner monologue’ may also mask part of the salience of the perceptuo-motor experience<sup>9</sup>.

Damasio could have pointed out that in several respects video games of the 3D kind typical for instance for shoot them up-games or some types of virtual reality are even closer to our core consciousness, because not only are we able to see and feel, we are even able to act upon what we see in light of our concerns, our (inter)active motor capabilities allows us to so shoot at what frightens us or approach what activate our curiosity. Thus, computer games and some types of virtual reality are the supreme media for the full simulation of our basic first person ‘story’ experience because it allows ‘the full experiential flow’ by linking perceptions, cognitions, and emotions with first person actions.

An embodied brain-approach to story experience allows us to characterize the way in which verbal story telling is a media-specific variant of the story experience. Many language-based story-descriptions have derailed descriptions of computer games (and films) because they ignore that semantic meaning is based on concrete perceptions and motor patterns, not on some abstract ‘semantics’, kept in place by verbal signifiers. Humans have probably only acquired language within the last 200.000-100 000 years<sup>10</sup>, whereas the basic story mechanisms may have existed for several million years. Some researchers have even argued that the use of language only took place 70.000-60,000 years ago<sup>11</sup>. Language has certainly been important for communicating such story experiences and has been a superior tool for the retrieval of and the complex manipulation of the basic experiences<sup>12</sup>. But a purely linguistic model may seriously impede descriptions of those media that like video games rely on a series of non-verbal skills.

Stories are not the only way that we may experience the world. We may perform analytical reasoning similar to that in an essay, we may have thematic-categorical principles of organization or principles based on a network of lyrical associations<sup>13</sup>. Novels, films or computer games may be full of non-narrative material, like philosophical reflections, descriptions unrelated to the narrative core, or lyrical segments.

#### *Computer games in the perspective of media history*

The basic story format is the one called the ‘canonical story’<sup>14</sup>, that is a story with one (or a few) focusing characters that unfolds itself in a linear, progressive time, from beginning through middle to end, as Aristotle noticed. A canonical representation does not only accord with the way in which we experience unmediated reality as a series of events in a progressing time, it is also the one that is easiest to remember and represent<sup>15</sup>. People will tend to reproduce a story in a canonical fashion even if they have heard it ‘uncanonically’, i.e., with temporal rearrangements. Thus, our innate mental machinery seems to take the canonical story format as its baseline. It is important to point out that the basic story experience must be described as taking place in a presence, the experiencer is situated in a now, that is anchored in the memory of a past that causes and informs the cognitions, emotions and actions directed towards the future. Furthermore, the nucleus of the story experience is the first person experience, because third person perspectives are – from an evolutionary point of view – expansions of a first person point of view<sup>16</sup> even down to the level of

motor activation. We infer how other people experience things by extrapolation from our own experiences, using for instance the so-called mirror neurons<sup>17</sup>. In the following I will show why media representations of experiences have lead many theoreticians into making misleading descriptions of stories. Theoreticians have focused on story mediation and left out those aspects of stories that the French structuralists called 'l'énoncé', the story as such, in order to define 'story' as a discursive phenomenon (l'énonciation). They have further tended to define stories as being based on a 're-telling' or 're-presentation', not as an experience that takes place in a progressing presence.

The first media representation of the brain's story experiences took place when language was invented. This has lead to several changes and additions to narratives. Linguistic representations stabilize the experiences and make them easier to recall and to manipulate. Furthermore, a central purpose of language is to provide stories with an intersubjective form and this refocus the story experience from a mainly first person to a mainly third person perspective (that of the listener), although a basic story experience also includes perceiving others from a third person perspective. Verbal representations enhance the already existing possibility of providing a third person's perspective to stories, because even if the story is one of one's own experience, language enhances the possibility of reliving past experiences out of their direct perceptual context. Even a first person 'autobiographical narrative is made by the storyteller from a distanced position to the previous online experiences. The distance is also possibly a temporal one, because retelling enhances the ability to mentally represent past experiences as past by means of linguistic tense markers.

The stable, intersubjective representation by language provides a symbolic filter (in the Peircian sense of symbolic) between the perceptions, emotions and actions, and their communicative existence. Language enhances the possibility of describing fictitious events, because even if a central function of imagining a 'story' is linked to those mechanisms that make it possible to imagine different possible future actions, language has removed all constraints on the veracity of stories by removing online indexicality. Vision (before paintings, film, and television) represented what existed and thus had strong indexical links, but in language (or even in paintings) it is just as easy to lie or fantasize as to 'tell the facts'<sup>18</sup>. This has lead may into making a link between 'story' and 'fiction', although story structures do not have a fixed reality status, they may have all kinds of truth values.

Oral narratives were and are predominantly canonical, because due to memory constraints and cognitive constraints, radical changes in the temporal order raised and raise difficulties<sup>19</sup>. Thus, even for oral stories the distinction between story and discourse is of limited value, because one of the main practical uses of the story-discourse distinction has been as a tool for describing texts with a scrambled temporal order and to compare several versions of the 'same' story. But if there is no scrambled temporal order and no other versions, the degree of story compression and focus on important events seems to be the only use that one can make of the story-discourse-distinction. Oral narratives enhance that aspect of stories that many find to be an important story-defining feature, namely that a story mainly represents very salient events, love, fight, death etc. and leave out trivial events. But to define 'story' by a compression that focus on high order experiences, and thus to define story as the opposite of representations of trivial events, is problematic.

Pre-linguistic 'mental' narratives probably made a strong selection among the aspects that existed prominently in the ongoing 'story': Some aspects of the experience were probably more important than other in a non-verbalized story-experience. Thus, to compress and focus the story on salient events is an aspect of how the mind works by making priorities for access to a limited working memory space. Joseph Anderson has provided a description of how superior structures are important for the comprehension of detail<sup>20</sup>. Compression may thus be described as a 'proto-discursive' phenomenon, because it is not really possible to distinguish between a story as 'it really

happened' and the presentation. But what is compressed in a given story depends on its purpose: if the purpose is also practical, it may focus on certain details and leave out a detailed description of the superior motivation. Thus video games often focus on the 'how' questions of a story.

