

Time Structures in Interactive Media:  
Videogames as Musical Objects

By David Kanaga

## ABSTRACT

This paper argues in favor of adopting a musical approach to videogame criticism. It claims that in order to come to an understanding of certain time-based aesthetic qualities intrinsic to the medium, it will be helpful to consider the interactions of videogames from a musical perspective. Here, “musical” means the structuring of events in time, rather than anything having to do with the traditional sonic/aural characteristics of music. In this sense, I am placing videogames in a non-aural musical context that is also occupied by dance, film editing, and other time-based arts.

## 1. INTRODUCTION

In 2005, film critic Roger Ebert made a bold claim, famously derided in videogame culture, that videogames are not art and that they never will be. His reasoning was as follows: "Video games by their nature require player choices, which is the opposite strategy of serious film and literature, which requires authorial control. [paragraph] I am prepared to believe that video games can be elegant, subtle, sophisticated, challenging and visually wonderful. But I believe the nature of the medium prevents it from moving beyond craftsmanship to the stature of art" (Ebert). Perhaps Ebert's reasoning is sound, if videogames are to be considered a strictly narrative phenomenon, one in which the meaning communicated is directly related to the "story" of the work--I have yet to play a game that provides a level of narrative satisfaction that even begins to come close to that of any number of linear stories (filmed, written, etc.) which I have enjoyed. However, videogames are not a strictly narrative phenomenon, and Ebert's reasoning as regards, in his own words, "the nature of the medium" fails to acknowledge the ways in which one might find meaning in "player choices," the heart of the medium, the place where it matters most. Videogames are designed to be played, and to ignore the quality of that play could be likened to closing your eyes while watching a movie. Myron Kreuger, a pioneering interactive artist provides us with a succinct observation on this participatory essence of interactive media. He wrote of his pieces that "the visual responses should not be judged as separate art works; nor should the sounds be judged as music. The only aesthetic concern should be the quality of the interaction, which may be judged by general criteria: the ability to interest, involve, and move people, to alter perception, and to define a new category of beauty" (Kreuger). Indeed, if

videogames are to be considered exclusively an extension of narrative media, we might have to wait a long time for otherwise culturally excitable individuals to accept them as works of art; however, if a method for considering the medium can be articulated which focuses on those qualities that are central to its form, in the way that Kreuger describes, then perhaps Ebert and others who share his views might begin to open up to the world of possibilities the still-nascent medium has to offer. This has been attempted before in a number of ways, and here I am presenting a new approach.

The 19th century critic Walter Pater wrote that "all art constantly aspires to the condition of music" (Pater); I believe that considering the ways that videogames, as a microcosm of interactive media at large, aspire to the condition of music can be very helpful in coming to an aesthetic understanding of the participatory heart of the medium. Ebert and other skeptics may benefit from abstracting their understanding of games, to try to understand them as complex time-based play-structures, their interactions exhibiting shared qualities with musical interaction and performance, rather than as subpar narrative structures, exhibiting shared qualities with adolescent power-fantasies. Seasoned gamers and designers may likewise benefit from considering the musical qualities of the medium, in that it may reveal a new realm of aesthetic play which has not been encouraged in many games to date.

Musicality, as regards this essay, is used to mean the structuring of events in time; as such, rhythm and structure, music's most explicitly temporal agents, are the core formal qualities that will be repeatedly applied to analyses of videogame experiences. By observing how musical meaning is created in play-structures, the goal is to understand the abstract aesthetic functions of the organization of a play experience in time; it is my hope

that finding musical meaning in play will help to reveal the sources of a more ineffable kind of ecstasy achieved in play, meaningful moments which are not attached to specific ideologies or narrative themes, but rather those which are moments of a more pure aesthetic quality, a quality of focused perception.

What is a musical approach to games? Rather than considering the actions of a character jumping or a gun being fired as shallow narrative devices or as mere means to a competitive end, a musical approach considers how these actions contribute to the rhythm of play, how they are ways of exploring the compositional boundaries that a game has erected. Similarly, rather than considering prescribed goals as restrictive game elements, counter to true creative play, a musical approach considers the ways in which goals, at their best, invite us to play in new ways that we might not have otherwise, in the same way that different pieces of music invite musicians to play in ways they might not have otherwise. Though most videogames do exhibit musical characteristics, it is necessary to note that they were probably not designed around such principles, and, thus, may not be as musically satisfying as they could be; even in this light, I believe that such an approach is helpful in considering videogames both as they are and as they could be, since enough games have been made that provide substantial amounts of musical interest, and that even the less musically interesting examples still do contain fragments of an underdeveloped musical essence.

