CHAPTER TWO

Three Kinds of Everywhere: The Multiple Genres of Ubiquitous Play and Performance

> *In the case of ubiquitous computation… people are still trying to find the loose verbal grab-bag just to put the concepts into. So I would argue that this work is basically a literary endeavor. When it comes to remote technical eventualities, you don't want to freeze the language too early. Instead, you need some empirical evidence on the ground, some working prototypes, something commercial, governmental, academic or military. Otherwise you are trying to freeze an emergent technology into the shape of today's verbal descriptions. This prejudices people. It is bad attention economics. It limits their ability to find and understand the intrinsic advantages of the technology…. So language is of consequence. Those of us who make up words about these matters probably ought to do a better job.*
>
> –Technologist Bruce Sterling, "The Internet of Things"

> *What's the name of the game?/ Does it mean anything to you?*
>
> – Pop group ABBA, "The Name of the Game"

2.1 Contentious Terms and Consequential Language

When the Institute of Electrical and Electronics Engineers (IEEE) published its first issue of *Pervasive Computing* in 2002, new editor-in-chief Satyanarayanan Mahadev pronounced: "This magazine will treat *ubiquitous computing* and *pervasive computing* as synonyms—they mean exactly the same thing and will be used interchangeably throughout the magazine" (3). This announcement, a kind of pre-emptive strike against semantic debate, was an attempt to address the considerable variation in nomenclature already then apparent in both developers' and researchers' work in the emerging field. As Adam Greenfield, author of *Everyware: The Dawning Age of Ubiquitous Computing*, has argued, it is possible to trace significant differences in the goals and methodologies

surrounding the original coining of, and early allegiances to, 'ubiquitous' vs. 'pervasive' computing, and other related terminology. Greenfield writes: "Each of the terms in use—'ubicomp,' 'pervasive computing,' 'tangible media,' 'physical computing,' and so on—is contentious. They're associated with one or another viewpoint, institution, funding source, or dominant personality" ("Hiding in Plain Sight" [4]). But simply because it is possible to identify these originary allegiances, must we actively preserve them? Technologist Max Goff counters: "Many authors do not distinguish between 'pervasive' and 'ubiquitous' when it comes to computing visions; even Mark Weiser used the terms synonymously" (65). Accordingly, rather than argue the merits of one term over the other or privilege a particular historical viewpoint or institution, *Pervasive Computing* magazine accepted the terms 'pervasive' and 'ubiquitous' as equally valid and perfectly synonymous. As a practical matter, so too have most researchers and developers: in the past five years, there has been no official discussion over the terms' semantic differences or respective rhetorical merits in the proceedings of any major ubicomp conference or in the published literature of either the IEEE or the Association for Computing Machinery (ACM), the two leading research organization in the field.

Strictly speaking, of course, as English-language words 'ubiquitous' and 'pervasive' are not perfect synonyms. What nuances in design philosophy and development strategies might be lost by treating them as such? Here it is helpful to consider the following pairs of related definitions, all from the American Heritage Dictionary of the English Language. First, *ubiquitous*: "Being or seeming to be everywhere at the same time; omnipresent," with its synonym, *omnipresent*: "Present everywhere simultaneously." And second, *pervasive*: "Having the quality or tendency to pervade or permeate," with its active form

permeate: "1. To spread or flow throughout. 2. To pass through the openings or interstices of: as in, liquid permeating a membrane." Although clear affinities exist between these two sets, so does one powerful distinction. 'Ubiquitous' and 'omnipresent' suggest a stable environment, in which the ubiquitous or omnipresent thing is always already there. These words do not indicate movement or manifestation; they have, instead a kind of passive aspect. We can contrast this *always already* quality with the terms 'pervasive' and 'permeate,' both of which share a *becoming* quality. Their definitions suggest a highly active process of spreading and flowing, especially when there are occasions of rupture in boundaries. 'Ubiquitous' says nothing of boundaries; the concept of borders is less relevant when whatever is ubiquitous has located itself successfully in every possible space. 'Pervasive', on the other hand, very much recognizes boundaries. It associates itself with their active dissolution or rupture.

While the larger field of ubiquitous and pervasive computing research may find it a practical solution to elide these differences, I want to suggest here that there may still be significant critical benefit in acknowledging the two terms' distinct connotations in the area of gaming. What might we come to understand about the state of networked play at the turn of the twenty-first century by using the terms more intentionally—for example, to distinguish between projects that strive to create persistent, *always already* gaming infrastructures (what we could more carefully call, according to the above definitions, "ubiquitous" games) and projects that aim to construct more mobile, intermittent infrastructures, emphasizing the *active*, and frequently *disruptive*, transition to gameplay (what we could more meaningfully term "pervasive" games)? Furthermore, if we are making an effort to apply names more strategically, what might we learn by

differentiating between projects primarily concerned with advancing the state of ubiquitous computing research through the medium of games (a category we might describe as "ubicomp" games) and projects inspired by the ubicomp design *philosophy*, but not necessarily interested in deploying ubicomp *technologies* as the means to enacting that philosophy?

Such distinctions are not being made at present. Like the effectively merged fields of ubiquitous and pervasive computing, both theorists and practitioners interested in the rapid expansion of real-world platforms, social environments, and everyday contexts for play have taken to using *pervasive gaming*, *ubiquitous gaming* and *ubiquitous computer gaming* interchangeably. It is not unusual, for example, to encounter a designer or researcher speaking of the same work as pervasive in one context and ubiquitous in another.[1] A survey of the terms' usage among the most prolific writers and designers in this space confirms this practice. Games research and development team Staffan Björk and Jussi Holopainen, for instance, variously use "ubiquitous computing games" (at the Third International Conference on Ubiquitous Computing, for example), "ubiquitous gaming" (in the *Journal of Personal and Ubiquitous Computing*'s "Special Issue on Ubiquitous Games") , and "pervasive games" (for the pervasive panel at the First International Conference of the Digital Games Research Association). Digital theorist and artist Julian Bleecker alternates between "ubiquitous games" (at the Seventh International Conference on Ubiquitous Computing, for example) and "pervasive electronic games" (at the Fourth Emerging Technologies Conference), while computer

[1] Indeed, I myself have used both "pervasive gaming" and "ubiquitous gaming" in previous publications, conference presentations and lectures to describe the same projects, without making a clear distinction between the two terms. My own previous work, then, has contributed to the problem of semantic fuzziness I wish to address with a more rigorous approach to naming conventions in this space.

scientist Matthew Chalmers describes his projects as both “pervasive games” (at the Fourth International Conference on Pervasive Computing, for example) and “ubicomp games” (at the ACM SIGGCHI International Conference on Advances in Computing Entertainment).

It seems clear from these examples that context, rather than implied differences in the subjects discussed, is the primary influence on which term is applied where—a workshop at a conference that identifies its subject as “ubiquitous computing” is more likely to attract talks on “ubiquitous games” or “ubiquitous computing games”, while a conference on “pervasive computing” is more likely to attract papers on “pervasive games”. A particularly telling and recent instance of this context-specific, rather than content-specific, naming involves two papers presenting the same research under alternate classifications: “Gaming on the Edge: Using Seams in Pervasive Games” (authors Matthew Chalmers, Marek Bell, Barry Brown, et al), which was presented at the 2005 International Workshop on Pervasive Games, and “Gaming on the Edge: Using Seams in Ubicomp Games” (authors Matthew Chalmers, Marek Bell, Barry Brown, et al), which was presented at the 2005 ACM SIGCHI Conference on Advances in Computer Entertainment. Here, the terms are employed not for their semantic distinctions, but rather for their rhetorical effect. Choosing the right term signifies relevance to a particular audience or publication. In a December 2005 conversation with Bleecker about the emerging field’s difficulty settling on a single name, I asked him about the common practice of using ‘pervasive’ and ‘ubiquitous’ synonymously according to the intended audience. He stated: “I personally use whichever term helps align the talk or workshop

with the larger conference or theme…. As far as I can tell, we're all talking about the same thing, right?" ("Personal Interview" 12/28/2005)

But I want to suggest that the field is not nearly homogenous enough in its goals, preferred platforms and design strategies to warrant such casual interchangeability of terms. I believe, instead, that attending to the traditional semantic variations between 'ubiquitous' and 'pervasive', as well as distinguishing between ubicomp design *practice* and ubicomp design *philosophy*, will provide substantial critical leverage in exploring difference across projects that have been conducted to date at the intersection of the fields of ubiquitous computing and experimental game design. In this chapter, I will suggest that three distinct pairs of design philosophies and aesthetic practices have emerged at this particular techno-historical juncture: what I will refer to as *ubicomp gaming*, *pervasive gaming*, and *ubiquitous gaming*. While all three of these terms are already widely used in both the ubiquitous computing and game studies literature, I want to make them do more specific work. Allowing each term to represent its own set of research aims, artistic intentions, and social impacts will enable us to recognize significant divergences in the field, divergences that often go unnoticed simply because the language that could be used to name them has been stripped of its ability to mark difference.