The verbal form of narratives until the beginning of the 20<sup>th</sup> century has lead theoreticians, for instance Marie-Laure Ryan<sup>21</sup>, into thinking that the story phenomenon is centrally a verbal phenomenon, because they conflate the story experience with the verbal re-telling. In principle Ryan follows Jakobson's (1960) very prudent semiotic definition of stories as something that can be manifested in many forms and that is not defined in relation to one medium, and her general description of narrative avoids a series of 'linguistic' traps. Nevertheless, the verbal form seems to be the central one for her. She thus thinks that computer games 'embody a virtualised, or potential dramatic narrativity' because the games provides some experiences that might be retold by means of language, although these virtual stories may ever be told, i.e. provided a verbal form. But this conception is paradoxical, because by these criteria we would never experience any 'stories' unless they got a linguistic form; even films would only become stories when we made a verbal *resumé* of a film.

The way in which verbal representations enhance the possibilities for taking a third person's perspective on stories also greatly enhance the experience of stories that rely on certain third person emotions, like empathy. The most fundamental emotions like love, hate, jealousy, curiosity, sorrow, and fear, rely on a first person perspective for a full experience of these emotions<sup>22</sup>. But emotions may also be simulated in a third person perspective in which these emotions are modulated by empathy, like pitying the tragic hero or admiring the superhuman hero. First person emotions are dynamic action-motivating emotions, whereas third person emotions like pity or admiration may motivate action, but also more static dispositions. Some theoreticians think that empathic emotions are more valuable than first person emotions (especially those connected with active coping), and more typical of stories. Thus Marie-Laure Ryan<sup>23</sup> uses such an emotional valorization as an argument against video game stories and possible VR stories because such stories are better at presenting first person emotions than, for instance, novels that excel in evoking empathic involvement. It is, however, problematic to make empathic emotions a criterion for whether something is centrally a story or not. In an evolutionary perspective, first person emotions like the urge for exploring, fighting (based on sympathetic reactions), or emotions linked to sex, food, and laughter (linked to parasympathetic reactions) are more fundamentally linked to stories than empathic emotions. But Ryan is right in her criticism of Janet Murray's claim<sup>24</sup> of the unimportance of media for the story experience, and in pointing out that video games better support some emotions than others. The centrality of motor control in games makes emotions supported by sympathetic reactions based on coping more probable than emotions supported by parasympathetic reactions based on acceptance and relaxation<sup>25</sup>, and first person emotions more probable than third person emotions. A game that presupposed an active striving for the death of a nice game character would be perverse. But those emotions that are centrally afforded in video games are sufficient for providing holodeck-like experiences as described by Murray<sup>26</sup>.

The invention of dramatic representations provided yet another expansion of the story experience. The dramatic form (re)infuses online perceptual qualities to story-representations. The actors are physically present and some dramatic representations rely on sets and props. The representation is perceived in a third person perspective (the distanced position in the theatre seat as well as the phenomenological 'outside' views on actors), although spectators might mentally identify with some of the protagonists. The physical constraints on dramatic performances made some stories more suitable for dramatic presentation than other stories. Verbal narratives have no cost in providing representations of movement through vast spaces, of handling complicated props

and performing complicated actions, or to represent a quick temporal progression. Drama is much more confined to some limited spaces, and to representations of a few contiguous temporal scenes. But it is well suited to represent personal interaction based on strongly emotion-evoking events, from courting to tragic death. Theatre has prompted a series of ancillary techniques, from the art of making sets to the art of structuring events and characters. Nevertheless, it is difficult to understand why Brenda Laurel<sup>27</sup> uses the theatre as a special metaphor for computers. Those Aristotelian elements that she uses as reasons for describing the computer as theatre, namely action, character, thought, language, melody and spectacle are a list of human capabilities that are neither exhaustive nor exclusive to theatre. The reference to theatre does only provide a starting point for breaking down computer features into some functions that could also be derived from other domains.

Dramatic representations are mostly done in the present tense, and thus challenge the belief that the core element of stories in general is their pastness (that is evident in the experiential basis of story comprehension). There are good emotional reasons that make a present tense experience the core story mode. The activation of the central action-motivating or curiosity-motivating emotions demands that a given point in the story is simulated with an open, undecided future. If the hero with certainty is going to fall in the pit there is no reason to feel fear or to simulate active coping in order to avoid the danger, but just to feel a distanced pity. If we are totally certain that the hero will get the heroine there is not much suspense. Even if folk tales are told in the past tense, the listener will take that past point in time as the focus of 'presentness' and construct an open future. The problem with some types of strongly narrative video games is that it is difficult to simulate such stories in a dynamic real time and this will deprive the player of a strong sense of experiencing the story in the present tense.

The dominant present tense of drama may be somewhat blurred by the fact that some dramas, for instance the most famous Greek tragedies, are based on stories that are well-known on beforehand, so that the viewer may know what happens and only asks how it happens. Tragedies and melodramas are however a variant of stories because they rely on passive emotions and/or third person emotions. For such stories pastness, decidedness, fatality is important in order to block a present tense experience that would make the passive acceptance of the inevitable and painful more difficult<sup>28</sup>, that is, make the transformation from first person to third person emotions more difficult. Comedies do not ordinarily need or presuppose such a pastness.

The invention of written story representations surpassed some of the memory constraints of oral stories. The written medium affords complex narratives, including discursive rearrangements. The written form emphasizes the pastness of the experience, and at the same time it enhances the experience of the 'fixity' of the story, because beginning, middle and end of the story exists physically in a fixed form. That does not exclude that stories are read in a simulated present and that the reader may tend to experience a given narrative future as 'undecided', just that the medium emphasizes the fixity of the story (and often the third person perspective). In the 20<sup>th</sup> century film and TV-fiction became the prime vehicle for basic storytelling, whereas high art literature increasingly emphasized the discursive dimensions by a series of complex narrative strategies (or by filling in non-narrative material such as philosophical reflections).