From here, I will argue that a musical approach to videogame criticism can be helpful in coming to an aesthetic understanding of videogames because of the ways it identifies particular time-based interactive structures unique to the medium. First, I will identify the context of my argument, and explain why past methods are inadequate in

exploring the aforementioned ideas; next, I will explore the process of *play*, and the ways in which one can interpret and experience it aesthetically; finally, I will touch the tip of the iceberg as regards the ways in which game designers have used and can continue to use musical principles in their works, and why this is a method worth paying attention to.

## 2. CONTEXT AND PRECEDENT

The idea of musical interaction as related to game interaction, while certainly not widely adopted in videogame culture, is also not without precedent; before continuing forward, it will be helpful to consider the context in which the argument has been formulated, and the reasons why previously developed methods are unsatisfactory in accounting for all aspects of its scope.

### *2.1 Participatory Art / Improvisation*

The most obvious and influential precedent of my argument can be found in the tradition of participatory art that has its origins in the second half of the 20th century. In the 1950s and beyond, a number of experimental composers—John Cage, Christian Wolff, David Tudor, Cornelius Cardew, and others—began writing scores in such a way that gave more and more interpretive control to the performer (Nyman). Where a traditional score leaves room for interpretation within the bounds of strictly defined pitches, rhythms and forms, an experimental score may give up control over one or all of those things, leaving them in the hands of the performer. One of the most extreme early examples of this type of score, Earl Brown's "December, 1952" (Brown), consists only of vertical and horizontal lines, scattered across a page, to be interpreted in any way, for any length of time, using any instrument, by any performer. This, and Cage's notorious silent piece, *4'33"* (Cage), in which the performer remains completely silent for the entirety of

the piece (which lasted four minutes and thirty-three seconds at its first performance, but is free to continue for any amount of time), are each essentially invitations to free play, Brown's piece inviting instrumental free-play, and Cage's inviting aural and mental play. Around the same time, Allan Kaprow and others (including Cage) began putting together participatory art events known as "happenings," which asked audience members to become players, as they participated in activities as varied as moving word paintings around a gallery wall (like a giant magnetic poetry set), and collectively licking strawberry jam off of a car in an open field (Kaprow). The Fluxus movement explored similar ideas of event as art, and indeed, Fluxus scripts were often called "scores" or "compositions," as a kind of nod to the (increasingly non-aural) experimental music tradition.

As Noah Wardrip-Fruin notes in *The New Media Reader*, "there is actually a distinct similarity between the language used to describe these pieces and the language now used to describe new media. [This] mid-century language [...] was that of the relationship between the author of the performance score and the performers..." (Wardrip-Fruin), which can then be likened to the relationship under question, that between the author of a videogame and its players. In this sense, the player of a game can be considered a performer of sorts, expressively interpreting the score of the game. The work of these composers and artists is applicable to the argument at hand, not just because of the work they were creating, but also because of the attitude with which they approached it. Where most contemporary videogames tend to consider play as a predominantly goal-oriented process, the work of these artists approached play with an aesthetic sensibility, encouraging a heightened sense of perception at every moment of

interaction, an awareness of the sensuous qualities of the work as well as the aesthetics of process and interaction and the ways in which one functions as a single unit in part of a larger, interconnected system.

There are still artists working today who are exploring and expounding upon the same themes, many of them using software to achieve their goals. Notably, Toshio Iwai is an interactive designer who created the videogame *Electroplankton* for the Nintendo DS, a set of ten goal-less aural musical play environments (Iwai). His work has been a huge inspiration in my developing ideas of musical play. Golan Levin, another interactive designer, has also produced a number of inspirational works utilizing designs which I would argue encourage a sense of aesthetic free play; his master's thesis researches the “design of systems for the simultaneous performance of graphics and sound,” a description which could be likewise used to define videogames (Levin). These artists are part of a larger community of software artists who, though they may not explicitly acknowledge the musicality of their work, nevertheless seem to be exploring similar ideas to those discussed here.

Indeed, such work provides many insights into the nature of interactive software; the main thing that it lacks is the wide distribution model that videogames have. Many software art projects exist for a short time only, and exclusively in installation form at museums, which makes them difficult to experience firsthand for a mass audience living outside of metropolitan cultural centers. Furthermore, most of the projects seem to focus on only one type of interaction, whereas commercial videogames tend to use a variety of interactions, composed together to create a more substantial whole. Thus, while the field may provide insight into the form of software, it seems distinctly removed from the realm

of videogames, which explore similar themes, but over longer stretches of time and in the comfort of one's own home.