I want to be clear here: I do not intend these newly differentiated terms to be proscriptive for future design, or even necessarily to last as critical tools for examining contemporary work in the coming decades of gaming. I cannot say whether they will serve as genre distinctions of any long-term usefulness; rather, I am proposing them as historically specific tools. I am interested in mapping a range of experimentation at the turn of the twenty-first century, and I want to mark the differences in this range now in

order to note and to preserve the heterogeneity of impulses and strategies across this experimental design space. I have no doubt that current computing technologies, the metaphors they map onto their human users, and the aesthetic practices they inspire will continue to evolve as dramatically in the coming century as computer culture has over the last 50 years. That is to say, I fully acknowledge that these three categories of gaming projects fueled by various late twentieth and early twenty-first century notions of ubiquitous computing are as specific to this era and as likely to obsolesce as the digital technologies themselves.

So why bother being careful about naming them? Why not allow a continued slippage of terminology? I believe these categories serve an important critical function, even in the face of their own probable obsolescence. The paradigm of their application now lays a foundation for a more rigorous general approach to analyzing experimental design practices and emerging genres in the future. It is intended to be an approach that opens up a diversity of potential development paths rather than prematurely foreclosing on an overarching vision that may not, in fact, reflect the proliferating examples and tests. In this specific case, what I want to argue is that not all ubicomp-inspired game projects have the same objectives, criteria for success, or subjective impact on their players. Not all experimental efforts in this space push us in the same direction, despite a pronounced tendency in the field to treat each and every "pervasive game" or "ubicomp game" or "ubiquitous game" as just one more step toward liberating digital games from the computer monitor or the television screen. To act as if this were the case is to ignore the very real *range* of potential futures for massively networked play and performance. As Bruce Sterling argued in his keynote address to the 2006 Emerging Technologies

Conference, “When it comes to remote technical eventualities, you don't want to freeze the language too early. Otherwise you are trying to freeze an emergent technology into the shape of today's verbal descriptions. This prejudices people. It is bad attention economics. It limits their ability to find and understand the intrinsic advantages of the technology.” Here, Sterling suggests that under-considered names have the power to derail thoughtful exploration of a new technological space. Are today’s somewhat careless verbal descriptions of games emerging in and around the ubicomp arena limiting our ability to find the phenomena, and to pay attention to their individual and inherent qualities?

If, as Sterling insists, “language is of consequence” and “those of us who make up words about these matters probably ought to do a better job,” then this chapter is an attempt at doing a better job. Sterling argues that to find the right words for talking abut emerging technological practice, “you need some empirical evidence on the ground, some working prototypes, something commercial, governmental, academic or military.” This dissertation can be written now precisely because there is significant evidence, five year’s worth, on the ground—prominent examples of each of the three proposed categories that are thoroughly documented through a variety of means: original game websites, design statements, published research, photos and videos of live gameplay, and first-person gaming accounts on player blogs and forums. And precisely because naming conventions are still in such a state of flux that it hardly seems to matter to designers and researchers which term gets applied to their work, I believe it is an excellent moment to attempt to vitalize the terminology of the field. Even if only through total disinterest, the language has not hardened yet. We therefore can still open up our ability, through more

considered naming, to clarify distinct and important differences. In doing so, we may be better able to find and to understand the intrinsic advantages, and yes, potential dangers, of these emerging technologies and concomitant metaphors for structuring aesthetic experience and social relations.

In the 2006 inaugural issue of the *Games and Culture* journal, games ethnographer Tom Boellstorff observes: "The information age has, under our noses, become the gaming age. It appears likely that gaming and its associated notion of play may become a master metaphor for a range of human social relations, with the potential for new freedoms and new creativity as well as new oppressions and inequality" (29). Here, then, I aim to reflect the fullness of that range, by presenting three such master metaphors generated by three different approaches to both the problem and the potential of play in the era of ubiquitous computing. These metaphors we can characterize as *colonization* through gameplay (the ubicomp games); *disruption* through gameplay (the pervasive games); and *activation* through gameplay (the ubiquitous games).

In the previous chapter, I identified the focus of this dissertation as the last of these three metaphors, the activation through gameplay of ubiquitous games. I described ubiquitous gaming as the design philosophy and practice that represents the most direct legacy of the play and performance roots of early ubicomp manifestos. However, in order not to settle on a particular vision of the future of play and games through ubiquitous computing prematurely, I want to dedicate a significant portion of this work to examining the two other major vectors of experimental design leading out of this particular historical moment. I present these ubicomp gaming and pervasive gaming as robust alternatives, which dialectically may very well influence the course of the future of ubiquitous gaming.

For as my analysis will demonstrate, these three genres of ubiquitous play and performance are not necessarily opposed practices. Instead, they form a network of distinct, but related, efforts to redefine the relationship between everyday life and play. Certain common strategies serve as central nodes connecting the three categories, while other strategies diverge to create an explosion of differentiation in both ludic agendas and impacts.

I will now present a comparative overview of these three distinct visions for the future of play and performance through ubiquitous computing. In the remainder of this chapter, I will outline the theoretical basis for the specific goals and tactics of each category. Then, in the following chapters, I will perform close readings of major examples from each category, one at a time, to illuminate their individual design strategies, aesthetic choices and social impacts.

2.2 Colonization through Gameplay

If, as game designer Eric Zimmerman suggests, "Design is a way to ask questions," then the genre of *ubicomp gaming* asks the questions: Does ubiquitous computing have a Manifest Destiny? (176) And if so, can that destiny be achieved through gameplay?

Consider the historical fact that novel computing technologies tend to be harnessed for gaming almost as soon as they are invented. Examples of this tendency toward play abound even in the earliest decades of computing: In 1952, A.S. Douglas programmed *OXO*, a graphical version of Tic-Tac-Toe on the University of Cambridge's EDSAC vacuum-tube computer; in 1958, William Higinbotham combined an analog computer and an oscilloscope to create the *Pong*-predecessor *Tennis for Two* at the Brookhaven National Laboratory; in 1962, Steve Russell invented *SpaceWar!* on the PDP-1

mainframe computer at MIT; and so on, as documented by the international History of Computing Project.[2] Today, in addition to game-specific home consoles (the Xbox 360, PlayStation 2 and Nintendo Gamecube, e.g.) and mobile devices (the Nintendo DS and the PlayStation Portable, e.g.), new games have been created for, or old games ported over to, virtually every personal digital device you could think of: games for MP3 players, games for mobile phones, games for graphing calculators, games for Personal Digital Assistants (PDAs), even games for digital cameras.[3]

Jan Jörnmark, a historian of the games industry, has argued that this consistent proliferation of innovative hardware platforms for play is a direct result of an intrinsic, colonizing quality of digital games. "Games have had an unprecedented ability to conquer new platforms and incorporate new technologies," Jörnmark observes (1). He credits this seemingly innate ability to the fact that digital games have an almost genetic relationship to their platforms.