The invention of film created a new medium for the simulation of basic story experiences. Like theatre, film makes it possible to present events with in a direct perceptual form. In some respects the screen does not have the same intense physical 'presence' of space and characters as theatre. But in other respects film affords a story-presentation that is free of some of the constraints of theatre. Films make it possible to move freely through time and space. Films make it possible to cue and simulate an experience that is close to a first person perception (either directly by subjective shots, POV-shots) or from positions close to the persons, contrary to the fixed and distant

perspective in the theatre<sup>29</sup>. The focusing and framing of persons, objects and events simulate and cue the working of our attention. The representation can furthermore represent various aspects of reality with photographic verisimilitude. As an audiovisual media, the dominant temporal dimension is the present tense, we directly witness the events. To present 'in the past tense' is possible but is not as in written stories the norm. The medium more easily affords story development that focus on a now with an undecided future that has to be constructed by the actions of the hero. Furthermore, there are also strong emotional reasons for a present tense presentation because this supports experiences based on emotions linked to active coping (hate, fear, love, desire), although the medium is also excellent for presenting passive emotions<sup>30</sup>.

The dominant mode of representation is a canonical one, because film viewing often works under strong time constraints that strain the viewer's cognitive capacities<sup>31</sup>. Mental capacity constraints will in mainstream cinema impede narrative complexity. This does not exclude that films – like written narratives - often use more complex forms of representation. They may use explicit narrators, discursive rearrangements, but in mainstream cinema such devices mostly serve special functions (explicit narrators are thus most typical for creating passive effects, discursive rearrangements mostly serve to provide subjective dimensions (flashbacks to childhood experiences e.g.)).

#### *Computer games, story experience and game playing*

The computer medium is the latest medium for story simulation. By providing an 'interactive' motor dimension to story experience the computer media adds a powerful new dimension to the possibility of simulating first person experiences. The motor link is still primitive compared to our capabilities to physically interact with a real life environment (speech is in this respect also a motor act), but eye and ear will not only be linked to an activation of the pre-motor cortex, but also to a full motor activation. Like cinema the computer game screen predominantly simulates perceptions of spaces and objects that are present to the senses, but they can be influenced by actions. In several respects then computer games are, as mentioned, the medium that is closest to the basic embodied story experience.

The interactive capability also raises a series of new problems that were absent in the earlier media, but are similar to those raised by interacting with real life phenomena on a first person basis. The reader/viewer of 'traditional' mediated stories only need to activate some general cognitive skills, including the ability to have some expectations. The story will proceed even without such expectations. The computer story, in contrast, is only developed by the player's active participation, and the player needs to possess a series of specific skills to 'develop' the story, from concrete motor skills and routines to a series of planning skills. Therefore the new activations also increases the capacity problems.

In the earlier media the story progression is controlled by the author/director. To follow protagonists through space only demands rather vague mental models (for instance to imagine that a character somehow gets from his apartment in Berkeley to Golden Gate Bridge, not detailed cognitive maps and eye-hand coordination. Being a witness to John Wayne shooting an opponent only demand crude models for actions, not precise motor programs for grasping the gun and aiming precisely. But in computer games such activities often demand rather detailed cognitive maps and motor skills, and playing therefore often require extensive training of necessary skills. One of the reasons why computer games are called *games* is precisely because the repetitive training of coping skills is an important element in many of those activities that are covered by the name games.

However, the term 'game' is a very loose one, and Wittgenstein used the term as a prime example of a category based on 'family resemblance' and Lakoff used family resemblance to describe categorizations based on prototypes<sup>32</sup>. There are no necessary and sufficient conditions for

belonging to or not belonging to the category games, only a loose network of interconnected resemblances. Several computer game researchers have used Roger Caillois's<sup>33</sup> categorization of games as a tool for characterizing computer games in contrast to narratives. Caillois divides games into four types, Agon (competition), Alea (chance), Mimicry (simulation) and Ilinx (vertigo). But a comparison between computer games and Caillois's categories creates more problems than it solves. Mimicry may be used when playing, but is also central in film and theatre. Ilinx is a central element in many action films. Agon is central in many action films, Alea is prominent in lotteries etc. but neither typical of fiction nor of computer games, although of course most events in this world may possess an element of chance. It is more rewarding to take the point of departure for describing games in a more general definition of 'play' and then describe games and fictions as special forms of play. The ability to play is a very general innate feature that characterizes all mammals<sup>34</sup>. To play means to perform an activity for pleasure, not out of a necessity, although the survival value of playing may be to train important skills, from motor skills to imagination and hypothesis-formation. Cats may play 'fighting' or 'hunting' and even if their playing may enhance their skills for real life fighting or hunting, the play situation is not carried out with full real life intentions, their claws are withdrawn. Humans may play cops and robbers, perform an act, play soccer or monopoly, but it is only a play as long as it is not carried out with real life intentions, where the players kill each other or risk their fortunes. Thus, a central element in the concept of 'play' is linked to what kind of reality status is manifested in a given play activity.

In some fictions (for instance the realist fictions) the fictive 'playfulness' of the activity is only a general prescript that prevents the viewer (or actor) from confusing the fiction with reality, but they are in several respects consumed as if they were real. Other fictions are overtly playful. The fictions may be fantasy stories that activate the spectators' or readers' joy by seeing a series of laws of reality violated. But they may also be fictions that cue the spectators into seeing the events as playful, as it is often the case in comedies. Thus, when *The Cosby Show* is called a show and not just a film or comedy, the name clearly indicate that these are some 'artist performances' that the characters do in order to please the audience, enhanced by the laugh track. Thus, the more the 'fourth wall' of the 'theatre' is negated, the more the actors are not only communicating to other people in the diegetic world, but also to the spectators, the more we will think that the activity is 'a performance', a 'game'. Such comic shows will never produce any final results, because in the next sitcom, all the activities will start again, just as we know that Ollie and Hardy will never develop, but repeat the same stupidities.