## *2.2 Game Studies*

The academic field of game studies has investigated a number of issues relevant to the topic at hand. For some time now, numerous scholars have been formulating different critical methods concerned with the ways in which videogames create and communicate meaning. Just as I am interested in how games can create musical meaning, others have likewise approached videogames with a solid reference point in old media: notably, narratology studies videogames as an interactive narrative form (Murray), Ian Bogost's notion of "procedural rhetoric" examines the expressive computer processes of videogames as they exist in the argumentative tradition of classical and contemporary rhetoric (Bogost), and Mary Flanagan's theory of "critical play" considers the ways in which designing play spaces can be a kind of social activism (Flanagan).

Most pertinent to my argument is the method of ludology (Frasca, Salen and Zimmerman, et al.), which considers the formal systems of videogames as part of the non-digital game tradition (board games, sports, etc.). Of the available methods, this is the only one that favors abstraction over representation in approaching videogame forms; that is to say, it considers rules, mechanics, and play rather than narrative elements. The ludological framework is, for the most part, a very helpful way of formalizing an understanding of videogames, and is probably closest to my own proposal, in the way that it examines the form of the player in a feedback loop with the game's internal structure, essential to an understanding of the unique form of videogames. However, it has one main problem: by rooting the method in studies of qualities that are also

exhibited by non-digital games, it neglects to address certain essential time-based elements which are unique to videogames.

### *2.3 Popular Culture*

Finally, it is important to acknowledge the popular cultural status of videogames today. They are, for the most part, a commercial medium driven by predominantly financial concerns. As such, it goes without saying that the wants of the marketplace play a large role in deciding the types of games that end up being made. In this light, one of the major problems with the industry today is just how focused its market is. In a recent Gamasutra article (a major games industry web source), Chris Remo noted: "Games tend to resolutely and aggressively target the 18- to 34-year male. If you aren't trying to capture as much of that audience as you possibly can... you aren't in step with the industry" (Remo 2009). Though the release of the Nintendo Wii and iPhone platforms, amongst other things, has added a certain amount of breadth to an otherwise narrow market, the games industry still has not achieved the type of saturation that other media like film or recorded music have, where just about everyone is a consumer to some degree, even if they have markedly different preferences. Given this state of affairs, it seems unlikely that the industry at large would be at all interested in adopting an admittedly abstract musical approach to understanding videogames. However, I would argue, to the contrary, that the musical metaphors and methods which follow can help to articulate a major selling point in many games that otherwise can only be described subjectively, and also that the still-expanding games market will surely come to include creative players who are most interested in an aesthetic approach to play, something which can be encouraged by musically-minded game designs. The first point should be

made clear by my use of commercial game examples throughout the paper; the second point is speculative, but has precedence in the unforeseen popularity of fairly experimental titles which encourage creative free play, like *The Sims* (Wright) and others. Indeed, though the games industry may be reluctant to adopt a musical approach to their medium, it seems that, nevertheless, such an approach could be helpful in articulating a certain element of games that players find enjoyable, and also by finding a new market with buyers who otherwise would not be interested in playing games.

### 3. PLAY

I would claim that musical play is more aesthetically meaningful than game play; however, this means nothing without an adequate understanding of the two terms, “aesthetics,” and “play.” How might we qualify something as aesthetically meaningful? What is play? How do videogames structure play and how are these structures related to those of sonic (traditional) musical play?

#### *3.1 Aesthetic Play*

There are a number of common uses of the word “aesthetic,” which often treat it as synonymous with the beautiful qualities or style of an object, but I am more interested in applying its original definition which is concerned with experience itself (Dewey); indeed, the term is derived from the Greek word *aisthesis*, meaning "perception." D.W. Gotshalk defines the aesthetic experience as "intrinsic perception, or attention to an object or field preeminently for the apprehension of the full perceptual being and value of the object or field." He elaborates, "Intrinsic perception is simply perception given major scope, depth, and dignity" (Gotshalk). That is to say: an aesthetic experience is one of deep focused perception for its own sake. The mode of perception itself is variable--it can

be one of *seeing*, or of *listening*, or *tasting*, etc. Here, I am interested in the aesthetic experience of *playing*. Specifically, I am interested in how approaching *play* from a musical perspective differs from approaching it from a ludological (game) perspective, and how the former encourages a more focused mode of perception, perception for its own sake.