> Video gaming was the first truly digital entertainment medium, requiring processing power both in the production and consumption stage. Born out of the transistor, it has always been intimately connected with the logic

[2] In addition to the historical timeline compiled by the History of Computing Project's "Chronology of the History of Video Games", readers interested in experiencing these early games or examining documentation of their original gameplay can refer to the following online resources: An excellent EDSAC simulator operating the original source code for *OXO* is available at http://www.dcs.warwick.ac.uk/~edsac/; the government website for Brookhaven National Laboratory features a remarkable video of the *Table for Two* game: http://www.osti.gov/accomplishments/ videogame.html; the text of a 1962 article about the original lab culture surrounding the game *SpaceWar!* can be read at http://www.wheels.org/spacewar/ decuscope.html, while a simulation of the game can be played here: http://lcs.www.media.mit.edu/groups/ el/projects/spacewar/.

[3] While there is a well-known range of downloadable commercial gaming products for mobile phones and PDAs, games for graphing calculators, digital cameras and MP3 players so far have largely been the result of amateur developers and fan efforts to port familiar genres like text adventures or emulations of classic arcade games to their new devices. Examples include the grassroots distribution of Mario-themed games for the TI-83 calculator; Adventure Gamers' collection of interactive fiction for iPod MP3 players; and the Mamed! Project to port emulations of PacMan, Doom and other early games to Digita OS digital cameras.

> that is inherent in Moore's famous law: the doubling of the processor capacity every eighteenth month or the halving of the price for the same processing capacity in the same time (1).

The intimate connection between the entertainment medium and its constantly evolving platforms, Jörnmark suggests, has led to a co-evolutionary trend, in which digital games demonstrate a remarkable adaptability to changing technology environments. The transformations in technology mark mutations in the medium's DNA, we might say, spawning novel game forms and genres with each new generation of technology.

Jörnmark, however, does not develop a theory of how precisely this co-evolution takes place. Instead, he is interested primarily in the business ramifications of the process. He optimistically predicts: "The co-evolution between games, computer technology and networked solutions… seems to be able to create a very large number of new game related industries. The room for new innovations seems almost limitless" (2). Jörnmark makes this claim most succinctly in the title of his analysis of the historical proliferation of gaming platforms: "Wherever Hardware, There'll Be Games." In other words, wherever computing platforms exist, designers and developers will soon discover opportunities for gameplay.

Is Jörnmark right? Is it the fate of all computing technologies to be adopted for gameplay? If so, the prediction "wherever hardware, games" arguably takes on dramatic new significance in a ubiquitous computing culture, in which anything is likely to be transformed into computing hardware. If literally any physical object or environment can become a platform for computing, then by extension any such thing and any such place can be adopted for gameplay. When Jörnmark observes that "the video game industry

seems to be characterized by a tendency towards *ubiquity*", therefore his choice of words seems quite apt (2, emphasis mine). Indeed, one of the most interesting phenomena to emerge at the intersection of ubiquitous computing research and game design is a concerted effort to speed up the co-evolutionary process of increasingly ubiquitous computing technologies and digital games through a strategic cooperation between the two fields. This phenomenon can best be understood, I want to propose, as a theory of a shared Manifest Destiny.

The original political theory of Manifest Destiny, as articulated by nineteenth century American expansionists, argued that the United States' tendency toward annexing new territories and settling new frontiers was a powerful and civilizing force for good. Moreover, the American right and choice to exercise this force was seen to be both self-evident—hence the use of the term "manifest"—and inevitable—hence the term "destiny". We can clearly see a similar ideology at work, separately, in both game development and ubiquitous computing research. Jörnmark's repeated use of the word "conquer" to speak about the expansion of games onto new platform conjures the militaristic dimensions of the original Manifest Destiny proponents' approach to territory annexation. He writes, for example, that through platform migration "video games have been able to conquer society in an evolutionary process" (1). And the kind of full-blown expansionist fever that characterized the original Manifest Destiny movement seems apparent in Jörnmark's statement: "Gaming has become ubiquitous and all-encompassing. The limits to its growth seem to have eroded almost completely" (8). The passionate enthusiasm Jörnmark shows for the future growth of digital games can only be understood as an ideological stance that more games, in more places, is not only a good

thing, but also an obvious and inevitable development of the continuing evolution of technological hardware.

Likewise, ubicomp visionary Rich Gold has on occasion adopted the rhetoric of colonization to make the point that a truly ubiquitous computing culture requires our willingness to allow computer systems complete access to all parts of our daily environment. "UBIQUITOUS COMPUTING OBJECTS ARE EVERYWHERE, COLONIZING," reads the headline of one of Gold's "Art in the Age of Ubiquitous Computing" lecture slides ([27]). Like Jörnmark, whose emphasis is on the growth of the game industry, Gold sees this expansion as offering excellent financial prospects to a potential ubicomp industry. He writes: "It makes little sense to talk about a single ubi-object. Every object in our current world must be replaced by a nearly iso-morphic ubi-version of itself. Sounds like a good business to get into. This replacement (or colonization) of every object with a ubi-object will certainly be very good for the economy" ([27-28]). Here, as in Jörnmark's description of the boundless evolution of the games industry, the unchecked expansion of ubicomp technology is assumed to be a foregone conclusion, with significant benefits to the culture at large.

What happens when these two ideologies come together? A co-evolutionary effort is born, intended to make both ubicomp technologies and computer gaming more ubiquitous. This is the primary work of the category of experimental game design I am calling *ubiquitous computing gaming*, or *ubicomp gaming* for short. It can be defined as the research and development practice driven by a belief that the ludic instinct can and will conquer all technological objects, not only transforming each and every interactive

system into infinitely proliferating platforms for play, but also aiding the proliferation of the technological platforms themselves.

Ubicomp gaming is firmly entrenched in the academic and industry research culture of ubiquitous and pervasive computing. It generates test games specifically in the name of ubicomp research, either in experimental application or further development of its specialized technologies. It has two mutually-reinforcing agendas: To use ubicomp technologies to put games into new objects and spaces, and to use the medium of games to put ubicomp technologies into more contexts and into the hands of more users.

In Chapter Three, "Colonizing Play: Citations Everywhere, or, The Ubicomp Games", I will explore how major projects in this category pursue their expansionist goals. The projects I will examine include the location-sensing adventure game *Pirates!* (Nokia Research and Interactive Institute, 2001), the mixed-reality tag game *Can You See Me Now?* (Blast Theory and the Mixed Reality Lab, 2002), and the augmented-reality driving game *The Invisible Train* (The Handheld Augmented Reality Project, 2005). My discussion will focus first on ubiquitous computing's use of gameplay as a *rhetorical medium* and as a *research platform*. I will then analyze the particular *play values* of games designed in the name of ubiquitous computing, and how these values seek to organize social relations among players. Finally, I will explore the genre's performative practice of playtesting, which I will argue prioritizes the mass replication of *citations* of gameplay over the ubiquitous proliferation of gameplay itself.

2.3 Disruption through Gameplay

When Mark Weiser first introduced the notion of ubiquitous computing, he issued a single warning: "If computers are everywhere, they better stay out of the way" (3). The

genre of *pervasive gaming* asks the question: What would the cultural landscape look like if computer games refused to stay out of the way?

Weiser's directive stemmed from a concern that proliferating technologies would overwhelm users unless a fundamental change was made in the way designers conceive of human-computer interaction. In "The Coming Age of Calm Technology", Weiser writes: "Computers for personal use have focused on the excitement of interaction. But when computers are all around, so that we want to compute while doing something else and have more time to be more fully human, we must radically rethink the goals, context and technology of the computer and all the other technology crowding into our lives" (3). Weiser argues for human-computer interaction that demands less attention and empowers users to relegate most computing to an area of peripheral awareness until they choose to engage more directly. Such a relationship, Weiser predicts, would be fundamentally *encalming*. It would assure the user of increased overall awareness and power over a greater and more diverse range of interactions. He therefore concludes: "Calmness is a fundamental challenge for all technological design of the next fifty years" (3).