A central element in those playful activities that we call games is therefore their repetitiveness, because somehow repetitive (reversible) activities are felt as less serious, less 'real' than activities like tragic stories that represent irreversible processes. A sophisticated viewer of, say, a tragic western might however see that film as a 'game' and thus as something more formal (less real) that could be repeated in another western. *Thus we might define games as a special kind of playfulness that is characterized by a virtual or actual element of repetitiveness, linked to a conscious feeling that the activity consists of exploring some pattern-bound, rule-bound possibilities (narrative schemas, comic schemas etc.). The repetitiveness may diminish the felt seriousness.* Although some activities may afford playfulness better than other, playfulness depends on subjective attitudes and skills as well as on object affordances. Just as we may either enjoy a western as a 'serious' simulation of reality, but also as a 'game' with some patterns, so we may also play a computer game in a serious-realist mode, but also in a 'playful mode'. The ease with which we can start a new game certainly supports playfulness, but there is a trade-off between depth of involvement and degree of playfulness<sup>35</sup>. If too easy, it may seem mechanical, and if too difficult it may cause frustration.



Mediated fictions are mostly enjoyed from a ‘perceptual’ third person perspective that eventually is simulated mentally from a first person’s perspective, whereas many types of playing are enjoyed from a first person perspective even in its motor dimensions, although many people also watch soccer games etc. Fictions are about the concerns of anthropomorphic beings, whereas some kinds of playing, like solitaire, lack an anthropomorphic dimension. And furthermore, most kinds of playing when experienced from a first person perspective are repetitive in nature, although competition may change playing into distinct events. Thus, big professional soccer games may be experienced in a mode similar to a drama, and more so from the perspective of the spectators than the players. The question of repetitiveness vs. unique events is based on subjective, experiential evaluations: players of all kinds of games or consumers of stories may experience a game or a story on the superior level of pattern repetition or focus on the unique variations of a genre or a game-world.

Stories and games are prototypical categories (or, in Wittgenstein’s terminology categories based on family resemblance). They bleed into each other and cannot sharply be delimited from yet other categorizations. Thus, the central prototype of stories are similar to those games that – like action-shoot’em up and adventure video games are based on intelligent agencies that act in time-space, whereas other games – like Tetris – have a weaker links to stories.

#### *Linearity, non-linearity, and interactivity as agency*

I briefly noted that contrary to the reader/viewer of mediated stories (and texts) the player of computer games (and related phenomena such as hypertexts) needs actively to develop the story. This development is often described by means of some ‘hyped’ terms like ‘interactivity’ and ‘non-linearity’, especially when those terms are used in a semiotic context. My definition of ‘interactivity’ in relation to computer application is simple: Interactivity means that the user/player is able to change the visual appearance of a computer screen (and/or sounds from speakers) by some motor action via an interface. The more this motor interaction take place in a world that simulates being an agent in a world that simulates aspects of a possible real world the greater experience of interactivity This definition is in accordance with our everyday experience of interaction (in contrast to mental processing). To describe an active reader or viewer of texts as interactive is confusing in relation to ordinary language. The definition furthermore focuses on the experience of the user/player (performing motor acts) and thus avoids those metaphysical speculations of whether the user/player is ‘really’ in control or not. The media theoreticians Bordewijk and Kaam (1986) have tried to make an objectivist typology of different types of communication. Traditional one-way media like television are ‘transmissions’. Information that is produced by a ‘center’ and distribution is controlled by the user (like a database or computer games) are characterized as ‘consultation’. The true interactive forms are telephone, e-mail and chat group etc. because only those media formats enable the user to produce and distribute information. But such a description clearly violates normal language. We do not ‘consult’ *Doom* in order to find out what information the producers of that game have provided, we play the game in order to get an experience that is a simulation of the way in which we might act in a hypothetical world. Our primary model is the way in which we experience interaction in a real world.

In a real world as well as in simulated worlds our influence is limited by the general design of that world: we follow roads, tunnels or career tracks, and obey rules, but within a given framework we may alter some elements, take different roads, build houses etc. The only necessary condition for experiencing ‘agency’ and interactivity is that our actions make a difference. Ryan (2001) provides a distinction between four kinds of interactivity, made up of two pairs internal/external (roughly equivalent to first person/third person) and exploratory/ontological. The

last pair shall distinguish between those games in which the user moves around the database but are unable to alter the plot and the virtual world, and those games in which the player can influence that world and consequently influence the possible stories. When exemplified however it becomes obvious that this distinction is difficult to maintain, because there is no clear distinction between exploring and altering. The reason for this is that the key element in agency and thus in the feeling of interactivity is the ability to change the player's experience. In real life I may feel agency by changing my experiences by going to Italy, and this might be described as 'exploring the 'database Italy' and that does not change much in the world. The 'database Italy' is pretty much the same after my visit, but nevertheless I experience agency by my power to change my mental states by my 'navigation'. But I may also experience agency by building a house or making a table. Is the first experience just exploratory whereas the last is ontological? When I wander around in a mystery, adventure or a shoot 'em up-game, I cannot change the fundamental layout of the game-world just as I cannot change Italy by my visit, but nevertheless I control my navigation, my ability to shoot monsters etc. and create many different stories. Thus, interactivity is not centrally about changing a world, on the contrary it is about changing the mental states of the player, whether that takes place by changing some objects in the world or by changing one's point of view.

Ryan describes some adventure and mystery games as (internal) exploratory whereas other adventure games are characterized as (internal) ontological. However, the difference between *Myst* and *Quake* is not one between a game in which the story is 'predetermined' and one in which the story is created by the player. In *Quake* the player also needs to do certain things that is inscribed in the game by the producer of the game, to shoot certain adversaries and to find certain paths, for instance. The difference is centrally the salience of the experience of the player's game alter ego in different games. In shoot 'em up-games the player more often navigates in a real time-3D world, the player may 'die' or 'crash' his/her plane or whatever, whereas a problem in a mystery game would be more 'external', some headache caused by game problems but projected out in the game world. Thus, even if both worlds are equally free or controlled by some built-in functions and trajectories, the surface of some games are more inviting for experiencing a first person involvement (including the speed of events). The slow and totally player-determined time in *Myst* may

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vs. controlling an airplane through a tunnel or a car on a race-track in 'real time'. The 'system-resistance' to agency may in the first case be experienced overtly as caused by 'narration', whereas failure to cope in an action game may be experienced as only a personal failure. Thus the distinction 'exploratory'-'ontological' is very much created by an implicit 'hype' that thinks that the essence of interactivity consists of free, demiurgic powers for world-making, instead seeing interactivity as the creation of experiences that appears to flow from one's own actions. World-making games like *Sim City* simulate such demiurgic powers, but are mostly not centrally experienced as stories, because the central story experience is linked to focusing agencies that are not typical for world-making worlds.