The greater sense in which I use the word "play" is as broad as its common uses suggest. Game scholars Katie Salen and Eric Zimmerman define play as "free movement within a more rigid structure" (Salen & Zimmerman). Using this definition, play can be used to describe a great variety of things: game play, improvisatory child's play, musical play, physical play, gambling, the play of war, etc. (Huizinga). Though all of these things do indeed qualify as play, I am interested in encouraging a specific type of play that play scholar Brian Sutton-Smith would describe as appealing to the "rhetorics of the imaginary," and what I would call "aesthetic play." Sutton-Smith identifies the status of play in the Romantic movement of the 19th century: "By making play essential to the aesthetic, and by attributing moral power to the aesthetic, play was potentially dignified for the first time in Western civilization" (Sutton-Smith). Perhaps this sentiment is best expressed by the poet Friedrich Schiller who wrote that "Man plays only when he is in the full sense of the word a man, and he is only wholly a Man when he is playing" (Schiller). Indeed, I am proposing a return to these Romantic notions of play: play as a creative act, play as emotionally and spiritually transformative.

### *3.2 Play Structures*

Videogames themselves are not playful objects; rather, they are the "more rigid structure" of our *play* definition, a set of boundaries functioning as a possibility space

within which "free movement" may occur. Boundaries are the raw materials of meaning-making in videogames, yet they do not create meaning in-and-of themselves; rather, it is the exploration of boundaries (the play) by the player that creates true aesthetic meaning. Boundaries are in no way unique to the medium; architects, law-makers, teachers, toy designers, utilitarian software programmers, authors of style guides: all of these individuals likewise practice the art of designing boundaries within which users (players) have freedoms. Numerous examples of thinking in these disciplines have rightfully been inspirational to many game designers, as the ideas used by all are dealing with similar structures and interface concerns on a certain level. That said, videogames are different from the products of many of the aforementioned disciplines in a significant way: they are designed for art/entertainment, rather than for utilitarian purposes. Because of this, the boundaries constructed in videogames need not strive for maximum functionality; rather, they can strive for maximum expressivity. This puts the function of videogames more in line with that of literature, music, or film: the exploration of aesthetic meaning.

There are two types of boundaries that can exist in play-structures: artificial boundaries, and absolute boundaries. The distinction is important to be made as concerns the musical ideas of composition and improvisation, and their relationship to videogame play. Artificial boundaries are those that require the suspension of disbelief, a willing choice to acknowledge and be contained by the boundaries; another word for artificial boundaries is *rules*. For example, in a game of badminton, if a player hits the shuttlecock too far (outside of the delineated boundary), the opposing player gains a point; this is an artificial boundary, since there is nothing preventing the players from hitting as far as they like, except their agreed-upon desire to follow the prescribed rules. Artificial

boundaries can be ignored. Absolute boundaries are those that do not require the suspension of disbelief, since they are generally physical truths, or, in the case of videogames, coded truths. For example, in a game of badminton, the feathers on the backside of the shuttlecock combined with the limitations of the human body create an absolute boundary that prevents the shuttlecock from being hit past a certain point; though here the absolute boundary is different for every player (depending on their strength and skill), it is still absolute for each individual in the sense that it cannot be ignored, that it must be accepted. The word used to describe our available methods with which we can explore absolute boundaries is *mechanics*, “methods invoked by agents for interacting with the game world” (Sicart).

All of the designed objects considered at the beginning of this section deal with both of these types boundaries to different degrees. Buildings create absolute spatial boundaries; laws create artificial boundaries; toys create absolute physical boundaries, sometimes with implied artificial boundaries. In all of these cases, the established boundaries are static for the most part, meaning that they don't change. Artificial boundaries, like laws, may change slowly over time as people agree on a new set of conventions, and absolute boundaries, like the walls of a building, may be changed abruptly by physically altering the object (breaking down the walls), but, for now at least, these kinds of changes are the exceptions rather than the norms.

As play-structures, videogames are unique in that they can present us with dynamic boundaries, meaning boundaries which change over time. This, a changing possibility space, will later be discussed in greater detail as one of the essentially musical qualities of game play. Also, videogames are unique in that their artificial boundaries, the

rules which must be followed for a player to win/complete the game, can be completely ignored without bringing the player out of the game world; this aspect of the videogame form allows, and incidentally encourages, a more free approach than other forms in which ignoring artificial boundaries destroys the agreed-upon play experience for its participants. This possibility for complete freedom within absolute boundaries contributes greatly to the opportunity for aesthetically meaningful play.