Well—*almost* all technological design. In fact, when Weiser imagined the future of computing, he did not envision a world in which truly every interactive system would be designed to recede into the background of our lives. He specifically identifies gaming as an area in which the peripheral design and encalming goals of ubiquitous computing would be counterproductive. Games, Weiser suggests, are meant to be played in the foreground. By commanding all of our attention, they engage us with an emotional, cognitive and physiological intensity that is the distinct pleasure of a challenging game. "A calm videogame," Weiser suggests, "would get little use; the point is to be excited"

(4). According to Weiser, then, the concept of *ubiquitous computer gaming* is actually a paradox. As such, ubicomp games would never work.

Of course, the many university departments and technology companies who have taken up ubicomp gaming as a research and development platform represent a break from Weiser's early assessment. Ubicomp games are possible, their work suggests—as long as we redefine our expectations about how gaming fits into the calm technology landscape. Games may be exciting to their players, but it is precisely the encalming nature of ubicomp technologies that can help situate such excitement in everyday contexts without endangering the players or disturbing the more traditional use of the space. A 2005 paper by a research team at the Interactive Institute seeks to formalize the range of available design strategies for creating these kinds of calm, ubicomp games. The paper, titled "Socially Adaptable Games" and co-authored by Daniel Eriksson, Johan Peitz, and Staffan Björk, insists that the potential disruptiveness of gameplay in unexpected contexts and spaces can (and must) be mitigated through proper ubicomp design. They write: "The motivation for this paper is grounded in the observation that the full potential of mobile and pervasive computer games will not be possible until these games are able to coexist with complex and changing social environments, as the introduction of technology is usually disruptive in a social environment" (1). The authors first identify physical danger as a possible outcome of a game that requires complete, rather than peripheral, attention. "For instance, a handheld game using players' physical location in a city as input puts players in a dilemma between navigating the physical world (e.g. avoiding traffic) and attending events in the virtual game world" (1). They also note the potentially negative impact of a game on others using the space: "Activities that are normally socially

unacceptable are unlikely to be regarded differently to observers when part of gameplay, especially if it is difficult to discern that the activity is actually part of a game" (1). Given the "invisible" nature of much of ubicomp gameplay, this latter scenario is particularly likely to occur. The conflict is clear: The novel kinds of gameplay made possible by ubicomp technologies are likely to conflict directly with the stated goals of ubiquitous computing. How can researchers resolve this design dissonance?

To solve this problem, Eriksson, Peitz, and Björk propose a series of encalming design strategies for ubiquitous computing games. Their suggestions include "supporting interruptability of the game"—that is, allowing players to self-select breaks in order to deal with other environmental factors; "offering multiple communication channels"—letting players choose the least disruptive technology at any given moment, whether that be text message or voice call, for instance; and "allowing players to seamlessly move between being active players and lurkers"—enabling players to switch to more subtle modes of participation as social or personal factors require (6). Each of these toggle-style solutions are directly inspired by Weiser's notion of encalming technology, which "will move easily from the periphery of our attention, to the center, and back" (Weiser 4).

Eriksson, Peitz, and Björk take Weiser's admonition that computers had "better stay out of the way" one step further. Their proscribed design strategies not only allow users to push ubicomp gaming technologies to the periphery, but also strive to keep the interaction completely off the radar of bystanders. Non-players are not forced to engage with, or even be aware of, local computing and its associated ludic activities. Under this notion of calm, in which all potential users maintain the right to be blissfully ignorant of the computing around them, the authors strongly urge designers to make the games

invisible to, and otherwise undetectable by, non-players. “These games are likely to occupy the same space as non-playing people. In order to minimize the impact on these bystanders, the game should be designed for minimal social weight” (7). In other words, ubicomp games should be designed to cause the least social disruption possible while still providing a manageably exciting interactive experience for those who have chosen to play.

If the genre of ubicomp gaming has taken steps to resolve the potential conflict between the exciting, attention-claiming nature of games and the desired calmness of ubicomp technologies, then the genre of *pervasive gaming* has taken steps in precisely the opposite design direction. Pervasive gaming is driven by artists, design critics and game developers who identify thrilling disruption as their games’ signature design feature. A pervasive game strives for *maximum social weight* by spectacularly drawing attention to itself. Pervasive game designers’ primary strategy for gaining this attention is to defy visibly the boundaries that are traditionally placed around play.

In a 2005 article for *Digital Arts and Culture*, “Exploring the Edge of the Magic Circle: Defining Pervasive Games”, digital games researcher Markus Montola examines the genre’s penchant for this particular kind of disruption. He offers the following definition: “Pervasive gaming is a genre of gaming systematically blurring and breaking the traditional boundaries of games” (1). Here, Montola makes literal use of the term ‘pervasive’, describing a genre that intentionally permeates the artificial membrane games traditionally place around play. What are these membranes, and how are they traditionally enforced? Montola identifies three axes of non-pervasive gameplay that typically are bounded: “The regular game is played in *certain spaces* at *certain times* by

certain players" (1). Usually, these three boundaries are protected by the "magic circle of play", which Montola defines as a "voluntary, contractual structure that is limited in time and space". The term 'magic circle' comes from Dutch historian Johan Huizinga, who first mentioned it briefly in his seminal study of human play *Homo Ludens*; later, the 'magic circle' was developed more fully as a theory of game design by Katie Salen and Eric Zimmerman in *Rules of Play: Fundamentals of Game Design.* For both Huizinga and Salen & Zimmerman, the primary function of the magic circle is to prevent both the game and everyday "real life" from interfering with each other in any detectable way.

In traditional computing and non-computing games, the magic circle is defined and enforced collectively, through social convention and the temporary agreement of all those playing. In a calm ubicomp game, however, we might say that the magic circle would be less monolithic in any given game. Instead, it can be individually and variously shaped and enforced through the peripheral practices of ubiquitous computing. Such a game's boundaries would differ from player to player, and from moment to moment. The individually assigned boundaries would be actively created and protected according to the available attention and ludic desires of the player, who actively decides *when* and *where* to toggle in out and out of gameplay, and presumably to *whom* to reveal the otherwise invisible gameplay.

The notion of an individually crafted and customized magic circle is a significant departure from classic game design and deployment. If ubicomp gaming is truly headed in the direction proscribed in "Socially Adaptable Games"—and as it is a recent design manifesto, it is hard to judge its impact yet—then this practice will surely become one of the most theoretically interesting and aesthetically challenging aspects of the genre.

Pervasive gaming, however, has already adopted a radically oppositional approach to the magic circle. Rather than making it a more personal and malleable system under the control of the individual user, in order to preserve the social order such boundaries enact, pervasive gaming prefers to preserve the collective notion of a magic circle—precisely so it can openly disturb that social agreement. As Montola argues: "Pervasive gaming is not limited to the contractual play space of the traditional magic circle" (4). That is to say, pervasive gaming does not *redefine* or *renegotiate* the traditional magic circle. Instead, it acknowledges the magic circle and then *defies* it.

In order to be maximally disruptive, that is to say in order to ensure that its defiance of the magic circle is detected, pervasive gameplay must be both *visible* and *legibly ludic*. That is to say, the game should seek maximal social weight for gaming through its striking visual presence, attracting attention and clearly marking itself as a ludic event even as it defies our expectations of where and when to encounter games.