A description of the game experience cannot only be 'objective' but must take its point of departure in a psychological description. Brenda Laurel (1993) has pointed out that the computer experience is a first person activity and that it is most activating if the proper sensory modalities are stimulated. Vividness of the sensory and motor interface provides salience to the experience of agency irrespective of objective control. The 'subjective' aspect of the experience of agency can be observed in the difference in experience between film sequences in film and the same or similar 'film'-sequences in a computer game, that is, sequences that temporarily block interaction. Because such sequences in a computer game are experienced in a context of interaction, they are experienced as more 'dead', less 'vivid' than in a film context.

Our experience of our interactive capabilities are however not constant over time. When beginning a new behavior and/or learning a new environment we may feel that we have many options that depends on our own choices. However, as we learn those behaviors and environments we may increasingly get a clear ‘map’ of our options, and we may even feel that we are just alienated robots that follows the commands of society or our own fixed compulsions. To play computer games provides a similar variation in our experience of interactivity. When starting a new game we may follow different routes and have an experience of controlling many options. But when we gain mastery we may not only experience the game as a series of routes that we may follow, but also create a total ‘map’ of the game and realize that we have a set of limited options. In this stage the game is more likely to be experienced as a ‘message’ from the game producers because we get an insight in their game design. Experienced players may sooner get to that stage and more often shift between experiencing the game as an interactive world and reason about the possible intentions laid down by the producers. But it spoils some of the fun to watch fictions and games as communication, although it creates other connoisseur pleasure. You may ask yourself the question: will Hitchcock kill this woman, instead of simulating her destiny as a real life event. Similarly, some pleasures of game playing is linked to the simulation of an experiential flow, although other pleasures consist in getting insight into the intentions of the creators. Our experience of basic mimesis is one of ‘naturalness’, it has to be so. However, our experience of ‘art’ is based on our insight into the way in which a given creator realizes specific intentions that are only fully understandable as a choice selected among several possible options, and this demands expertise. The metaphors ‘game as an experiential route’ vs. ‘game as a map and as a system’ sum up the two poles in the game experience (novice-master), and may perhaps also cover the way in which ‘texts’ may be either experienced as mimesis or as art.

The term ‘non-linearity’ is closely related to the question of interactivity, because for many scholars within the humanities, the idea of total interactivity and supreme agency is linked to that term. The term is heavily loaded with associations provided by different strands of postmodernist-deconstructionist thinking, e.g. those derived from Derrida. According to their philosophy linearity is a product of a western, metaphysical logos-thinking (e.g. causality), enhanced by the linearity of alphabetical writing. These ideas are often linked to rather patronizing ideas that consists in implicitly claiming that non-western people should be more illogical than westerns. The computer ‘hype’ version of non-linearity consists in claiming that the computer media possibly emancipates from these metaphysical and ideological constraints.

However, linearity is not a product of western metaphysics but based on very fundamental features of the world, of action, and of consciousness. An experiential flow is – unless totally unfocused – a linear process in time. At the same time linearity is a mental representation of the essential feature of the world that it exists in time, and that time is experienced as linked to irreversible processes. Such processes are represented mentally by concepts like cause and effect. The sun begin to shine and then the snow melts. The arrow pierced into the heart, and then the person or animal died. The man entered the tunnel, went through and came out on the other side of the mountain, etc. Lakoff<sup>36</sup> have shown how such causal links are universally represented by source-path-goal-schemas. By playing a film backwards it becomes obvious that our whole conceptual machinery is based on such linear processes, based on concepts of causality that we share even with animals. The role of linearity and causality in science is only a sophisticated version of innate mental mechanisms that have been developed because of their survival value. Actions are causes that make a difference of effect, and therefore it would be difficult to make a story that was not based on some kind of linearity and causality, because else the actions of the story would make no difference.

A given effect may have different causes: the street may be wet because of rain or because a city water wagon has passed. We may construct computer games that consist of different paths that cross each other at some points. In one of the storylines we may arrive to a given space after having followed a path that simulated rain, in another storyline we may arrive to the same space by another path after having witnessed how a water wagon made the street wet. Thus by providing several linear trajectories to the same point we may create ambiguity (seen from a 'system' point of view: one effect, several possible causes, as in the deliberations of possible motives and causes in crime fiction, including representations of alternative possible scenarios). It is however evident that because a given effect cannot have an unlimited amount of different causes, there can only be a limited amount of such causally motivated crossing paths (cf. Ryan 2001). A 'hyper-text'-like computer story in which all the scenes of the game story were connected by a complex web of links, would have to be a fairly primitive one, or one with insignificant effects. It would be impossible to figure out hundreds of different paths crossing in hundreds of different scene-nodes that provided significant processes and actions irrespective of what concrete trajectory was taken in the web of links. Thus such 'a-linear' hypertext web structures afford association-like phenomena (similar to those of dictionary cross-reference links, lyrical associations, literary allusions etc.) that get their significance by the accumulation of associations. But complex hypertext-like networks do not afford those narrative actions well that rely on causality, a certain time direction, and some irreversibility. Network of (lyrical) associations versus linear (narrative) trajectories are linked to two different types of emotions, the unfocused emotions that I have called 'saturated'<sup>37</sup> and those 'tense' emotions like aggression that motivate action, and that need a 'linear-causal' setting. Media cannot change our innate cognitive and emotional architecture, only invent products that may activate and enhance the innate specifications.