### *3.3 Musical Play and Game Play*

In musical play, a player is anyone who is playing music; she is able to move freely within the more rigid structure of both her instrument and the composition. The definition of this type of player is nearly identical to that of the player of a game, who is able to move freely within the more rigid structure of the code, which musically functions as both instrument and composition. An instrument is a set of absolute boundaries given to the player; the player may achieve strange new beautiful sounds that have never before been heard, but no matter how unique, these sounds are always encompassed by the possibility space of the instrument, which is limited only physically, not artificially. The capabilities of the instrument are the equivalent of the mechanics of a videogame, in that they both provide the structure of the absolute possibility space. A composition is a set of artificial boundaries functioning as a possibility space for the player; the player may do whatever she pleases within these rules, and within the boundaries of her instrument, and that is the extent of her freedom. The composition of a videogame, in the sense that it is artificial, is its goal; for games with no defined goal, as with freely improvising instrumentalists, the composition is created by the player, and it may change as often as she wishes.

## 4. DESIGNING FOR MUSICAL PLAY

In the previous section, we considered some of the ways in which a player can approach videogame play through an understanding of the types of boundaries it shares with musical play; here, we will look at specific examples of those boundaries, ways in which a game's author can structure a changing possibility space designed to encourage a musical style of play.

### *4.1 Changing Possibility Spaces: An Example*

Again, a videogame's possibility space is defined by its absolute boundaries. One of the unique characteristics of the videogame medium is its ability to create complex structures of changing possibility spaces. To illustrate this uniqueness, let's imagine a non-digital happening, structured as a sort variation on Cornelius Cardew's "Paragraph 7" of *The Great Learning*, an experimental piece of music that calls for a similar process (Cardew):

Any number of people enter a room. They all pick a random pitch and begin to sing it; after taking a breath, they listen and begin to sing a new pitch that they hear around them, one that is already being sung by another singer; eventually (naturally), they all land on the same pitch. At the same time, the singers should be painting the walls, with each pitch corresponding to a distinct color; accordingly, at the beginning of the event, the walls will be a multi-colored mess, and at the end, they will all be the same color.

A few aspects of this happening create some practical problems. How will the colors be matched to the initial pitches, which are chosen randomly? How will the players change the color they are painting with quickly enough to not slow down the

action? How can we ensure that, after the first random pitch, the players choose a pitch that is already being sung by another, rather than accidentally singing a new random one? These are problems that make this a very impractical event to organize in non-digital space (if precision is considered important); however, in a videogame they could all be very easily solved. Every pitch could be mapped to a color value, which the player would automatically be given the power to paint with upon choosing that pitch. Thus, it would take no time to switch colors, and indeed, players wouldn't even have to think about colors, but rather just experience them. Also, as more players started singing the same pitch, the pool of pitches possible to sing would grow smaller, making it actually impossible to sing a new random pitch. At the end, when everyone is singing the same pitch, it would be impossible, absolutely rather than artificially, to sing a different one. The computer would essentially take care of the rule following, leaving only the burden of expressivity to the players.

#### *4.2 Designing Rhythm*

Just as the above hypothetical happening provided an example of how a changing possibility space can provide a sense of musical form in play, so too, faster changes of possibility space, all the more common in videogames, can provide a sense of rhythm in play.

Rhythm is the driving force of music, that which creates an immediate sense of forward-motion in time. The different rhythms of a Mozart minuet and a Steve Reich tape piece each communicate to us a distinct sense of time. For our present purposes, rhythm will be defined as the placement of events in short stretches of time; the character, or feel, of the rhythm is determined by the amount of time between events. In the context of

videogames, the events placed are the actions of a player, the placement being determined by the player during the process of play. Rhythm of some sort is present in all videogames; whether it's the frantic button-mashing of a shmup (like *Space Invaders*), the cautious pulse of keeping mario from sinking while he's swimming in *Super Mario Bros.*, the meditative pauses of a game of online chess, or the quantized grooves of *Rez*, all videogames use rhythms in one way or another. The possibility of rhythmic action gives the player an essential sense of immediate agency; indeed, even strictly linear games, offering little to no structural freedom, are often revealed to be beautifully designed compositions, provided the player's rhythmic freedoms are adequately engaging. As a way of exploring the uses of rhythm in videogames, I have divided organizational rhythmic strategies into two categories: free rhythm, and metrical rhythm.

#### *4.2.1 Free Rhythm*

Free rhythm is the most common rhythm of play, and, incidentally, the least common type of rhythm in recorded and performance music; these assertions are both true because free rhythm is that which most accurately represents the rhythms of natural experience, rather than those of the common conception of musicality. An example of free rhythm is the jumping command in any platform game, or the shooting command in a shooter; actions that are direct responses to a player's input. Most people would not consider these rhythms "musical" in a traditional sense; many would not even consider them proper rhythms at all. However, rhythms they are, and though they are free, they nevertheless exhibit unique composed qualities in all games that use them. Speed, or loose tempo, is the key factor to be aware of in considering the character of free rhythmic play. Although games may not present the player with a consistent pulse, they usually

suggest a looser pulse of one kind or another. Such a pulse can be suggested by the presence of both artificial and absolute boundaries.