In Chapter Four, "Disruptive Play: Spectacle Everywhere, or, The Pervasive Games", I will discuss some of the genre's best-known works, with an eye toward their disruptive goals and high-visibility strategies. The projects I will examine include the city-wide board game the *Big Urban Game* (The Design Institute, 2003), the urban tag game *PacManhattan* (The Interactive Telecommunications Program, 2004), and the follow-the-leader game *The Mp3 Experiment 2.0* (Improv Everywhere, 2005). I will consider how these projects approach game design as medium of *technosocial critique* and *public intervention*. I will suggest that the central design problem of the genre is a tension between *performing* gameplay in public and *inviting* the public to play. I will explore the projects' strategies for resolving this tension, as well as some of the political dimensions

of so dramatically rupturing the magic circle of play. Finally, I will argue that the genre's preference for visual spectacle leads it to generate massively-scaled *semblances* of gameplay, rather than massively-participatory *affordances*—a choice that ultimately aligns its reproductive practices more closely with the era of ubiquitous imaging than with ubiquitous computing.

2.4 Activation through Gameplay

In *Homo Ludens*, Johan Huizinga proposes that "the charm of play is enhanced by making a 'secret' out of it" (12). The genre of *ubiquitous gaming* asks the question: What are the secret gaming affordances of everyday objects and spaces?

Design critic Donald Norman first introduced the term 'affordance' to the field of everyday object design in *The Psychology of Everyday Things*, published in 1988 and then republished in 1990 under the new title *The Design of Everyday Things*. Norman's user-oriented philosophy emphasizes the importance of sensory cues that help users understand how to interact with designed things and built environments. The designer's ability to create effective cues depends, Norman suggests, on a "psychology of materials and things", which he defines as "the study of affordances of objects" (9). He clarifies the central term: "*Affordance* refers to the perceived and actual properties of the thing, those fundamental properties that determine just how the thing could possibly be used" (9). For example, "knobs are for turning. Slots are for inserting things into. Balls are for throwing or bouncing" (9). In other words, the perceivable properties of things—not only their physical shape, size, position in space, but also their culturally recognizable form as something one traditionally pushes, pulls, dials, detaches, grabs, or sits on—tell us exactly what to do with them in order to make them work. Visibility is key to Norman's

notion of affordances: “When affordances are taken advantage of, the user knows what to do *just by looking*” (9, emphasis mine).

Although Norman is credited with bringing widespread attention to the concept of affordances, it does not originate with him. As Norman observes in a footnote, its source is perceptual psychologist J.J. Gibson’s 1977 article “The Theory of Affordances.” The tone of the footnote indicates, however, that Norman struggled with how to present and repurpose Gibson’s work for the field of design. He writes: “My view of affordances is somewhat in conflict with the views of many Gibsonian psychologists” (219). Norman does not summarize Gibson’s original argument or discuss this point further in *Everyday Things*. The nature of the conflict is left obscured until fifteen years later, when Norman revisits the theory’s genesis in an online essay called “Affordances and Design”. Because this essay is self-published on Norman’s website and previously appeared only as a message on the ACM “SIGCHI WWW Human Factors (Open Discussion)” listserv, it has not received, perhaps, as much attention as it deserves. In fact, it represents a significant clarification of Norman’s earlier work and, as such, offers an important opportunity to reconsider the role of affordances in design in general and more specifically, in game design.

In the 2004 essay, Norman seems intent on undoing part of the tremendous success of *Everyday Things*—namely, his success in stripping ‘affordance’ of some of the complexity of its original intended meaning. Norman reveals his regret that what he intended as a special-case use of “affordance” came to stand in for its full definition. He writes: “The concept has caught on, but not always with true understanding. Part of the blame lies with me: I should have used the term ‘perceived affordance,’ for in design, we

care much more about what the user perceives than what is actually true. What the designer cares about is whether the user perceives that some action is possible" ([3]). But perception of an affordance does not perfectly overlap with actual affordance, Norman suggests. "Where one deals with real, physical objects, there can be both real and perceived affordances, and the two need not be the same" ([4]). Indeed, Norman argues that some real affordances—that is to say, actual opportunities for interaction—are not perceived by users, whereas some users perceive that they are effectively acting upon a thing or system when in fact that affordance does not exist.

What does it mean to perceive an affordance? Here, Norman is not speaking about sensory perception, although affordances are often communicated through the sensuous qualities of a thing (especially its form). Instead, affordance perception depends on the user's cognitive *belief* that taking a particular action will produce an effect, positive or negative, in relation to a specific use goal. Consider, for example, Norman's discussion of the affordances of a point-and-click graphic interface. He writes: "Because I can click [the mouse button] anytime I want, it is wrong to argue whether a graphical object on the screen 'affords' clicking. It does. The real question is about the perceived affordance: Does the user perceive that clicking on that location is a meaningful, useful action to perform?" Norman's point that a user can click a mouse button at any time is well-taken—it is an affordance of the button itself, not an affordance of the overall computing system. A user can click a mouse button even if in the computer is turned off, or if the mouse peripheral is disconnected from the main system. In both such cases, the only real interaction is the tactile pleasure of depressing and releasing a button. As an act of computing, however, clicking lacks meaningful affordance unless something in the

system responds to the click. In other words, the perception of affordance occurs when a system is responsive to a particular kind of user interaction. Interaction that is predicted or directly observed (rightly or wrongly) to *activate* some aspect of the object or program is what constitutes a perceived affordance.

So is an affordance really an independent property of a designed object or built environment? Yes, it is, and no, it is not. As Norman notes, "To Gibson, affordances are a relationship" ([2]). We can better understand the nature of this relationship by turning to one of Gibson's unpublished manuscripts, notes for a 1979 university lecture clarifying his recent work on the theory of affordances. In the manuscript, "A Note on Substances, Surfaces, Places, Objects, Events", Gibson emphasizes that affordances are both objective (properties of the thing itself) and yet subjective (perceived by a living being with a personal agenda). He writes: "In the *Ecological Approach to Visual Perception* I propose what animals perceive are the *meaningful* properties of substances, surfaces, etc. instead of the *primary* and *secondary* qualities of physical objects" ([1]). By primary and secondary qualities, Gibson refers to the properties that a scientist might ascribe to a thing. While these qualities might accurately describe the physical world in an objective sense, Gibson concedes, they do not adequately account for the physical world in a subjective sense. Here, Gibson makes explicit what he is resisting with his theory: the (then) trend in perceptual psychology to think about human perception in terms of physical stimuli that activate physical receptors. He writes: "Ever since Descartes, human psychology has been held back by the doctrine that what we have to perceive is the 'physical' world that is described by physics. I am suggesting that what we have to perceive and cope with is the world considered as the environment" ([4]). By "the world

considered as the environment", Gibson means the world considered as a physical system of things and phenomena with specific actionable properties. In other words, to a large extent, *what* things are does not matter. Instead, it is the *how* of physicality that matters—how things engage us and are engaged by us.

To this end, Gibson is interested in affordances particularly as "behavior is *motivated*" by them ([9]). He provides a range of examples that indicates he is not speaking simply about designed objects or built environments, but rather also about both naturally occurring substances and accidental phenomena:

> A substance that is nutritive invites eating, water invites drinking, pouring, or washing (but not walking on), clay invites molding, and dry wood affords fire-making. A surface support invites sitting, standing, walking, or running; a surface that is a barrier to locomotion demands a halt; a double surface that is flexible affords wearing; a warm, soft, suitably shaped, animate surface invites caressing. A place that is enclosed affords getting out of the rain, a place that is hidden and safe affords sleeping, a place where prey is found allows food-getting but a place where predators lurk affords danger; a grocery store also affords food-getting but a six-lane highway with trucks is as bad as a place with saber-toothed tigers. … According to this formula, behavior consists primarily of acts that *take advantage* of the existing substances, surfaces, places, objects, and events of the environment while avoiding painful encounters with them ([9-11]).

Here, we see that affordances can be both positive and negative, that a single object or place can afford multiple and potentially contradictory behaviors, and that there is

something of the survival instinct involved in correctly perceiving physical affordances. To this end, there is something almost entirely and surprisingly *unconventional* about Gibson's affordances. That is to say, they are not culturally determined, but rather a naturalized aspect of human instincts and desires.