□□ The reason for wanting multiple choices and multiple possible storylines is the wish of simulating that feeling of a (relative) freedom of choice that we may have in real life (although I previously pointed out that even real life has massive constraints). Seen from this point of view the creation of several alternative routes simulate such a freedom. We may, for instance, follow one path to the princess on which we need to kill a dragon in order to proceed to the princess, whereas the other path to the princess has a trial that consists in solving riddles. But choice based on path bifurcation and path separation also imply some constraints on 'significance', because if one path implied that the hero lost an eye, and the other one did not, they could not meet. xxx

If, in contrast, a computer game combines several alternative paths leading to different goals they are 'collections of linear stories' that make explicit what is implicit in other story forms, namely that our story comprehension is based on the fact that the story is a series of 'forks' (of alternatives, as pointed out by Bremond 1964); either we go left or right, either the hero wins or loses the battle etc., with the difference that many of the options in normal stories are only virtual even in the reading, whereas a computer story may be constructed in such a way that what was virtual in the first game is chosen and actualised in the second game.

Thus we may conclude that stories are essentially linear in their realization: 1. All texts and experiences are linear as experiential processes, because even when 'reading' a hypertext the experiential flow would always be linear as it would be revealed if we taped our hyper-text activity, our netsurfing, or our consultation of an electronic dictionary with links between articles and terms. 2. The story as a sequence of significant events is linear because a significant story relies on causality and on irreversible processes. This insight may be blurred by two different phenomena: 1. A given story world may support different stories, different choices of paths (and in computer stories different player performances). However, we need to distinguish between story experience

and story world affordance, because a given story world, game world, may afford one or several story experiences<sup>38</sup>. The experience of the way in which a game/a story world affords one or several story experiences is however not a a-linear experience, but an insight into the difference between 'experiential route' and game world as a 'map', as a system of multiple linear routes.

### *The aesthetics of computer games*

Several theoreticians have pointed out that at least at present most computer games have a less complicated story than films or novels. Thus Juul (2001) compare some films with their game versions, e.g. *Space Invaders* and *Tomb Raiders*. He points out that the game versions are much simpler than the film versions and uses this as one of his arguments for thinking that computer games are not a story-telling media. The problem with this argument is that it is normative. That some stories are rather simple in some dimensions are not a reason for depriving them their status as stories. There is obviously a trade off between control and some dimensions of complexity. Films based on novels may often in some dimensions be simpler than the novel because the richness of the perceptual presentation and the pressure of experiential time are in conflict with other dimensions of complexity that may characterize the printed medium. Similarly, the complexity of the active control of story development in computer games is in conflict with other dimensions of complexity. Playing computer games demands a detailed richness and specificity in cognitive maps of spaces and opposing agents, of causal inferences that does not only have to be vague premonitions as in films or novels in which the author/director is in control, but precise ideas in order to work. The perceptions have to be fast and precise, the motor control coordinated with the perceptions, and thus the computer story demands the acquisition of a series of procedural schemas. From another point of view therefore computer games are not imploded stories, but on the contrary the full, basic story that the retelling has to omit, including its perceptual and muscular realization. Computer games are based on learning processes and rehearsals and are therefore stories *in the making*, sketches of different stories, different coping strategies. In our first person experience of a series of events the actual physical manipulation may be intriguing: how to dress oneself, how to control a car, how to find out how a given piece of machinery should be dealt with. All those procedures may be vital elements in our 1. person experience. However, such 'procedural' experiences are often not very interesting for other people, they do not like to hear about all those 'low level' procedures and learning processes, but only to get the bottom line, e.g. those macro events that are experienced in an exterior world. In retelling there is often a conflict between the teller that wants to provide all the salient details and the listener that wants the big picture. Computer games activate a 1. person perspective and furthermore often possess a time-frame of many days that allow for a story that is realized on a procedural micro level as well as on the macro level. Films provided a rich access to those perceptual experiences that grounds the basic story experience, computer games provide the full agency-dimensions of story experience.

In several respects, computer games provide an *aesthetic of repetition*, similar to that of everyday life. A film is mostly experienced as a unique sequence of events, and we do not learn the physical outlay of a given simulated world very well, we are carried from space to space. In everyday life, however, we repeat the same actions over and over in order to gain mastery. When we arrive to a new city or a new building we slowly learn how to move around, and if we want to learn to drive or bike, we exercise those skills until we have acquired the necessary procedural skills. The computer game experience is very much similar to such an everyday experience of learning and controlling by repetitive rehearsal. We often tell our everyday experiences to others, but often learn that all those details that we find intriguing may be boring for other people.

The computer game experience consists of different phases. The first time a game is played it is experienced with a certain unfamiliarity, the world is new and salient and poses challenges and

mystery By playing the game numerous times the game world will increasing become familiar. The peak result of such a learning process may be a trance-like immersion in the virtual world, because of the strong neuronal links that are forged between perceptions, emotions and actions. But the end result of the learning process is what the Russian Formalists called *automation*, and what psychologists might call *desentization by habituation*. The virtual world become predictable, it loses its visual and acoustic salience, and the player will probably stop playing the game at this stage. Thus this aesthetics of repetition is based on the sequence: first *unfamiliarity and challenge*, then *mastery*, and finally *automation*. The experience is thus in some respects similar to the way in which we enjoy music - musical appreciation is also strongly based on repeating the listening process until it has reached a stage of automation.

The repetitive and interactive nature of computer games leads to changes in the function of central devices in the emotional experience of 'narratives', namely *curiosity, surprise and suspense*. In a film, the curiosity that is cued by secrets of the narrative world is a passive one, and mainly linked to first time viewing. The viewer will activate a passive curiosity that supports the viewer's attention. In a computer game, however, curiosity takes the form of *explorative coping*. The game only develops if the player performs a series of explorative actions. This self-controlled exertion of active agency is a central fascination in one type of game segment. However, other segments, especially in 'shoot 'm up' games are based on the experience of personal agency as being *dynamic coping* by interacting with other *dynamic agencies*, from monsters to gravity, in a simulated *real time*. Explorative coping and dynamic coping provides two distinct experiences of agency as control and agency as playful interaction with other dynamic agencies.