Artificial boundaries can suggest pulse in the ways that they present the player with a series of desirable conditions, or temporary goals, over a short period of time. A good example of this is the placement of enemies in world 1-1 of *Super Mario Bros.* Here, the action is not meant to be too intense, and so the design suggests a fairly moderate tempo of play, regularly presenting the player with goombas and koopa troopas to jump over or on, but not so regularly that quick successive jumps are ever required. Such a temporal presentation of challenges encourages moderate play rhythms. Consider, in contrast, almost the whole of world 8-3, and its hammer brothers. Here, the endless barrage of hammers being thrown at the player necessitates the improvisation of a quick dance-like series of runs and jumps if she wishes to reach the endgame state. The tempo here is faster. In the sense that these rhythms are suggested by artificial boundaries, they are only revealed to players who are playing with some sense of a goal; they can likewise be ignored by those who are uninterested in winning, though in many cases, that will result in an endgame state.

Absolute boundaries can suggest pulse in the ways that game mechanics are structured temporally, in the ways that objects respond to the player's actions, and also in the spatial construction of the game world.

An example of a mechanic's temporal structure is the triple jump in *Super Mario 64*. To execute the move, the player must jump once, jump a second time immediately after landing, and jump a final time immediately after landing the second jump. The pulse of this mechanic is dictated by the amount of time Mario spends in the air, during which

the player is unable to execute any further actions. It is not a consistent pulse, but rather a gradually slowing one, a kind of *ritardando* in play. Though not as composed or complex, in a shooter, the amount of time a player must wait after firing a shot before firing the next also provides loose pulse through the time structure of a mechanic.

An example of an object's response creating a sense of rhythmic pulse is the placement of bumpers in the *Sonic the Hedgehog* games. When a player allows Sonic to touch a bumper, he is abruptly bounced back in the direction he came from, which temporarily takes away the player's sense of rhythmic agency, in the same way as does the time-mechanics of a jump. Likewise, in many games, being hit by an enemy momentarily stuns the player character. This is a major rhythmic device as regards composing possibilities for play; even if the player is fairly limited in the mechanics she is given direct access to, objects can always be added which provide new, interesting interactions.

The element of space in videogames gives the player opportunities for musical play in the same way that real-world architecture can be considered, in the words of Goethe, a kind of "frozen music." To once again use *Super Mario Bros.* as an example, consider the spatial design of the first underground level, world 1-2. To complete the level requires a combination of jumping over bottomless pits, breaking blocks to clear a space, and jumping onto moving platforms. All of these spatial elements, though they do assume that the player is bound by the artificial goal of trying to complete the level, or at least a personal goal of seeing all the level has to offer—all of these spatial elements create a kind of gymnastic playground requiring certain actions in order to move from one place to another.

#### 4.2.2 Metrical Rhythm

Metrical rhythm is that precise kind of toe-tapping rhythm which most people would consider "musical" in a traditional sense; it is generally locked into a set tempo, and either pulses regularly, or else grooves freely within a rigid subdivision of time. I call it "metrical" after the meters, or time signatures, of most traditional forms of music, which are the devices used to divide time evenly into a number of beats. Metrical rhythm is used primarily in self-described "music games," both as a non-interactive kind of interactive score, and as a tool of player-quantization, a device which "snaps" the player's "free movements" into the "more rigid structure" of the meter; it is also used, in many ways to greater effect, in other genres which contrast the tight repetitions of meter with the loose realism of free rhythm.

The most ubiquitous kind of metrical rhythmic play is that of the rhythm action game. In games of this kind, like *Dance Dance Revolution*, *Pop'n Music*, *Guitar Hero*, and *Rock Band* (all of which use the same play structure), the player is presented with a cascading stream of spatial rhythms on screen which, at just the right moment, must be interpreted as a play-rhythm (Harmonix Music Systems 2005, 2005; Konami 1998a, 1998b). What these games essentially give us is a dynamic notation system, a structure made up of mostly artificial boundaries (the composition--here, the song structure), with very little respect for the established absolute boundaries, which, indeed, do have potential in some of these cases. The experience of these games is a kind of play which is so removed from the creative process as to be almost aesthetically meaningless as a play opportunity; the only agency the player is given is that of rhythmic input, and the only opportunity she is given to pursue with said input is the task of following the rules. It is

ironic that these games are what many would consider to be prime examples of designs allowing for musical play in videogames; the rigidity of the structures hardly allow for any of play's necessary "free movement," such a lack of play making the experience really more mechanical than musical.