The point Norman wishes to clarify in "Affordances and Design", by gesturing back to Gibson, is that much of what has come to pass for affordance in human-computer interaction is, in fact, *cultural* constraints rather than *physical* constraints. He writes: "Cultural constraints are learned conventions that are shared by a cultural group…. that one should move the cursor to it, hold down a mouse button, and 'drag' it downward—all this is a cultural, learned convention. The choice of action is arbitrary: there is nothing inherent in the devices or design that requires the system to act in this way" ([6]). However, Norman is careful to note: "The word 'arbitrary' does not mean that any random depiction would do equally well: the current choice is an intelligent fit to human cognition" ([6]). Therefore, Norman allows, designers are right to follow established conventions as much as possible; conventions are usually good models, and moreover, they are often known to new users.

Norman encourages us, however, to begin differentiating between cultural constraints and physical constraints. The former increasingly limits interface design to a set of well-known and generally understood interaction patterns; the current path of design is therefore heading toward a premature foreclosure of most of the possibilities in the interaction design space. According to Norman, this is not necessarily a bad path; it makes things easier to use. However, design with respect to actual physical constraints, affordances instead of conventions, could actually continue to open up interaction

possibilities. He concludes:. “[Affordances] are a part of nature: they do not have to be visible, known, or desirable. Some affordances are yet to be discovered. Some are dangerous. I suspect that none of us know all the affordances of even everyday objects” ([2]).

What are some of these unknown affordances, and how might we discover them? Ubiquitous gaming proposes that many of these heretofore unperceived affordances are in fact *gameplay* affordances. That is, it is possible to play with things and spaces that conventionally do not invite a ludic mindset. Indeed, ubiquitous gaming suggests that play itself can make subjectively meaningful many of the objective actionable properties of things and spaces that ordinarily go unexplored or unrecognized because they seem unrelated to the goals of everyday users. Game goals and game procedures can activate these affordances and make them perceivable for the first time by inserting them into a larger system of play. The central premise of ubiquitous gaming, we might say, is this: If affordances are actionable properties, then games are contexts in which action is invited.

How, exactly, might ubiquitous gaming accomplish its goal of revealing the secret gameplay affordances of everyday objects and sites? Here, it helps to take a historical detour to consider two early genres of personal computer games: text adventures and graphic adventure games. These genres taught gamers a pair of strategies for investigating virtual worlds: what I call *affordance hunting* and *promiscuous activation.* I want to suggest that ubiquitous gaming aspires to teach gamers these same strategies for investigating the real world in everyday life.

The technique of affordance hunting can be defined as the highly experimental recombination of game objects deployed in different game locations and applied to

different game characters. Affordance hunting was the primary lesson of the text adventures, a genre of text-based puzzle-solving and world exploring made famous by Infocom in more than thirty bestselling games such as *The Zork Trilogy* (1980), *Planetfall* (1983), and *The Lurking Horror* (1987). Affordance hunting emerged as a response to a hallmark interactive pattern of the genre, the "inventory puzzles", which required your character to carry multiple found items until you figured out where, how, and when to deploy them in a meaningful way. As digital media theorist Espen Aarseth observes in "The Adventure Game", this results in an "inappropriate attachment to objects", for the player "must collect and examine as many objects as possible, because you never know what you might need later" (116). The result of this style of puzzle was the tendency to treat everything and everyone in the environment as potentially useful. And that usefulness had to be *actively* discovered.

A popular example of the inventory puzzle is the "hacker puzzle" from *The Lurking Horror*.[4] At the beginning of the game, the player encounters a hacker in a university computer lab. Because every text adventure player knows that any person in the game environment poses a unique interactive opportunity, the player must figure out how best to engage the hacker. Conversation fails to produce interesting results, as does attempting to unplug the hacker's computer, kissing the hacker, insulting the hacker, and every other attempted interaction inspired by the affordances, or actionable properties, of another living human being. Thus, an investigation of the local environment ensues; the player must look for objects to apply to the hacker. The player discovers a nearby kitchen with a

[4] In addition to replaying *The Lurking Horror* on a Commodore 64 emulator for Windows XP during the process of writing this chapter, I consulted a 1997 walkthrough of the game compiled by Phillip M. Reynolds and posted online at http://www.darkmoon.force9.co.uk/lurking.htm. The game program is available at http://www.classic-pc-games.com/pc/adventure/the_lurking_horror.html.

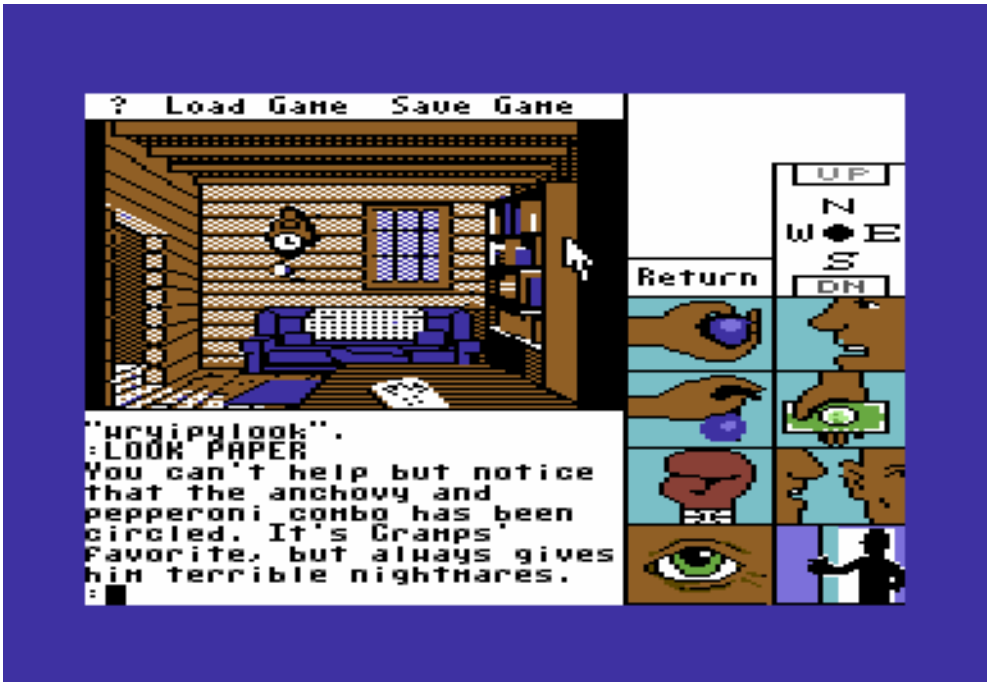
variety of objects, including a microwave and a refrigerator with a carton of leftover Chinese food inside. While in real life, a player would likely ignore this mundane object, in a text adventure, the player must consider all of its potential uses. The natural affordances of these objects are considered and tested. Eating the cold Chinese food appears to accomplish nothing. Heating the Chinese food in the microwave and then eating it also appears to accomplish nothing. Now the player must consider: Was this Chinese food really meant to be consumed by me? Alternative affordances of a carton of Chinese food are explored. It is portable, suggesting that it could be removed from the kitchen and transported to the computer lab. There, its aerodynamic properties suggest it could serve as a weapon—perhaps throwing the carton at the hacker would initiate an interesting interaction. (It does not.) The purgability of a carton is considered: perhaps dumping the Chinese food on the hacker's monitor and keyboard would yield helpful results. (It does not.) Finally, the player may consider that one potential affordance of a carton is that it can be *handed* to someone; one interactive function of food is to be used as a bribe. Indeed, giving the heated Chinese food to the hacker makes him very happy and amenable to all requests. (As a result, he offers you a very important key hanging from his belt.) Here, the player learns to deploy common objects in both ordinary and creative ways, attending to the full scope of the objects' diverse physical properties and cultural functions. Likewise, the player is taught to engage strangers assertively, with the expectation that a meaningful exchange or experience of some kind will result.