In films, surprising events are mainly emotionally activating in the first viewing. But when playing video games, what was surprising in the first game, is transformed into a suspense-like coping anticipation in the following games. When the player advances toward the space in which the 'surprising' event previously has occurred, say the sudden appearance of a fierce antagonist, it will induce an increased arousal. The arousal will diminish over time as the player learns some coping mechanisms, for instance fast routines for shooting the monster despite the surprising speed or the surprising location of the monster.

A film will create arousal related to the viewer's expectations of what will happen to the central protagonists. This combination of arousal and expectation is what is ordinarily called *suspense*, and it is mainly linked to first time viewing. Computer games also evoke suspense related to the outcome of local sequences as well as related to the final outcome of the game. But suspense in computer games is interwoven with the interactive and repetitive nature of the game. The outcome in a given game is in principle just as uncertain the second time as the first time. The player might in the first game by chance shoot an important antagonist or by chance solve a problem, make a perceptual or motor mistake, or forget a step. The time factor in games characterized by dynamic interaction will often create differences in performance from game to game. The player will only by training achieve such an expertise that the game will lose its suspense, and thereby its ability to arouse and stimulate the player. Suspense in computer games is partly linked to explorative and dynamic coping, because, contrary to film suspense, computer game suspense supports coping, not passive expectations.

I mentioned that to play a computer game could be divided in three phases: challenge, mastery and automation. The player may have a strong experience of agency and free will in the first two phases. However, the way in which the game is controlled by the designer, and therefore is a 'non-interactive' experience, may surface in the third, automated stage. In order to experience our exertion of agency and free will, we need to feel that we are not enacting some stimulus-response patterns. We do not only need to have a choice between a series of different options, we also need

to 'feel' that they are real options. But even if a given game world has a series of different paths and options at a given moment, not all these options are equally valid. Often a given game will have rather few optimal strategies. The final stage in playing a given game therefore consists in explicitly or intuitively to learn these constraints and the optimal strategies of a given game world, just as our everyday may become a dull routine that carries out some automated optimal strategies that rule out a series of alternatives. This further underlines that the experience of interactivity and agency is a subjective one that varies over time, not something that is a static feature of a given game. The experience of interactive agency demands a certain degree of unpredictability in order to guarantee challenge and salience, but also a certain degree of predictability in order to support active coping.

That computer games are based on repetitive playing and on interaction has important consequences for the emotional experience in comparison with films. The player's emotional experience is a personalized one. When a viewer is observing, say, how a monster is approaching a character, the possible arousal in the form of fear is not linked to the personal coping potential of the viewer, the viewer has vicariously to identify with the coping potentials of the endangered film character. The viewer cannot personally come up with specific coping strategies, except – like the rest of the audience - hope for a positive outcome and eventually make some more personal predictions. But a player of a video game is personally responsible for the outcome of such a confrontation. It is the player's evaluation of his own coping potential that determines whether the confrontation with a monster will be experienced as fear (if the evaluation of his coping potential is moderate), despair (if he feels that he has no coping potentials), or triumphant aggression (if he feels that he is amply equipped for the challenge). This entails that the emotional experience will vary over time, due to the learning processes leading to a change in coping potentials. The first time player of a game may feel despair the more experienced player may feel a little fear, whereas the master will feel triumphant aggression. Furthermore, different players will have different emotional experiences, linked to their different expertise, although such devices, like options for playing the game on different levels of difficulty, makes it easier for the unskilled player to get some of the emotional experiences of the more skilled. There is not such a thing as preprogrammed levels of difficulty in film viewing, because the basic assumption in film viewing is that viewing is not an individualized experience, although some films may possess symbolic and enigmatic elements that are not accessible for everybody.

The interactive, output-directed nature of video games put some constraints on the types of emotions that can be elicited by computer games compared with films that are mainly input-driven, driven by the powerful screen representations that viewers passively receive. By its structural emphasis on motor control it is obvious that video games are mostly able to evoke those emotions that are supported by the sympathetic nervous system (fight and flight-related emotions). The typical emotions evoked by video games are related to active coping. The film experience is basically a passive one, although simulation of character actions can provide strong active dimension to film. But many films are centrally aimed at evoking strong passive emotions, like for instance melodramas. The input-driven nature of film makes it easy to cue strong passive emotions, including experiences of fate, and they may evoke strong autonomic outlet, like crying. In contrast, computer games are based on acting out the emotions, and the games may therefore even create some kind of catharsis<sup>39</sup>.

However, some video games also excel in evoking lyrical-associative experiences, closer to emotions supported by the parasympathetic nervous system. Games like *Myst* and *Riven*, but also several adventure games, are experientially based on series of audiovisual 'freeze' frames, pauses, that the player can explore and seek out one by one. Part of the pleasure of such games is therefore not active control of the type exerted in dynamic interpersonal and inter-agency relations (like the control exerted in shoot 'em up-games in which the player in dynamic real time is confronted with

monsters etc. On the contrary, the pleasure of such *Myst*-type adventure and mystery games is partly a series of associative and contemplative situations and feelings, in which the associative processing of the perceptual input is just as important as the motor output. Such static associations cue feelings, that is, general emotional states without specific objects or specific action tendencies, not emotions. Such 'passive' feelings of a mismatch between grandiose input and blocked output<sup>40</sup> were called 'sublime feelings' by the pre-romantic and romantic poets, and the quest for sublime feelings is one of the main parasympathetic reactions cued by computer games, as an alternative to the dominant aesthetics of sympathetic control.

Because the story-development in computer games is driven by the player's motor action, its central story format is linked to first person perspective of the basic story experience. Computer games may also be used as a vehicle for third person stories, driven by curiosity. But third person stories in the computer media have some difficulties in synthesizing the function of player control, player agency, with the 'passive' simulation of third person actions, cued by visual stimuli. In films and novels (third) persons are infused with the life and agency by author and characters, and most readers and viewers will attribute that life to the characters, not to the 'storyteller'. In the computer game it is the job of the player to create 'life' in the third persons, and failure to do so will create feelings of a mechanical lifelessness, eventually perceived as due to the designer and his/her system or as a feeling of insufficiency.