A more free kind of metrical rhythm experience is that of quantized play, as used in games like *Rez* and *Space Invaders Extreme* (Mizuguchi, Taito). In this type of play, the player has the same rhythmic freedom as she does in free rhythm games; however, instead of the system's output occurring as an immediate response to the player's input, it waits to respond until the next subdivision of the set tempo, often a quarter of a beat (sixteenth note), to respond. In this way, the player is given the impression that all of her actions fall perfectly into rhythm with the pulse of the game; incidentally, such a structure often encourages further play to be considered explicitly rhythmically, the input often being treated as a small set of drums. There is a kind of freedom in this, though locked into the rigid tempo, and it might look like this: --\*---\*\*\*\*--\*---\*\*---\*\*, supposing the dashes represent the game's consistent timekeeping, and the asterisks represent the player's free quantized input. Of all types of play rhythms, this is probably the type that is most effective in getting the widest selection of players to freely play the game as they would a piece of music.

The last kind of metrical play is that which happens in the context of free rhythms; for this reason, it is imbued with a greater sense of agency--in the context of rhythmic freedom, metric pulse can provide a sense of musicality more akin to that of an instrumentalist who chooses to play in time, though she could just as well choose otherwise. An example of this type of play can be found near the end of *Portal* (Swift, et

al.). The core mechanic of the game is the ability to shoot two different colors of “portals” onto surfaces around the game space; when a player enters one, she comes out the other, as if it were a door to another room. For instance, one portal could be shot onto the ceiling, and another directly beneath it on the floor. If the player entered the floor portal, she would fall through from the ceiling, and back through the floor, looping indefinitely. This itself is a kind of metrical rhythm, establishing a consistent pulse of falling. Near the end of the game, the player is asked to reach a high point in a very tall room, and she must use a technique the developers call “flinging” (ibid.) to get there. Flinging is what happens when a player falls through a portal and the effects of gravity from one space carry over to the next. In this tall room, the player must fling repeatedly, falling through a portal on one surface, to be propelled upwards out of a portal on another; when at the apex of her fall/ascent, the player must shoot a new portal on a higher platform that she can be once again be flung out of to reach an even higher position. The end result of this artificial goal combined with the absolute boundary of the portal mechanics is one of the most balletic experiences any game has offered to date, creating a free-falling pulse which must be felt rhythmically in order to progress, yet which doesn’t limit the agency of the player as the aforementioned rhythm action games do. By inserting a metric pulse in the midst of free rhythmic play, the pulse itself is felt as an act of agency, the rhythm a musical product of player choice.

#### *4.3 Why Design in Time?*

When artists speak about working with the “grain” of a given medium, they are referring to the process of taking advantage of what comes naturally to that medium. Chris Crawford wrote in his classic game design reference that the grains of computer

games that should be worked with are their natural processing abilities and, following this naturally, emergent game play, which can be succinctly described as kinds of play that the designers couldn't have predicted. The rhythm metaphor provides access to another "grain" of the medium—processing in time. When Crawford wrote his book in the early 1980s, the capabilities for real-time interaction were not as strong (though they were evident) as they are now. Exploring this grain, which has gone underexplored so far, can provide insights into the nature of the medium, exploring ideas from a musical perspective, where Crawford and others have mostly focused on the ludological.

## 5. CONCLUSION

The ideas presented here only begin to touch on the significance of a musical approach to videogames. Just as I discussed videogame play as it is structured by artificial and absolute boundaries, it could likewise be very helpful to explore scored pieces of music using this same method to consider the ways in which game design can learn from the work of experienced composers who have a greater level of experience creating structures in time. Moreover, just as I discussed rhythms of play briefly, much more could be done on the topic, including descriptions of procedural rhythms, which may not fall into the free rhythm or metric rhythm category. The long-form structure of videogames, from beginning to end, was also ignored in this essay, the study of which could provide a good jumping off place for exploring changing possibility spaces on a larger scale as they relate to traditional musical forms.

The most important kind of research remaining to be done regarding musicality in videogames is in the field of game design itself. Where I have identified in writing the formal qualities of rhythm and structure, a designer could identify them using the

medium itself, and articulate them further by making all game elements subservient to the creation of musical meaning.