Promiscuous activation, on the other hand, can be defined as the exhaustive search for every single interactive platform in a given environment. The technique of promiscuous activation was the primary lesson of the graphic adventure game, a successor to text

adventures that incorporated a point-and-click graphic interface, replacing some or all of the typing input. Major graphic adventure games include *Tass Times in Tone Town* (Activision, 1986), *King's Quest VI* (Sierra Entertainment, 1992), *Myst* (Cyan, 1993), *The Pandora Directive* (Microsoft, 1996), and *Grim Fandango* (Lucas Arts, 1998). While the graphical landscapes of these games grew increasingly detailed as technology improved, only certain details in the gaming environment had interactive potential. It was up to the player to find them by, essentially, pointing and clicking at every discernable object on the screen. In a *Computer Times* review of a *Myst* sequel, Andrew Lim summarizes this essential strategy: "Leave no stone unturned, touch everything, click on everything in sight" ([3]). If a given game object were indeed programmed with some level of interactivity, it would activate upon clicking. The player could then choose to examine it, read it, eat it, throw it, keep it, or whatever else seemed a viable action to take (and here, of course, is where affordance hunting comes back into play). In early graphic adventure games, this search for interactive opportunities was made easier by what players dubbed the "hotspots" on the screen. When a player was pointing at a meaningful detail, the cursor would change from a pointer to some other icon to signify the latent interactive opportunity. In the case of *Tass Times in Tone Town*, for example, these icons included an eye to "look at the object"; a hand to "take the object"; a dollar bill to "buy the object"; and a mouth to "talk to the object"—usually most helpful when the 'object' was another character, although at one point in the game, it actually helps to talk to a gated wall (see figure 2.1).[5] As this genre developed, however, hotspots were phased out. In a *Game Zone* review of the graphic adventure game *Conspiracies* (Got Game, 2003), Robert

[5] I refer here to details observed playing *Tass Times in Tonetown* on a Commodore 64 emulator for Windows XP, available at http://www.classic-pc- games.com/pc/adventure/ tass_times_in_tonetown.html.

Gerbino writes: “Dragging the pointer across the screen to find objects of interest is especially frustrating because there are no hotspots. That is, if you do manage to run over something important, the mouse cursor does not change. So you must click on everything” ([5]). The first experience of encountering a new space in these games, then, consisted of checking each and every detail for interactive opportunities.



2.1 Screenshot from *Tass Times in Tonetown*. The player selects an interaction—such as pick up, talk to, buy, and look at—and then highlights objects in the game environment to see what can be activated. In this room, the paper on the table can be looked at. (Activision, 1986)

Often promiscuous activation was combined with affordance hunting to generate complicated sequences of highly improvisational gameplay. One of my favorite such moments occurs on the first level of *Grim Fandango*. The player, who has been assigned the mission of collecting a pair of pigeon eggs so that an underground revolutionary named Salvador can hatch messenger pigeons from them, wanders an outdoor street fair, searching for something to do to move the game forward. The graphic detail of the outdoor environment is remarkable, with hundreds of distinct objects and characters

2.2 Screenshot from *Grim Fandango*. The player must search the environment exhaustively for interactive platforms. Here, the loaves of bread can be activated, as can the clown and his balloons. (Lucas Arts, 1998)

rendered (see figure 2.2). The player must click through the noisy environment searching for a signal, eventually discovering an interactive platform: a sarcastic clown making animal balloons. It is not, however, immediately apparent what to do with the clown or the balloon animals. Here, the gameplay switches to affordance hunting. Because the subsequent series of game events is so rich, I will quote a walkthrough of the game. The walkthrough—a complete, fan-created guide to solving all of the game's puzzles and missions—is written in second-person address and describes exactly what actions the player should take stemming from this interaction with the clown:

> Ask the clown to make you a balloon animal (a cat, for instance). Steal the bread from the clown's tent. After you get the balloon, head to the alley

> again and climb to the ledge using the tie rope. There seems to be someone in Don's office, so get into Domino's office through the open window. Open his desk drawer and get the glowing green coral you find inside. Hit the punching bag on the wall until the mouthpiece on it falls down. Take it and head back out to the ledge. Walk to the tie rope and pick up the rope's loose short end. Tie the coral to it, and throw it over the gap. Head to the roof by using ladders and the bridge you just formed. Once on the roof, walk to the corner where the pigeons are nesting. If you try to approach the pigeon nests, the birds will attack you, so you'll need to think of a way to get rid of them. Put the balloon animal on the small dish on the roof, and grind the bread into crumbs on the balloon. Step back and watch the pigeons eat the bread... and fly away after being startled by the balloon blowing up. Walk to the pigeons' nests and take two eggs from them (Linkola [9-10]).

Consider the multitude of both intuitive and non-obvious affordances of the many objects and sites that need to be recognized and acted upon in order to complete this mission. A preoccupied clown invites the act of stealing, while a dangling rope inspires climbing up it. An open window suggests going through it, while a desk drawer wants to be opened and rifled through. Found objects can be stolen. A punching bag, hit. That rope you climbed up earlier? It also affords tying. And that heavy piece of coral? It can serve as a weight. A piece of bread? Instead of eating it, you could tear it into crumbs. And a blown-up balloon is not just decorative—it has the affordance of serving as a noisemaker when popped. And so the affordance hunting continues, so that each thing encountered

can be called upon to play a meaningful role in the player's quest. While the walkthrough document presents each step in the mission as if it were the only and the most obvious option, typically a player would take at least several hours to complete such a mission, testing all the possible variations and combinations of affordances. For instance, what about throwing the coral rock at the pigeons? Or bribing the clown with the bread? How about putting on a balloon puppet show for the boss? Or tying up the clown with the rope? (These are all affordances I acted on when I first played *Grim Fandango*.)

What would real life be like if players applied these interactive strategies to everyday objects, places, and sites? Ubiquitous gaming seeks to answer this question. Rather than focusing on specifically technological platforms, ubiquitous gaming seeks to make everything in real-life environments as satisfyingly interactive as the objects and characters encountered in virtual game worlds. Instead of "wherever hardware, there'll be games", we have "wherever *whatever*, there'll be games." The genre, which includes both commercial and grassroots projects, ask players to take up two core mechanics: first, searching for and experimenting with the hidden affordances of everyday objects and places; and second, exhaustively seeking to activate everything in one's immediate environment. This activation is, in fact, mutual. Game structures activate the world by transforming everyday objects and places into interactive platforms; game structures also activate players by making them more responsive to potential calls to interaction. This is because the act of exposing previously unperceived affordances creates a more meaningful relationship between the actor and the object or the space in the world.

It is important to note here that of the three categories I propose in this chapter, ubiquitous gaming has produced to date by far the most scalable, reproducible and

popular vision of a games-infused, everyday life. Because of the research and art-practice conditions under which they are produced respectively, both ubicomp games and pervasive games are typically deployed in a rather limited fashion. As prototypes and as provisional interventions, ubicomp and pervasive games take place over a relatively short period of time—usually just a few hours—and are iterated, or produced, usually just two or three times—a dozen at most. Ubiquitous games, on the other hand, typically are played persistently (without stop) over much longer periods of time: anywhere from several months to indefinitely. During this extended gameplay period, particular game missions, challenges and other ludic events are iterated hundreds, thousands, or tens of thousands of times. And if a ubiquitous game is not persistent, then as a live event, it is deployed on a much higher order that the other two categories: say, thousands of games produced over the course of several years. The number of players across the three categories of games also shifts dramatically upward when it comes to ubiquitous games. As I will document, ubicomp playtests and pervasive gaming events typically engage, directly, a few dozen players at a time—maximally, a few hundred. Ubiquitous games, on the other hand, engage players by the hundreds or thousands at minimum, more typically by the tens of thousands, and in the most successful ubiquitous games, by the hundreds of thousands at a time.[6]

Together, the massively-multiple *iterability* of ubiquitous game events and the massively-multiplayer *scale* of the ubiquitous games' communities allow this particular experimental category to generate a very different set of research insights and social impacts than either ubicomp or pervasive games. The quantitatively higher order of

[6] An excellent compilation of player statistics for ten major ubiquitous games has been compiled by new media researcher Christy Dena and is available at http://www.cross-mediaentertainment.com/index.php/2006/03/04/top-args-with-stats/.

connected gameplay events and players, and the resultant complexity of the game networks, provides three kinds of qualitatively different outcomes. These outcomes can be summarized as followed: More is *better*; more is *different*; and more is *needed*. As Andrew Fluegelman, founding member of the 1970s New Games Movement, has argued: "The more the better", in reference to the optimal number of players for the movement's patently oversized and intensely physical games (141).[7] In other words, players experience a distinct phenomenological pleasure in being part of a much larger, intimately connected whole. The production of this collective pleasure results in a desire to *keep gaming* that I will explore as the signature engine of the perpetual ubiquitous gaming experience.