### *Conclusion*

The basic narrative format is a way of arranging perceptions, emotions, cognitions, and motor actions (pecma), based on innate brain modules and with or without a linguistic representation. The narrative mechanisms predate language and even the linguistic forms are (also) cues for reactivations of the pecma-structures. The mental mechanisms are geared to the ecological niche of humans. Narratives presuppose living agents that act and experience in time-space, contrary to other formats of representations, like associative forms, prepositional forms etc. that are often linked to an 'interior', mental niche. Features of the narrative 1. person experience may be represented in different media that each have their specific affordances. In general media representations (including language) affords discursive rearrangements, deviations from canonical forms. Film and computer games afford 1. person perceptions, computer games affords motor interaction, written stories affords complicated deviations from canonical representations etc. The media forms are therefore not only representations but also forms that afford new activities (from circumventing internal memory constraints to enhancing the possibility already latent in fantasy of creating virtual actions and scenarios). The media forms also greatly enhances the possibilities of choosing different levels of representation, from ten minute representations of the history of the universe to fine-grained visuo-motor simulations of actions. It may be difficult to make a lower limit to the phenomenon 'narrative', although most would think that learning quite basic action patterns like those found in 'Tetris' (that lacks an agent-in-time-space dimension) fall below the category narrative.

The basic narrative format is linked to a living agent in a natural environment, and therefore does not presuppose any storyteller except the experiencing agent. Mediated representations may be experienced as 'untold', as a simulation of an experiential sequence, but also as 'told', as a communicative text. The last point of view also implies that the text may be understood as 'art', as a specific communicative strategy among several possible strategies. The basic narrative format is linked to linearity, because significant actions and processes are based on linearity and irreversibility. The linear narrative forms are different from some 'paratelic'<sup>41</sup> phenomena like dancing in which there is reversibility and in which there is no source-path-goal-



schema, and different from associative structures as found in hypertexts with dense nonlinear links. Although a given instantiation of a computer game is linear, a given game 'world' affords many different instantiations. We may thus distinguish between a given game sequence that is linearly narrative and the affordances of the game world (and its representation in the player's mind). that might be called 'meta-narrative' because the player envisions the individual game from a meta-perspective of possibly all the different options and trajectories within the game world. This meta-narrative stance is similar to art appreciation, because art appreciation is based on comparing a given choice of representation with other, possible choices.

Computer games provide personalized experiences that are based on playing (that is: pleasurable *repetitive learning* processes), backed up by emotions that change over time not only due to the events but also due to the development of the learning processes. The subjective experience of non-linear choice is strongly enhanced by the repetitive nature of games that allow different lines of actions in different versions of the same game, contrary to film that chooses one line of action, one narrative out of the virtual options. The experience of agency may over time be constrained by learning the way in which the game world is a designer construct, and thus provide an experience of automation or provide an experience of interacting with designer intentions.

Computer games are furthermore mainly based on sympathetic, aversive emotions, due to its output-driven setup, contrary to films that are input-driven, and thus able to simulate parasympathetic emotions, but also to a certain extent able to simulate output-driven narratives, thus cueing sympathetic emotions.

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<sup>1</sup> Brenda Laurel (1993)

<sup>2</sup> Hugo Münsterberg (1916)

<sup>3</sup> (cf. Grodal 1997):

<sup>4</sup> (cf. Young and Saver 2001)

<sup>5</sup> (cf. Damasio 1999).

<sup>6</sup> (Grodal 2000c).

<sup>7</sup> (Grodal 1997)

<sup>8</sup> Damasio (1999, p.188, passim)

<sup>9</sup> A description of the prelinguistic basis of experiences and thinking may also be found in Fauconnier and Turner (2002).

<sup>10</sup> (cf. *The Cambridge Encyclopedia of Human Evolution*)

<sup>11</sup> cf. Ian Tattersall: *The Monkey in the Mirror* and also Fauconnier and Turner 2002)

<sup>12</sup> (cf. Corballis 1991, Damasio 1993, Fauconnier and Turner 2002),

<sup>13</sup> etc (cf. Bordwell, Thompson 2001, Grodal 1997)

<sup>14</sup> cf. Bordwell 1986, Grodal 1997

<sup>15</sup> cf. Mandler 1983

<sup>16</sup> cf. Grodal 2001),

<sup>17</sup> (cf. Grodal 2001).

<sup>18</sup> . (cf. Fauconnier and Turner 2002, esp. on counterfactuals).

<sup>19</sup> (cf. Mandler 1984)

<sup>20</sup> Joseph Anderson (1996)

<sup>21</sup> Ryan (2001),

<sup>22</sup> (Grodal 1997, 2001)

<sup>23</sup> (e.g. Ryan 2001)

<sup>24</sup> Murray's (1997)

<sup>25</sup> cf. Grodal 2000b),

<sup>26</sup> Murray (1997).

<sup>27</sup> Brenda Laurel (1993)

<sup>28</sup> (cf. Grodal 1997, 2000a),

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<sup>30</sup> (cf. Grodal 1997).

<sup>31</sup> (Bordwell 1986)

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<sup>32</sup> Lakoff's (1987)

<sup>33</sup> Roger Caillois's (1958)

<sup>34</sup> (cf. MacLean 1986)

<sup>35</sup> Bordwell (Bordwell *in press*) has described a group of films that try out different options, different futures, thus telling stories that wind back to a possible point of bifurcation. The experience of such films may however often change from a mimetic to a playful mode. The first version of the narrative is experienced in a more serious, 'existential' mood by the viewers than the following versions, because the viewer feels the playful intentions of the addresser in version two and three (cf. Tom Tykwer *Lola Rennt*). However, if the film's use of multiple futures is based on some supernatural premises, as in Ramis' *Groundhog Day* or *Terminator II*, the viewer may accept alternative versions with the same kind of existential involvement, because they are not playful repetitions any more but consequences of supernatural laws.

<sup>36</sup> Lakoff (1987)

<sup>37</sup> Grodal 1997

<sup>38</sup> cf. Branigan *in press*, Bordwell *in press*

<sup>39</sup> cf. Grodal 2000b

<sup>40</sup> (cf. Grodal 2000d)

<sup>41</sup> (cf. Grodal 1997)