Hopefully, by addressing some of these issues, the reader came to understand a new abstracted approach to considering the videogame medium. Computer technologies and software surround us, and they have the power to be used for expressive purposes just as much as they do for utilitarian purposes. It is my hope that one day, more of the cultural consumers who are currently only interested in what we would now consider the canonized art forms will also be interested in the expressive potential of videogames. Although most forces in game culture seem to think that the way this connection might be breached is through deeper storytelling, a seemingly futile attempt to bring videogames closer to film and literature, I believe that the participatory nature of the medium necessitates groundbreaking works be designed explicitly around that quality. Games have existed for most of human history, as has music; though they are both examples of structured play, the latter has proven to be a greater force in aesthetics than the former. If we can learn from the ways that participation is meaningful in musical play, then perhaps we can begin to appreciate videogames for a different reason, one which values creativity in the ways it inspires aesthetic play, one which inspires transformative experiences in both the player and the designer.

#### Works Cited

##### Written Works:

Bogost, Ian. *Persuasive Games: The Expressive Power of Videogames*. Cambridge: MIT Press, 2007.

Crawford, Chris. *The Art of Computer Game Design*.

- <http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html>  
(originally published in 1982)
- Ebert, Roger. "Answer Man" (Nov 27, 20005). <http://rogerebert.suntimes.com/apps/pbcs.dll/section?category=answerman&date=20051127>
- Flanagan, Mary. *Critical Play: Radical Game Design*. Cambridge: MIT Press, 2009.
- Frasca, Gonzalo. "Ludologists love stories, too: notes from a debate which never took place." 2003
- Gotshalk, D.W. *Art and the Social Order*, 2nd ed. New York: Dover, 1962.
- Huizinga, Johann. *Homo Ludens: A Study of the Play Element in Culture*. Boston: The Beacon Press, 1955
- Kaprow, Allan. *Essays on the Blurring of Art and Life*. Expanded Edition. Berkley: University of California Press, 2003
- Krueger, Myron. *Artificial Reality II*. Reading: Addison-Wesley, 1991.
- Murray, Janet H. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Cambridge: MIT Press, 1997.
- Nyman, Michael. *Experimental Music: Cage and Beyond*. Cambridge: Cambridge University Press, 1974.
- Pater, Walter. *The Renaissance*. <http://www.gutenberg.org/files/2398/2398-h/2398-h.htm>  
(originally published in 1873)
- Remo, Chris. "IGDA Forum: Asking 'Why' Will Keep Games Out of the Ghetto, Says Hecker." [http://www.gamasutra.com/php-bin/news\\_index.php?story=26077](http://www.gamasutra.com/php-bin/news_index.php?story=26077) 2009.
- Salen, Katie, and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Cambridge: MIT Press, 2004.

Sicart, Miguel. "Defining Game Mechanics," <http://gamestudies.org/0802/articles/sicart>.  
2008.

Schiller, Friedrich. *On the Aesthetic Education of Man* (1795), trans. R. Snell. New York, Frederick Ungar, 1965.

Sutton-Smith, Brian. *The Ambiguity of Play*. Cambridge: Harvard University Press, 1997

Wardrip-Fruin, Noah. "Experiments in Art and Technology: Introduction." From *The New Media Reader*. Cambridge: MIT Press, 2003.

Musical Works and Videogames:

Brown, Earl. *December, 1952*. 1952. (score)

Cage, John. *4'33"*. 1952. (score)

Cardew, Cornelius. *The Great Learning*. 1962. (score)

Harmonix Music Systems. *Guitar Hero*. Red Octane, 2005. (Playstation 2)

Harmonix Music Systems. *Rock Band*. Electronic Arts, 2007. (Xbox 360, etc.)

Iwai, Toshio. *Electroplankton*. Nintendo, 2001. (Nintendo DS)

Konami. *Dance Dance Revolution*. Konami, 1998a. (Arcade)

Konami. *Pop'n Music*. Konami, 1998b. (Arcade)

Miyamoto, Shigeru. *Super Mario 64*. Nintendo, 1996. (Nintendo 64)

Miyamoto, Shigeru. *Super Mario Bros*. Nintendo, 1985. (Nintendo Entertainment System)

Mizuguchi, Tetsuya. *Rez*. Sega, 2001 (Dreamcast)

Swift, Kim, et al. *Portal, with Developer's Commentary*. Valve, 2007. (PC)

Taito. *Space Invaders Extreme*. Square-Enix, 2008. (Nintendo DS)

Wright, Will. *The Sims*. Electronic Arts, 2000. (PC)

Yasuhara, Hirokazu. *Sonic the Hedgehog*. Sega, 1991. (Genesis)