Also, as physicist P.W. Anderson famously explained in the first scientific paper on the phenomenon of emergence, "More is different" (373). Here, Anderson argues that macro-systems operate in much more complicated and surprising ways than similarly structured micro-systems. Anderson was interested in the unpredictable atomic interaction in complex particle systems, but the same principle of emergence has been observed in physical, biological, technological and social systems across disciplines: Unexpected things happen when you scale up.[8] The study of new genres of networked play therefore benefits enormously from projects that, like the ubiquitous games, seek to explore higher levels of gameplay complexity. As I will demonstrate in the chapters on ubiquitous gaming, fundamentally different relations among players and phenomenal

[7] In the aftermath of the Vietnam War, Stewart Brand and other activists created the New Games Movement to encourage creative and collaborative, rather than competitive, gameplay. They pionoeered dozens of massively multi-player games for the real world. Today, the movement is referenced as pre-digital predecessor of pervasive and ubiquitous games in various game studies texts, such as *Rules of Play* (Salen & Zimmerman, 2004) and "Sustainable Play: Towards a New Games Movement for the Digital Age" (Pearce et al, 2006).

[8] Steven Johnson's *Emergence: The Connected Lives of Ants, Brains, Cities and Software* (2001) provides an excellent introduction to emergence across multiple kinds of complex systems.

qualities of play emerge through projects that both iterate massively multiple times and connect massively-multiple gamers into a single ludic network.

Finally, as computer scientist Pat Miller has observed of the design of grassroots supercomputers: "More is needed" ([2]). Miller refers here to the massive number of central processing units required to construct a "do-it-yourself" supercomputer.[9] To become exponentially more powerful, to pass the coveted threshold from *ordinary* computer to *super* computer, you need to connect as many individual parts as possible. Ubiquitous games, I will document, seek to empower players to change not only their own perception of the everyday environment, but also to alter the actual, conventional interaction patterns of everyday life. And just as distributed computer projects require massively-networked processors to produce a transcendent computational performance, so too do distributed games require massively-networked players to produce a transcendent ludic performance. The massively-scaled gamer network of players working together on the common problem of where, when and how to play produces both a magnitude and a quality of impact not possible in experimental games deployed under more limited conditions.

Because of the additional complexity generated by their massively-scaled play and player communities, I want to explore the category of ubiquitous games in considerable depth and detail, over the course of several chapters. In Chapter Five, "Activating Play: Affordances Everywhere, or, The Ubiquitous Games – Part I", I will explore two major examples of ubiquitous games: the original alternate reality game *The Beast* (Microsoft,

[9] On April 3, 2004, Pat Miller led a University of San Francisco effort to create the world's first "flash mob supercomputer", so called for its grassroots, ephemeral construction. Over seven hundred people brought their personal computers to network as a single, co-located, massively distributed computing system. This event is further discussed in my "SuperGaming! Ubiquitous Play and Performance for Massively Scaled Community" (McGonigal 2005).

2001) and its sequel *I Love Bees* (42 Entertainment, 2003). I will focus on how these projects seek to activate the gameplay affordances of everyday media objects and physical environments by embedding and replicating a *cognitive pattern of play*, rather than constructing a new technological infrastructure. I then will analyze how these projects approach games as a *hailing* medium, that is, as a medium for maximizing public engagement with things, places and people that players would ordinarily not perceive as offering meaningful interactive opportunities.

In Chapter Six, "Dangerous Mimesis", I will explore the purposes and pleasures of a signature phenomenon of ubiquitous games: the players' collective performance of *excessive immersion* and *credulous belief* in the game. I will argue that the players' sensationalized representation of their own ludic experience is required by the games' simultaneously *simulative* and *dissimulative* rhetoric.

In Chapter Seven, "Power and Superpowers: The Ubiquitous Games – Part II", I will explore another set of seminal ubiquitous game projects: the reality-based superhero games *The Go Game* (Wink Back, Inc., 2001-present) and *SFZero* (PLAYTIME, 2006-present). I will focus on how these games seek, also through affordance-based design, to create the perception that real life can be experienced more pleasurably and productively through a ludic frame. I will also continue to explore performance of belief in the game's ubiquitous presence as a primary factor in ubiquitous gaming.

Finally, in Chapter Eight, "The Collective Play Values of Ubiquitous Games", I will explore the play values and social structures of ubiquitous games. I will identify three specific community architectures that have emerged from the socio-technological themes and platforms of these most widely-played ubiquitous games. I will argue, ultimately,

that these community architectures create massively-scaled gaming communities capable of, and prone to, perpetually perceiving and reproducing ludic affordances, everywhere.

Across all of these chapters, I will work to show how the process of perceiving and replicating the game is neither automatic nor unconscious, but rather thoughtful and deliberate. Indeed, I will argue that the responsiveness developed by players to potential ludic interaction represents a new kind of *critical gaming literacy*. The gamers grow to read the real world as rich with ludic opportunity, carefully testing everyday objects, sites, people and contexts for the potential benefits and drawbacks of bringing each inside the magic circle of play. Ultimately, then, the *ubiquity* of ubiquitous gaming is not a ubiquity of the actual game itself, but rather a ubiquity of *perceived gaming potential* that can be engaged critically and assessed for both payoffs and risks. In this way, ubiquitous games combine the *personal customization* of ubicomp games' approach to the magic circle of play, in which players decide when, where and with whom to play to create as minimal social impact as possible, with pervasive games' *defiant approach* to the magic circle of play, in which designers intentionally disrupt expectations about where, when and how to play. Ubiquitous gamers, first individually and then collectively through their documentation and meta-discussions of the game, take responsibility for articulating the current boundaries of the magic circle. They then must decide whether to protect or to transform them. In this way, it is the players who ultimately, and strategically, construct a new intimacy between real life and the game.

2.5 A Map to Three Kinds of Everywhere

In this chapter, I have proposed three different categories of ubiquitous play and performance: *ubiquitous computing games*, *pervasive games*, and *ubiquitous games*. As I

have stated, each category works toward a different end: toward the mutual research and development goals of digital games and ubiquitous computing; toward techno-critical and ruptures of the magic circle of play; and toward the discovery of more platforms for meaningful interaction in everyday life, respectively. And as I will elaborate in the next three chapters, each has its own distinct reproductive practices: the proliferation of gameplay *citations*, the proliferation of gameplay *spectacles*, and the proliferation of gameplay *affordances*. As I discuss the design strategies and aesthetic choices that drive these various proliferations, I will also explore title of this dissertation *This Might Be a Game* in the critical context of each category. For ubicomp games, "this might be a game" is an expression of the forward-looking, prototyping nature of the genre. Games are hinted at and provisionally deployed as a way of investigating the future. In other words, *this might be a game… some day*. For pervasive games, it is an indication of the genre's ambivalence about who gets to play, where, and when. Game-infused spectacles are performed in public, but there might not in fact be public opportunities for game play. In other words, *this might be a game… or it might just look like a game*. And finally, for ubiquitous games, the title evokes the sense of perpetual ambiguity created by genre. Game objects, game data, and game are not marked as such, requiring players to actively investigate the world around them for ludic opportunities. In other words, "This might be a game…and the only way to find out is to play it *as if*."